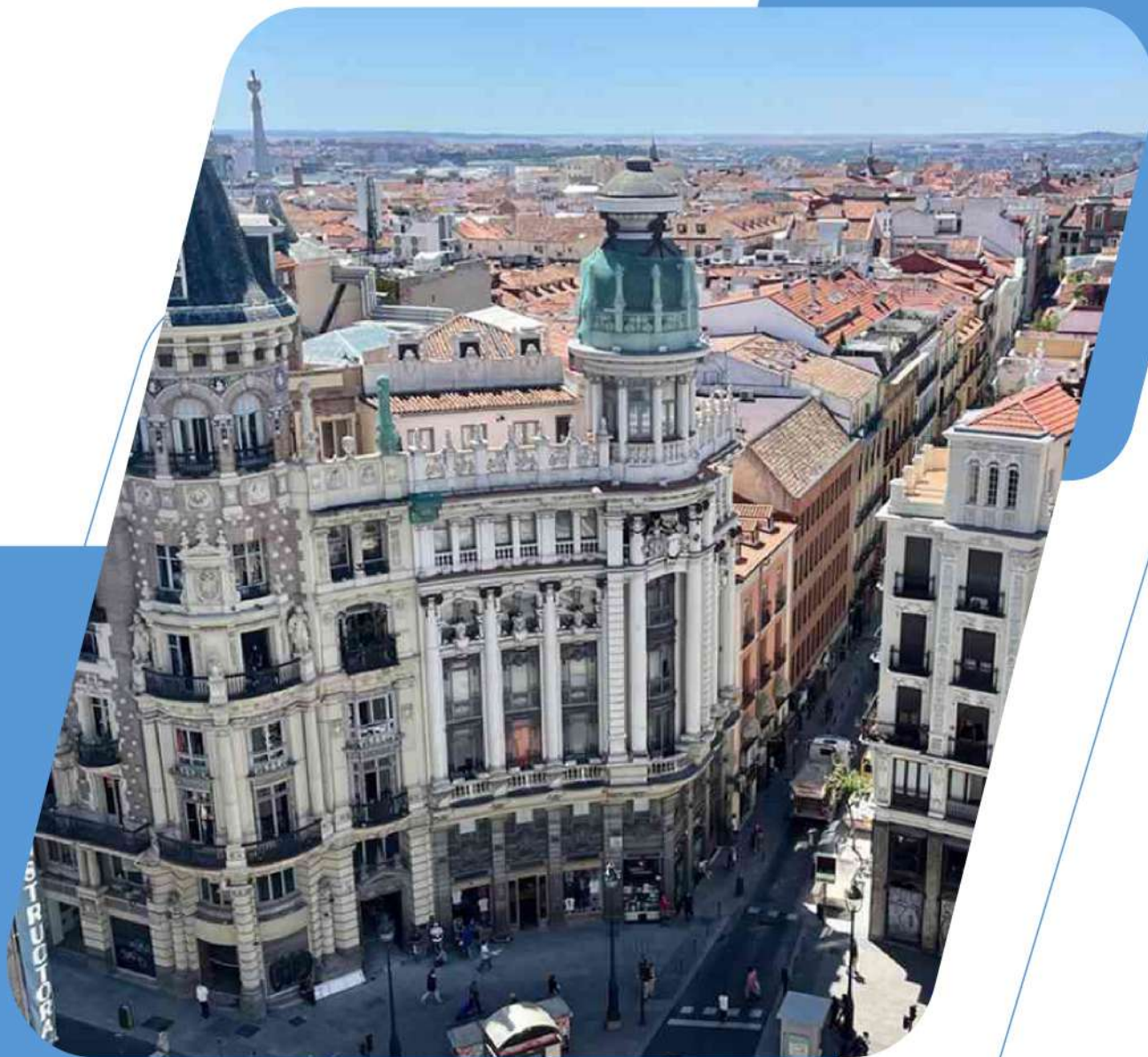




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Cultural sciences

CULTURAL ADAPTATION AND ADJUSTMENT

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Abstract

This article will highlight the importance of cultural adaptation and adjustment. The stages of these processes are explained in details. The U-curve and The W-curve models are presented with full description. Cultural adaptation and adjustment are integral aspects of navigating life in an increasingly interconnected world. While the process can be fraught with challenges, it also offers opportunities for personal growth, enhanced communication skills, and deeper intercultural understanding. By recognizing the stages of adaptation, understanding influencing factors, and employing effective strategies, individuals can successfully navigate the complexities of cultural transitions. Embracing this journey not only enriches individual lives but also fosters greater global harmony and cooperation in our diverse world.

Keywords: *adaptation, adjustment, the u-curve model, phase, navigate the life, cultural transitions.*

Introduction

Cultural adaptation and adjustment are critical processes that individuals undergo when they move from one cultural environment to another. As globalization continues to connect people from diverse backgrounds, understanding these processes becomes increasingly important. This article explores the concepts of cultural adaptation and adjustment, their stages, the factors influencing them, and strategies for successful navigation through these experiences.

Cultural adaptation refers to the process through which individuals learn to adjust to a new culture. This involves acquiring the necessary skills, knowledge, and behaviors to function effectively in a different cultural context. The process can be both challenging and enriching, as it often requires individuals to confront their own cultural biases and assumptions.

The Importance of Cultural Adaptation

Cultural adaptation is essential for several reasons:

1. **Effective Communication:** Adapting to a new culture enhances communication skills, enabling individuals to interact more effectively with others.
2. **Social Integration:** Successful adaptation fosters relationships and social networks, which are crucial for emotional support and community building.
3. **Professional Success:** In a globalized workforce, cultural adaptability is often linked to career advancement and opportunities.
4. **Personal Growth:** The process of adapting to a new culture can lead to increased self-awareness and personal development.

Stages of Cultural Adjustment

Cultural adjustment typically occurs in several stages, often described in models such as the U-Curve and W-Curve models. These models illustrate the emotional journey individuals experience during adaptation.

The U-Curve Model

The U-Curve model suggests that individuals experience three main phases:

1. **Honeymoon Phase:** This initial stage is characterized by excitement and fascination with the new culture. Individuals may feel a sense of adventure and novelty.
2. **Crisis Phase:** As time progresses, the initial excitement may fade, leading to frustration and confusion. Individuals may struggle with language barriers, social norms, and cultural differences.
3. **Adjustment Phase:** Eventually, individuals begin to adapt to their new environment. They

develop coping strategies, build relationships, and gain a deeper understanding of the culture.

The W-Curve Model

The W-Curve model expands on the U-Curve by incorporating the return home phase:

- 1. Initial Honeymoon Phase: Similar to the U-Curve, individuals experience excitement upon entering a new culture.*
- 2. Crisis Phase: Frustration and homesickness set in as challenges arise.*
- 3. Adjustment Phase: Gradual adaptation occurs as individuals become more comfortable in their new surroundings.*
- 4. Return Honeymoon Phase: Upon returning to their home culture, individuals may feel a renewed appreciation for their native culture.*
- 5. Re-Entry Crisis: Returning home can also lead to feelings of alienation or disconnection as individuals realize they have changed during their time abroad.*
- 6. Re-adjustment Phase: Finally, individuals find a balance between their home culture and the new experiences they have gained.*

Factors Influencing Cultural Adaptation

Several factors can influence the process of cultural adaptation, including:

- 1. Personal Characteristics*
 - Personality Traits: Openness to experience, resilience, and adaptability can significantly impact how well an individual adjusts to a new culture.*
 - Previous Experience: Prior exposure to different cultures can ease the adaptation process, as individuals may already possess some cultural competence.*
- 2. Cultural Similarity*

The degree of similarity between the home culture and the new culture can affect adaptation. Cultures that share common values or practices may facilitate an easier transition compared to those that are vastly different.
- 3. Social Support*

Having a strong support system can enhance the adaptation process. Friends, family, or community groups can provide emotional support, practical assistance, and guidance in navigating cultural differences.
- 4. Language Proficiency*

Language plays a crucial role in cultural adaptation. Individuals who are proficient in the local language are more likely to engage with their new environment, build relationships, and access resources.
- 5. Motivation*

An individual's motivation for adapting to a new culture can significantly influence their success. Those who are genuinely interested in learning about the culture are more likely to embrace challenges and seek out opportunities for growth.

Strategies for Successful Cultural Adaptation

While cultural adaptation can be challenging, there are several strategies individuals can employ to facilitate a smoother transition:

- 1. Education and Research*

Before moving to a new culture, individuals should educate themselves about its customs, values, and social norms. Understanding cultural differences can help mitigate misunderstandings and foster respect.
- 2. Language Learning*

Investing time in learning the local language can enhance communication skills and build connections with locals. Language classes, language exchange programs, or online resources can be valuable tools.
- 3. Building Relationships*

Forming friendships with locals can provide insights into the culture and create a support network. Engaging in community activities or joining interest groups can help individuals connect with others.
- 4. Maintaining an Open Mind*

Approaching new experiences with curiosity and openness can ease feelings of frustration or alienation. Embracing differences rather than resisting them fosters adaptability.

5. Seeking Support

Utilizing available resources such as counseling services, expatriate groups, or cultural organizations can provide guidance and encouragement during the adjustment process.

The Role of Cultural Intelligence

Cultural intelligence (CQ) is the ability to relate to and work effectively across cultures. It encompasses four key components:

1. Cognitive CQ: Knowledge of cultural norms and practices.
2. Emotional CQ: The ability to manage emotions and navigate social situations sensitively.
3. Physical CQ: The ability to adapt verbal and non-verbal behavior in different cultural contexts.
4. Motivational CQ: The drive to learn about and engage with other cultures.

Developing cultural intelligence can significantly enhance an individual's ability to adapt successfully to new environments.

Conclusion

Cultural adaptation and adjustment are integral aspects of navigating life in an increasingly interconnected world. While the process can be fraught with challenges, it also offers opportunities for personal growth, enhanced communication skills, and deeper intercultural understanding. By recognizing the stages of adaptation, understanding influencing factors, and employing effective strategies, individuals can successfully navigate the complexities of cultural transitions. Embracing this journey not only enriches individual lives but also fosters greater global harmony and cooperation in our diverse world.

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Economic sciences

BANK PROFIT MANAGEMENT

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Today, the Ukrainian banking system is facing numerous upheavals due to a terrible war, the consequences of which are macro-instability, client insolvency, regulatory changes, and tax rate increases. Under such conditions, the formation of profit and its effective management become an important aspect of bank management in the system of ensuring the sustainable functioning of a financial institution. The activity of banking institutions of Ukraine takes place under conditions of dire challenges and is highly dependent on the systemic influence of both political and economic factors, however, the activity of the financial and credit institutions themselves has a system-forming effect on the development of the economic environment of the state, because it is they who redistribute financial assets through the accumulation of monetary flows of economic entities and households, transforming them into financial capital. The effective functioning of domestic banks will contribute to the stabilization of the economy of our country as a whole, and therefore ensuring the financial stability of banks is of national importance. The system of forming a positive financial result and its quality management is the duty and main function of every banking institution today and requires constant analysis and improvement. Conditions for domestic banking today are extremely negative. Ukraine was engulfed in a deep, unpredictable crisis of the economic system due to a protracted war with a neighboring aggressor and the consequences of the pandemic. That is why the activities of domestic business entities have, without a doubt, great difficulties [1].

The positive or negative result of banking activity depends mainly on the coordinated interaction of each element of the organizational system. The ability to accurately estimate and effectively manage the bank's cash flows allows you to receive planned benefits from the implementation of activities in the interests of the bank, as well as its own clients. Bank profit, which characterizes the positive result of activity, is, first of all, the material basis for the operation of the bank, therefore the adequacy of its level is an important task not only for the growth of capitalization, which contributes to the growth of volumes and improvement of the quality of services, but also the improvement of banking operations, the introduction of new products, including digital and cost reduction institutions.

The negative processes that are inherent in the economic system of modern Ukraine significantly complicate the process of formation and management of the profit of a banking institution, because the bank's profit is primarily influenced by interest income, which, together with commissions and other income, forms the total income, and after the reduction by the amount of the total costs, forms the profit banking institution before taxation. Accordingly, in order to increase the amount of bank profit, it is necessary to direct the vector of development in two directions: the growth of interest and commission income and the decrease, respectively, in the level of commission and interest expenses [2]. Through the proportions in distribution and use, the profit contributes to the combination of the economic interests of the country, banking institutions and bank employees. The object of the state's interest is that part of the profit that is paid in the form of mandatory payments and taxes. The interest of the banking institution is summarized in the amount of profit that remains in the bank and is directed to solving development issues, and the interest of bank employees is connected, first of all, with the amount of profit that will be directed to material encouragement and social development [3]. The system of high-quality management of bank profits allows you to fully implement your tasks and achieve planned goals. The management process is based, first of all, on the analysis of profitability - a difficult task, because each direction of the bank's activity affects the efficiency of its activity and should be the object of careful attention. Today, it is important for banks to create significant reserve funds, motivate their staff to improve their activities, reduce costs and improve the quality of service.

The activity of Ukrainian banks today is carried out in the conditions of transformational changes and a deep crisis, which resulted in the deprivation of banking licenses of a large number of financial and

credit institutions. Thus, in the period from January 2013 to January 2024, the number of banking institutions decreased by 113 units. (64.2%) from 176 at the end of 2012 to 63 units at the beginning of 2024 [4]. The banking sector of Ukraine experienced significant negative results due to understandable circumstances during 2014-2017: in 2016, the loss of banks amounted to a record 159.4 billion UAH due to the increase in the amount of deductions to reserve funds. 2018 brought the banking business a net profit of UAH 22.3 billion for the first time in 5 years. In 2019, the domestic banking business achieved a significant positive financial result of activity in the amount of UAH 59.6 billion, which is 62.5 percent more than in 2018. In 2020, Ukrainian banks made a profit of 39.7 billion hryvnias, which is 33.3% below the level of 2019. At the beginning of 2022, banking profit amounted to UAH 77.5 billion. A significant increase in the profitability of the banking system during 2018-2021 became possible due to a decrease in deductions to reserves with a stable increase in interest and commission income. In 2022, according to the annual results of the activity of the banking sector, a net profit in the amount of UAH 21.9 billion was obtained, which was almost three times less than the previous one, but the banking system of Ukraine was able to withstand and did not prevent critical consequences. At the beginning of the current year 2024, the profit of solvent banks amounted to a record 86.5 billion UAH due to the growth of interest income from highly liquid assets and lending. The quarantine restrictions of 2020-2021 and the active phase of the war at the end of February 2022 changed the life of our country and significantly influenced the politics and economy of most countries of the world.

The post-pandemic consequences worsened the lives of the population, but accelerated the implementation of medical programs and caused a jump in the development of digital technologies for the development of business, including banking. Despite the deterioration of the general economic situation in the country, the situation on the banking services market remains favorable thanks to the «cleaning» of the banking system and timely decisions, primarily regarding reserve deductions.

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ANALYSIS OF STRUCTURAL CHANGE IN THE NATIONAL AGRICULTURAL FIELD AND ASSESSMENT OF DEPENDENCE ON IMPORTS

Sevinc İbrahimova
Mayıl Orucov

Abstract

The article focuses on the analysis of structural changes in the agricultural sector and the assessment of import dependence. The article analyzes the state of agriculture in Azerbaijan in recent years and shows the problems of agricultural development at the present stage. The increase in agricultural processing in the Republic of Azerbaijan and its competitiveness play an important role in ensuring the country's food security. Based on an assessment of the current state of the agri-food market in Azerbaijan, factors were presented that affect the level of food security in its development, and proposals were made.

Keywords: food security, sowing area, structural changes, plants, cattle breeding,, agro-food market, purchasing power, food resources,

1. Introduction

The successful implementation of the agrarian policy in our country depends a lot on the reforms implemented in the structure of this sector. The reforms carried out in the agricultural sector of our republic require the formation of the structure of the agricultural sector, the formation of mutually balanced relations between the divisions of this structure, and as a result, the radical structural renewal that leads to the increase of the efficiency of the agricultural sector. In this regard, one of the important issues is the formulation of an agrarian reform strategy in order to implement reforms in the structure of the agricultural sector. It is the changes in the structure of the agricultural sector that ensure the formation of effective farming [1. p. 175].

2. Results

The conducted studies show that the reformed structures in the agrarian field go through similar and common stages in the course of the reforms. The strategic road map of the Republic of Azerbaijan should be taken into account at each stage of the reforms implemented in the agrarian sector, because the strategic state interests in the implementation of these reforms consist in ensuring the food security of the population in the Republic [2.p.12]. When making changes in the structure of the agricultural sector of the country's economy, it is necessary to take into account the seasonality of the agricultural sector, the dependence of agriculture on weather conditions, the lack of interest in investments due to the lack of profit in this area, and other factors.

Based on the reforms carried out in our country in recent years, the transition to the market economy was made in agriculture, which is an important sector of the Republic's economy, and a business entrepreneurship environment based on free competition was created. The reforms carried out in the structure of the country's agrarian sector reflect the interrelationship between the production, processing and sale of each element of agriculture. The reforms carried out in the agricultural sector in our republic are aimed at eliminating the previously existing inconsistency between the elements of the agricultural sector and, taking into account the specific characteristics of the agricultural sector, to improve the supply of the country's citizens with the required quality and quantity of agro-food commodities, and the farms that process agricultural products with the necessary raw materials aims to create effective working conditions and provide the country's agrarian market with required agricultural commodities. After the current market economy mechanisms start to operate in the agricultural sector of the country's economy, more attention should be paid to the production of food commodities in this sector. The reforms carried out in the agricultural sector, the interests of business people investing in the agricultural sector, the creation of favorable market relations in agriculture, the specialization in the production of agricultural products, which are the basis of food security, should be an important component of the economic policy of the Republic of Azerbaijan [3. p. 41]. In the early stages of the formation of market relations in the agrarian sector, there was a noticeable decrease in the volume of a number of agricultural products..

Table 1

Plantation areas of agricultural crops (thousand ha)

Years	Total	Including							
		Legumes and cereals		Technical plants		Vegetables, potatoes and melons		Fodder plants	
		Area	%	Area	%	Area	%	Area	%
1985	1371.0	484.0	36.0	318.3	23.2	70.2	5.1	488.8	35.6
1990	1462.5	583.4	39.9	282.1	19.3	74.7	5.1	522.3	35.7
1993	1394.8	709.5	50.9	244.5	17.5	56.1	4.0	384.7	27.6
1995	1207.9	609.4	50.5	227.0	18.8	49.4	4.1	322.1	26.7
2000	1041.5	648.2	62.2	118.2	11.3	136.1	13.1	139.0	13.3
2002	1222.5	821.7	67.2	77.2	6.3	158.9	13.0	165.1	13.5
2003	1219.0	776.3	63.7	88.9	7.3	164.3	13.5	190.0	15.6
2005	1327.9	802.3	60.4	132.0	9.9	179.7	13.5	213.9	16.1
2008	1499.9	897.0	59.8	70.3	4.7	184.0	12.3	348.6	23.2
2010	1583.9	968.0	61.1	52.6	3.3	178.8	11.3	384.5	24.3
2011	1608.2	967.3	60.1	66.9	4.2	179.7	11.2	394.3	24.5
2012	1647.1	1031.4	62.6	48.5	2.9	174.5	10.6	392.7	23.8
2013	1684.2	1074.1	63.8	42.2	2.5	171.5	10.2	396.4	23.5
2014	1613.8	1001.4	62.1	43.8	2.7	165.7	10.3	402.9	25.0
2015	1585.4	952.1	60.1	38.7	2.4	166.0	10.5	428.6	27.0
2016	1628.3	937.5	61.3	73.6	4.5	163.1	10.0	394.1	24.2
2017	1665.7	977.2	58.7	180.9	10.9	151.5	9.1	356.0	21.4
2018	1738.0	1083.1	62.3	159.0	9.1	149.7	8.6	346.2	19.9
2019	1717.1	1072.3	62.4	130.2	7.6	147.7	8.6	366.9	21.4
2020	1630.9	989.1	60.6	122.0	7.5	143.6	8.8	376.2	23.1
2021	1644.5	998.7	60.7	122.0	7.4	144.6	8.8	379.2	23.1
2022	1624.0	985.7	60.7	125.2	7.7	140.3	8.6	372.8	23.0
2023	1535.0	948.3	61.8	112.8	7.3	127.9	8.3	346.0	22.6
2023/1990	104.9%	162.5%		40.0%		171.2%		66.2%	
2023/2005	115.6%	118.2%		85.4%		71.2%		161.7%	
2023/2020	94.1%	95.9%		92.4%		89.1%		91.9%	

Source: Statistical indicators of Azerbaijan 2023

As can be seen from the data of Table 1, the total cultivated area decreased from 1990 to 2008, and only in 2008, the total cultivated area was 1499.9 thousand ha. and exceeded the 1462.5 thousand hectares in 1990. The main reason for the reduction of cultivated areas between these years was the larger decrease in the cultivation of fodder and technical plants during this period. The reduction of the cultivated areas of fodder plants during that period had a negative impact on the livestock sector in general, along with a number of factors. From the data of Table 1, it is known that the total cultivated area was 1394.8 thousand hectares in 1993, 1207.9 thousand hectares in 1995, 1222.5 thousand hectares in 2002, and 1219.0 thousand hectares in 2005. thousand hectares has decreased year by year. The decrease of the total cultivated area is mainly due to the decrease of technical crops from 282.1 thousand hectares in 1990 to 77.2 thousand hectares in 2003 and the cultivation area of fodder crops from 522.3 thousand hectares in 1990 to 2003- which occurred as a result of its decrease to 165.1 thousand hectares. As a result of the country-wide agrarian policy, the stabilization of the agricultural sector of the economy began, and as we can see from the data in Table 1, the total cultivated area increased after 2008, so that in 2008 In 2015, the total cultivated area was 1499.9 thousand hectares, which increased by 37.4 thousand hectares or 2.6% compared to 1990. Based on the data of Table 1, we can say that the cultivated area of agricultural crops in 2023 It is 1535.0 thousand hectares and has increased by 207.1 thousand hectares compared to 2005. In 2023, the cultivated area of grain and leguminous plants reached 948.3 thousand hectares, which increased by 146.0 thousand hectares compared to 2005, and the cultivated area of fodder plants increased by 132.1 thousand hectares and reached 346.0 thousand hectares, technical crops the cultivated areas decreased by 19.2 thousand hectares to 112.8 thousand hectares, and the cultivated areas of potatoes, vegetables and melons decreased by 51.8 thousand hectares to 127.9 thousand hectares.

Table 2

Production of crop products (thousand tons. 1985-2023)

Years	Tobacco	Cotton	Vegetables	Watermelon products	Potato	Cereal and grain legumes
1985	60.0	787.8	872.2	48.6	219.7	1297.9
1990	52.9	542.9	856.2	67.5	185.2	1413.6
1995	11.7	274.1	424.1	41.9	155.5	921.6
2000	17.3	91.5	780.8	261.0	469.0	1540.2
2003	4.7	99.6	1046.3	356.7	769.0	2057.8
2005	7.1	196.6	1127.3	363.8	1083.1	2126.7
2010	3.2	38.2	1189.5	433.6	953.7	2000.5
2011	3.6	66.4	1214.8	478.0	938.5	2458.4
2012	4.3	57.0	1116.2	428.0	968.5	2802.2
2013	3.5	45.2	1236.3	429.8	992.8	2955.3
2014	2.9	41.0	1187.7	440.9	819.3	2383.3
2015	3.5	35.2	1275.3	484.5	839.8	2999.4
2016	3.6	89.4	1270.6	464.8	902.4	3065.1
2017	5.3	207.5	1405.6	438.1	913.9	2928.8
2018	6.3	233.6	1521.9	401.9	898.9	3309.2
2019	6.0	295.3	1714.7	447.6	1004.2	3538.5
2020	6.9	336.8	1738.9	448.1	1037.6	3257.1
2021	6.4	287.0	1815.5	459.9	1062.0	3363.0
2022	5.1	322.5	1823.3	469.3	1074.3	3161.3
2023	6.3	276.3	1825.6	438.2	1010.5	3248.6
2023/1990	11.9%	50.9%	213.2%	649.2%	545.6%	229.8%
2023/2005	88.7%	140.5%	161.9%	120.4%	93.3%	152.7%
2023/2020	91.3%	82.0%	105.0%	97.8%	97.4%	99.7%

Source: Statistical indicators of Azerbaijan 2023

Between 1990 and 2023, the volume of crop production in the agrarian sector increased as a result of the increase in the area of agricultural crops in our country (Table 2). So, based on the figures calculated in Table 2, we can say that in 2023, the production of cereals and legumes will be 3248.6 thousand tons, the production of tobacco will be 6.3 thousand tons, the production of cotton will be 276.3 thousand tons, and the production of vegetables will be 1825.6 thousand tons, the production of melon products was 438.2 thousand tons, and the production of potatoes was 1010.5 thousand tons, compared to 2005, 1199.3 thousand tons, 1.7 thousand tons, 187.4 thousand tons, 759.2 thousand tons, increased by 103.2 thousand tons. As shown in Table 2, the production of tobacco products in 2023 decreased by 88.1% compared to 1990, by 11.3% compared to 2005, and by 8.7% compared to 2020, and the production of cereals and legumes in 2023 2.3 times compared to 1990, increased 1.5 times compared to 2005 and decreased 0.3% compared to 2020, cotton production decreased 49.1% compared to 1990 in 2023, increased by 59.5% compared to 2005, and decreased by 18% compared to 2020.

Based on the data of both table 1 and table 2, we can say that in 2023, the cultivated area of cereals and legumes will increase by 162.5% compared to 1990 and 118.2% compared to 2005. , the volume of production increased by 229.8 and 152.7%, respectively, and in 2023, the volume of production decreased by 0.3% due to the 4.1% decrease of the cultivated area compared to 2020. It should be noted that during this period, the growth rate of production was ahead of the growth rate of cultivated areas due to the improvement of labor productivity for these products, which is evaluated positively.

Table 3

Productivity of agricultural crops (cents/ha: 100kg/ha)

Years	Cereal and grain legumes	Cotton	Tobacco	Potato	Vegetables	Watermel on plants
2003	26,6	15,0	22,4	124,0	140,0	112,0
2005	26,5	17,5	25,7	149,0	140,0	121,0
2010	20,7	12,7	24,0	145,0	142,0	137,0
2015	31,5	18,8	25,4	136,0	158,0	174,0
2016	30,6	17,3	15,2	140,0	159,0	176,0
2017	29,8	15,3	16,6	150,0	155,0	187,0
2018	30,0	17,6	19,0	149,0	162,0	191,0
2019	32,1	29,5	19,3	169,0	176,0	209,0
2020	31,8	33,6	22,1	174,0	188,0	224,0
2021	32,8	28,5	21,3	183,8	189,8	227,5
2022	31,3	30,9	20,8	190,4	196,2	233,1
2023	33,0	29,5	23,1	199,6	200,2	254,0
2023/2003	124,1	196,7	103,1	160,9	143,0	226,8
2023/2005	124,5	168,6	89,9	133,9	143,0	209,9
2023/2020	103,8	87,8	104,5	124,7	106,5	113,4

Source: Statistical indicators of Azerbaijan 2023

Based on the data of Table 3, we can say that in 2023, the yield of cereals and legumes will be 33.0 centners per hectare, 29.5 centners for cotton, 23.1 centners for tobacco, 196.6 centners for potatoes, 200 centners for vegetables. 2 centners, and for melon products it was 254.0 centners. It should be noted that in 2023, the productivity of cereals and legumes will be 124.1% compared to 2003, 124.5% compared to 2005, and 103.8% compared to 2020. increased by 196.7%, 168.6%, and decreased by 13.2% compared to 2020pi, potatoes by 160.9%, 133.9%, 124.7%, vegetables by 143.0%, 143.0% and 106.5%, and 226.8%, 209.9%, 113.4% for melon products (table 3).

Animal husbandry is one of the important areas of the agricultural sector of the country's economy. The structure of animal husbandry consists of cattle, sheep and goats, pigs, poultry and others. The distribution of production among these types of products is given in table 4.

Table 4

Number of animals and birds (1990-2023)

Years	Cattle (thousand head)	Sheep and goats (thousand heads)	Pigs (thousand heads)	Birds (million heads)
1991	1831.6	5418,7	156.7	29.1
1993	1621,3	4539,0	47,9	17,0
1995	1632,8	4557,6	33,4	14,4
2000	2021,6	6085,7	18,6	14,7
2008	2543,4	8199,8	18,7	22,4
2013	2678,2	8569,4	6,5	24,5
2015	2697,5	8645,4	6,1	28,8
2017	2698,5	8614,8	4,4	28,0
2018	2673,0	8454,3	4,9	30,5
2019	2658,8	8304,1	5,5	30,5
2020	2646,6	8189,2	5,7	32,2
2021	2650,7	8089,7	5,9	30,2
2021	2648,8	7899,7	6,0	29,6
2022	2618.1	7751.7	5.1	29.8
2023	2507.7	7060.6	4.8	28.7
2023/1991	136,9%	130,3%	3,1%	98,6%
2023/2008	98,5%	86,1%	25,7%	128,1%
2023/2020	94,7%	86,2%	84,2%	89,1%

Source: Statistical indicators of Azerbaijan 2023

In the first periods after the independence of the Republic of Azerbaijan, between 1991 and 1995, there was a decline in the livestock sector of the agricultural sector. Thus, the number of cattle from

1991 to 1995 decreased by 198.8 thousand heads, sheep and goats by 861.1 thousand heads, pigs by 123.3 thousand heads, and birds by 14.7 million heads, correspondingly in those years. totaled 1632.8 thousand heads, 4557.6 thousand heads, 33.4 thousand heads and 14.4 million heads (Table 4). In connection with this decrease, there was a decrease in the volume of livestock products as a whole. Thus, from 1991 to 1995, total meat production decreased by 44.1 thousand tons, water production by 121.2 thousand tons, egg production by 502.4 million units, and wool production by 0.7 thousand tons.

As a result of the agrarian policy carried out in our country, there have been positive structural changes in the structure of agricultural land in the field of agriculture. Based on this, the quantity and productivity of crop production has increased. This, in turn, has a positive effect on the livestock sector, increasing the number and productivity of animals and birds [4. p. 11].

Based on the data of Table 4, we can say that in 2023, the number of cattle increased by 138.3% compared to 1991, by 11.5% compared to 2008, and by 2020 decreased by 15.3%, the number of sheep and goats increased by 130.3% compared to 1991, decreased by 13.9% compared to 2008 and 13.8% compared to 2020, pigs decreased by 1,2%, 2.9% compared to 2003, 15.8% decreased compared to 2020, and the number of birds decreased 1.4% compared to 1991, and increased 128.1% compared to 2008, decreased by 10.9% compared to 2020. Despite the fluctuations in the number of animals and birds, there has been an increase in the production of livestock products. So. Total meat production in 2023 is 247.3% compared to 1993, 155.0% compared to 2010, and 109.7% compared to 2020, milk production is 241.0%, 148, 7% and 104.2%, and egg production increased by 228.4%, 185.7% and 114.8%, respectively. (table 5).

Table 5

Production of the main livestock products (1993-2023)

Years	Meat (thousand tons)					Milk (thousand tons)	Eggs (million units)	Wool (thousand tons)
	Total	Beef	Sheep and goat meat	Pork	Poultry meat			
1991	153,5	62,5	33,0	8,8	49,2	947,7	958,2	10,5
1993	118,3	56,5	33,0	3,4	25,4	798,5	584,5	9,7
1995	109,4	55,0	32,5	2,8	19,1	826,5	455,8	9,0
2000	153,6	78,4	49,5	1,4	24,3	1031,1	542,6	10,9
2003	185,6	92,0	54,1	2,1	37,4	1167,8	681,9	12,1
2010	244,9	112,4	70,0	0,8	61,7	1535,8	1178,6	15,6
2013	286,9	120,8	70,9	0,7	94,5	1796,7	1401,5	16,5
2015	298,6	129,8	70,9	0,7	97,2	1924,5	1552,9	17,0
2018	326,0	135,6	80,8	0,5	109,1	2080,4	1676,2	15,8
2019	335,7	137,9	85,3	0,5	112,0	2150,8	1827,1	16,1
2020	346,0	143,1	87,0	0,5	115,4	2192,5	1906,2	16,1
2021	357,6	145,0	87,7	0,5	124,4	2223,4	1838,8	16,1
2022	368,2	148,6	89,0	0,5	130,1	2264,7	2018,1	15,8
2023	379,7	152,8	88,9	0,5	137,5	2284,0	2188,2	15,1
2023/1991	247,3%	244,5%	269,4%	5,7%	279,5%	241,0%	228,4%	143,8%
2023/2010	155,0%	135,9%	127,0%	0,6%	222,8%	148,7%	185,7%	96,8%
2023/2020	109,7%	106,8%	102,2%	100,0%	119,1%	104,2%	114,8%	93,8%

Source: Statistical indicators of Azerbaijan 2023

As a result of the conducted research, we can note that the main reason for the growth in the agricultural sector is the support and regulation of this sector as a result of the reforms implemented in the agrarian sector and the agrarian policy carried out by the state.

The positive dynamics of growth in the volume of responsible production in the agricultural sector during the years 2000-2023 is an important issue from the point of view of the country's food security. One of the important factors in ensuring the country's food security is the high specific weight of agricultural products. The production factor of local agricultural products can be considered as the main factor in ensuring food security when the cost of production of local agricultural products is high and quality is high [5. p. 34].

The increase in the production of agricultural products is an important step in ensuring the food security of the country's citizens, and one of the main issues is the increase in per capita output. Therefore, the growth rate of the production of agricultural products should be ahead of the growth rate of the country's population.

Table 6

Production of basic food products per capita (during the year, kg)

of the product	2015	2019	2020	2021	2022	2023	The year 2023-2015 % compared to
Name	307	348	318	324.8	304.5	313.9	102.2
Grain	88	101	104	106.2	107.4	101.0	114.8
Potato	134	173	174	152.9	182.3	182.6	136.3
Vegetables	93	111	114	120.5	125.3	126.1	135.6
Fruits and berries	51	45	45	46.0	46.9	43.8	0.86
Watermelon products	19	22	23	22	22	24	126.3
Sugar beet	31	34	35	35.7	36.8	37.9	122.2
Meat (cut weight)	202	217	220	222.3	226.5	228.4	113.1
Milk	163	184	191	184	201	219	134.4
Egg	5,4	6,4	6,1	5.3	6.0	6.2	114.8

Source: Statistical indicators of Azerbaijan 2023

From the data in Table 6, it can be seen that in 2023, compared to 2015, there was an increase in the production of other basic food products, excluding the production of melon products per capita. Thus, compared to 2015, in 2023, per capita grain production will be 6.9 kg, potatoes 13.0 kg, vegetables 49.6 kg, fruits and berries 33.1 kg, meat 6.9 kg, milk 26,4 liters, 256.0 eggs, fish production increased by 0.8 kg, melon production decreased by 7.2 kg. It can be seen from the conducted research that along with the increase in the population, the amount of basic food products per capita has increased.

Table 7

Consumption of main types of food products per capita (during the year, kg)

of the product	2015	2019	2020	2021	2022	2023	The year 2023-2015 % compared to
the name	33,5	40,8	40,8	41,2	42.1	43.5	112,9
All types of meat and meat products	246,2	246,3	257,6	253,3	259.3	258.8	105,1
Milk and milk products	154	165	175	170	179	189	122,7
Eggs (quantity)	21,7	26,3	26,9	27,3	27.3	25.3	116,6
Sugar and confectionery products	12,6	16,1	15,3	9,4	8.4	8.2	65,1
Vegetable oils	7,0	7,6	7,3	7,4	7.6	8.0	114,3
Fish and fish products	4,4	3,3	3,6	3,8	4.0	3.9	88,6
Butter	124,2	125,5	128,4	126.2	122.5	116.6	93,9
Bread and bakery products	71,6	82,2	83,3	84,2	91.3	83.9	117,2
Potato	110,4	127,7	134,1	138,2	139.4	139.3	126,2
All kinds of vegetables	72,7	80,4	87,4	83,7	79.9	69.6	95,7

Source: Statistical indicators of Azerbaijan 2023

As a result of the conducted studies, it was determined that the increase in the volume of production of basic food products per capita led to an increase in the consumption of basic food products per capita.

From the data of Table 7, it can be seen that an increase in the annual consumption of the main types of food products per capita was observed during the year. So, compared to 2015, in 2023, meat and meat products will increase by 12.9%, milk and milk products by 5.1%, eggs by 22.7%, potatoes by 17.2%, all kinds of vegetables by 26.2%, fish and fish products by 14.3%. %, sugar and confectionery products increased by 16.6%, bread and bakery products by 6.1%, fruits and berries by 4.3%, butter by

11.4%, and vegetable oils by 34.9%.

In order to determine how dependent the country's agro-food market is on the import of basic food products, let's analyze the dynamics of the import of these products into the country and the level of self-sufficiency in basic food products.

It can be seen from the data of Table 8 that compared to 2015, the import of potatoes increased by 38.3% to 172.6 thousand tons in 2023, the import of fresh fruit increased by 2.1 times to 129.2 thousand tons, the import of milk and cream 44, 12.7 thousand tons increased by 3%, confectionery products made from sugar increased by 11.8% to 23.7 thousand tons, the import of cattle meat increased by 62.7% to 8.3 thousand tons, and the import of raw sugar and sugar alone was 11, 258.7 thousand tons decreased by 3%.

Under the influence of structural changes and reforms implemented in the agricultural sector of the republic's economy, due to the increase in the production of local agricultural products, the population's consumption of many basic types of food products has been ensured.

Table 8

Dynamics of import of the main types of agricultural products (thousand tons)

<i>Product name</i>	<i>2015</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>	<i>2022</i>	<i>2023</i>	<i>Growth rate % in 2023 compared to 2015</i>
<i>Wheat</i>	1353,1	1585,0	1365,1	1148,1	1293,0	1175,3	86,8
<i>Potato</i>	124,8	193,0	182,6	214,9	197,7	172,6	138,3
<i>Fresh vegetables</i>	25,5	19,5	35,3	39,6	27,1	28,9	113,3
<i>Fresh fruit</i>	57,9	110,3	123,0	124,3	129,3	129,2	223,1
<i>Milk and cream</i>	8,8	9,0	9,6	11,2	10,1	12,7	144,3
<i>Eggs (million units)</i>	51,4	20,6	27,9	51,6			100,4
<i>Wheat flour</i>	5,8	2,8	2,9	3,5	27,7	71,9	12,4 def
<i>Raw sugar and sugar</i>	291,5	346,4	296,2	303,7	322,3	258,7	88,7
<i>Confectionery made from sugar</i>	21,2	19,6	22,1	23,1	24,2	23,7	111,8
<i>Bighorn meat</i>	5,1	8,8	9,8	5,7	4,8	8,3	162,7
<i>Poultry and additional meat</i>	7,4	37,7	29,8	30,9	34,7	29,2	394,6
<i>Fresh and frozen fish</i>	9,9	12,2	9,7	9,7	12,8	13,7	138,4
<i>Meat sausage and other</i>	1,1	3,4	4,6	5,6	5,2	6,1	554,5
<i>Butter and other milk fat.</i>	13,8	14,0	16,8	15,0	18,6	16,6	120,3
<i>Vegetable oils</i>	115,2	141,5	139,6	130,1	142,5	121,2	105,2
<i>Margarine</i>	14,1	24,2	23,5	23,1	26,4	23,0	163,1
<i>Pasta products</i>	9,1	13,3	17,3	16,0	16,9	15,0	164,8
<i>Tons of tea</i>	7,5	14,1	14,0	13,9	14,4	13,7	151,4

Source: Statistical indicators of Azerbaijan 2023

Thus, the analysis of the data of table 8 shows that, despite the weakening of import dependence on several main types of food products as a result of the increase in the production of local agricultural products, there is still import dependence on a number of agricultural products.

The agro-food market of our republic is mainly formed by imported main food products, and this is reflected in the indicator of the level of self-sufficiency of the population with the main types of food products

Table 9

Level of self-sufficiency in the main types of agricultural and food products %

Nº	Product name	2015	2018	2019	2020	2021	2022	2023
1.	Wheat	54,8	64,8	57,2	57,1	61,5	56,7	60,4
2.	Potato	89,1	90,8	87,8	90,6	88,8	89,0	89,8
3.	Vegetables (all types)	103,4	115,0	112,0	110,4	106,6	106,8	107,2
4.	Fruits and berries	113,7	123,2	123,1	116,3	122,9	123,9	135,5
5.	Milk and milk products	84,3	86,7	86,3	83,5	84,8	83,3	84,0
6.	Egg	99,7	101,5	101,8	100,0	99,1	100,5	102,2
7.	Flour (all types)	95,1	95,9	95,6	95,4	95,0	93,3	90,4
8.	Sugar	192,9	81,7	75,0	69,4	100,7	103,9	84,4
9.	Sugar confectionery	17,8	25,6	29,8	30,7	34,2	30,6	27,2
10.	Beef and meat products	91,8	85,1	86,1	87,4	91,9	93,0	88,4
11.	Sheep and goat meat, especially meat.	99,3	98,1	97,6	97,3	98,2	97,0	94,9
12.	Poultry meat and meat products	98,6	75,9	74,6	79,0	79,6	78,5	81,7
13.	Fish and fish products	77,6	83,1	82,2	81,7	78,2	76,7	75,4
14.	Butter	69,2	71,3	69,5	62,7	66,7	62,0	64,7
15.	Vegetable oil	60,5	34,3	33,6	34,8	73,2	66,7	54,9
16.	Margarine	292,2	98,8	98,2	98,6	99,6	99,3	99,2
17.	Pasta products	53,2	28,7	24,7	42,3	47,2	64,3	73,2
18.	Tea	40,2	44,6	43,7	45,5	89,5	91,1	89,5

Source: Statistical indicators of Azerbaijan 2023

Cədvəl 9-un məlumatlarının təhlili göstərir ki, özünü təminatmə səviyyəsi 2023-ci ildə Compared to 2015, milk and milk products decreased from 84.3% to 84.0%, sugar from 192.9% to 84.4%, beef and meat products from 91.8% to 88 to 4%, poultry and meat products from 98.6% to 81.7%, butter from 69.2% to 64.7%, vegetable oils from 60.5% to 54, It decreased to 9%, from 292.2% to 99.2% for margarine.

The safety threshold size for basic food products is 95% and above for grains and potatoes, 90% and above for milk and milk products, 85% and above for meat and meat products, and 80% and above for sugar, vegetable oil and fish products. . In this way, the threshold level of self-sufficiency is a measure of food security.

From the data of Table 9, it can be seen that the size of wheat self-sufficiency was much less than the 95% size threshold during the years 2015-2023-cw. The measure of potato self-sufficiency in 2023 increased to 90.6% in 2020 compared to 2015, but in 2023 this figure was 89.8%, less than the 95% measure limit. The level of self-sufficiency in milk and milk products decreased by 0.3% compared to 2015 and reached 84.0% in 2023, slightly away from the 90% limit. Although vegetable oil was 60.5% in 2015. already in 2023 it was 54.9% and was 6.8% less than the limit level.

Table 10

The level of dependence on imports in the provision of the main types of agricultural and food products %

Nº	Product name	2015	2018	2019	2020	2021	2022	2023
1.	Wheat	45,2	35,2	42,8	42,9	38,5	43,3	29,5
2.	Potato	14,8	16,0	12,2	9,4	11,2	11,0	10,2
3.	Vegetables	3,4	+15,0	+12,0	+10,4	+6,6	+6,8	+7,2
4.	Fruits and berries	9,6	16,8	+23,1	+16,3	+22,9	+23,9	+35,5
5.	Milk and milk products	16,0	13,8	13,7	16,5	15,2	16,7	16,0
6.	Egg	0,3	1,1	+1,8	0	0,9	+0,5	+2,2
7.	Flour (all types)	5,1	4,4	4,4	4,6	5,0	6,7	9,6
8.	Raw sugar and sugar	37,2	37,9	25,0	30,6	+0,7	+3,9	15,6
9.	Sugar confectionery	95,4	80,2	70,2	69,3	65,8	69,4	72,8
10.	Beef and meat products	8,8	15,0	13,9	12,6	8,1	7,0	11,6
11.	Sheep and goat meat, especially meat.	0,7	2,1	2,4	2,7	1,8	3,0	5,1
12.	Poultry meat and meat products	1,4	24,4	25,4	21,0	20,4	21,5	18,3
13.	Fish and fish products	22,4	17,6	17,8	18,3	21,8	23,3	24,6
14.	Butter	31,5	29,4	30,5	37,3	33,3	38,0	35,3
15.	Vegetable oil	79,3	72,7	66,4	65,2	26,8	33,3	45,1
16.	Margarine	2,4	6,9	1,8	1,4	0,4	0,7	0,8
17.	Pasta products	52,1	76,0	75,3	57,7	52,8	35,7	26,8
18.	Tea	87,6	62,1	56,3	54,5	10,5	8,9	10,5

Source: Statistical indicators of Azerbaijan 2023

In Table 10, it is calculated how much the supply of the country with the main types of agricultural and food products depends on imports.

From the data of Table 10, it can be seen that in 2023, compared to 2015, the level of import dependence for wheat will decrease from 45.2% to 29.5%, for potatoes from 14.8% to 10.2%, for vegetables from 3.4% to 0%, for sugar confectionery from 95.4% to 72.8% for vegetable oils from 79.3% to 45.1%, for tea 87.6% By falling from 10.5% to 10.5%, this main type of agriculture and food products has slightly reduced its dependence on imports. The reduction of the level of dependence on imports in 2023 for the indicated products compared to 2015 was possible due to the structural reforms implemented in the agricultural sector.

The analysis of Table 11 suggests that in the last 13 years, the growth rate for all economic categories was 314.8%, while the growth rate for agricultural enterprises was 701.5%, and the growth rate for individual enterprises was 294%. was 7%. From here, we see that the growth rate of agricultural enterprises is two times ahead of the growth rate of all categories of agriculture, while the growth rate of individual entrepreneurs is slightly behind.

Table 11

Dynamics of the total agricultural produc (at actual current prices, million man)

Product Name	2010	2017	2020	2021	2022	2023	2023 to 2010 relative %
For the entire farm:	3877,7	6580,0	8428,9	9163,4	10984.2	12210.6	314,8
Crop farming	1999,2	3019,0	4028,4	4511,0	5538.0	5933.9	296,6
Animal husbandry	1878,5	3561,0	4400,5	4652,4	5446.2	6276.7	334,1
Agricultural enterprises:	192,6	645,4	834,5	885,9	1094.0	1351.1	701,5
Crop farming	60,0	238,5	438,3	467,3	509.2	693.7	1156,2
Animal husbandry	132,6	406,9	396,2	418,6	584.8	657.4	495,8
Individual entrepreneurs, family, peasant and household:	3685,1	5934,6	7594,4	7594,4	9890.2	10859.5	294,7
Crop farming	1939,2	2780,5	3590,1	4043,7	5028.8	5240.2	272,2
Animal husbandry	1745,9	3154,1	4004,3	4233,8	4861.4	5619.3	321,8

Source: Statistical indicators of Azerbaijan 2023

III. Conclusion

As a result of the research, we can note that the decrease in the production of agro-food products, which is the main threat to food security in our Republic, has stabilized since 2003, and the agricultural sector has become a priority direction of the country's economy. As a result of this, in the last 13 years, the increase in the total amount of agricultural products has been due to products that replace imports. The macroeconomic indicators of the agricultural sector have exceeded the level of 1990 for many commodities. The country's negative state in terms of food security is the insufficient amount of state aid to agricultural production, the weak and low profitability of innovations in agricultural enterprises that are participants in the food market, the insufficient size of the agri-food market infrastructure, the overall low profitability of agriculture and the low level of protection of their interests. we can say that it is at the level.

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ECONOMIC ANALYSIS OF THE FINANCIAL POSITION OF THE BUSINESS, FINANCIAL INDEPENDENCE AND RECEIVABLES ANALYSIS

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ЭКОНОМИЧЕСКИЙ АНАЛИЗ ФИНАНСОВОГО ПОЛОЖЕНИЯ БИЗНЕСА, ФИНАНСОВАЯ НЕЗАВИСИМОСТЬ И АНАЛИЗ ДЕБИТОРСКОЙ ЗАДОЛЖЕННОСТИ

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Финансовое состояние предприятия зависит от результатов его производственной, коммерческой и финансовой деятельности. Если производственный и финансовый планы успешно выполняются, то такая ситуация положительно влияет на финансовое положение предприятия. Наоборот, в результате невыполнения плана производства и реализации продукции увеличение себестоимости продукции, уменьшение выручки от реализации и суммы прибыли, как следствие, свидетельствуют об ухудшении показателей производства и реализации продукции. Финансовое состояние предприятия и его платежеспособность положительно влияют на удовлетворение потребности. Поэтому финансовая деятельность как составная часть экономической деятельности направлена на обеспечение планового притока и расходования денежных средств, выполнение расчетной дисциплины, получение частного и заемного капитала по эффективной ставке и повышение эффективности его использования.

Основная цель финансовой деятельности – решить, где, когда и как использовать финансовые ресурсы для эффективного развития производства и получения максимальной прибыли, необходимо хорошо знать, какова ее структура, соотношение специальных фондов и кредита. средства. При этом в качестве предпринимательской деятельности необходимо знать понятие рыночной экономики, ликвидности предприятия, предела рентабельности, резерва финансовой устойчивости (безопасной зоны), степени риска, эффективности финансовых средств и т.д., а также методология их анализа.

Основные задачи анализа:

1. Поиск ресурсов для улучшения финансового состояния предприятия и его платежеспособности, а также своевременное выявление и устранение недостатков финансовой деятельности.
2. Составление модели финансового положения при различных вариантах использования нашей республики и прогнозирование возможных финансовых результатов.
3. Подготовка конкретных мер, направленных на укрепление финансового положения предприятия и более эффективное использование финансовых ресурсов.

Для оценки устойчивости финансового положения предприятия используется система многих показателей, характеризующих изменения:

- а) структура капитала предприятия, его местонахождение и источники формирования;
- б) эффективность и интенсивность его использования;
- в) платежеспособность и кредитоспособность предприятия;
- с) резерв финансовой устойчивости.

Анализ финансового положения в основном базируется на относительных показателях, так что в условиях инфляции относительные показатели баланса практически несопоставимы.

Относительные показатели анализируемого предприятия можно сравнить со следующими:

- с общепринятыми «нормами» прогнозирования возможности банкротства и оценки степени риска;

- должно быть проведено сравнение с такими же данными другого предприятия, позволяющее выявить сильные и слабые стороны предприятия и его возможности.

- следует провести сравнение с аналогичными данными предыдущих лет с целью выяснения тенденции улучшения или ухудшения финансового положения.

Для анализа финансового положения в основном используются следующие источники информации:

- а) бухгалтерский баланс
- б) отчет о прибылях и убытках
- в) движение капитала;
- г) другие формы отчетности;
- д) другие формы отчетности;
- е) предварительные и учетные аналитические данные.

Бухгалтерский баланс содержит информацию о денежных средствах, находящихся в распоряжении предприятия, и источниках формирования денежных средств. Чтобы оценить и спрогнозировать финансовое положение предприятия, необходимо уметь хорошо читать балансовый отчет и хорошо знать методологию его анализа.

В рыночной экономике существование предприятия в условиях свободной рыночной конкуренции, банкротства и крупных финансовых неудач, лидерство в конкурентной борьбе, максимизация цены и прибыли, возможные темпы экономического роста, обеспечение высокой рентабельности деятельности предприятия и т.д. Эти знаки, играющие решающую роль в деятельности, напрямую зависят от финансового положения. Основными направлениями анализа являются выявление основных факторов, влияющих на изменение финансового положения предприятия в условиях рыночной экономики, определение их степени и прогнозирование ожидаемых тенденций финансового положения. В настоящее время в условиях отсутствия государственных гарантий улучшения финансового положения предприятий, действующих в различных формах собственности, на всех предприятиях, даже на предприятиях, добившихся высоких темпов роста, возникла необходимость увеличения источников финансирования тех или иных форм собственности. степень ощущается постоянно.

Необходимо мобилизовать внутренние ресурсы и покрыть эту потребность за счет источников вне предприятия. Найти эти источники можно на рынке капитала, анализируя объективную информацию о хозяйственно-финансовой деятельности предприятия. Поэтому изучение финансового положения предприятия является одной из задач, обеспечивающих финансовый интерес иностранных инвесторов и кредиторов. Финансовое состояние является важной характеристикой деловой активности и надежности предприятия. Он определяет конкурентоспособность предприятия и его потенциал в деловом сотрудничестве, является гарантией эффективного обеспечения экономических интересов не только предприятия, но и его партнеров. В условиях рыночной экономики еще больше возросла заинтересованность участников экономических процессов в получении объективной и достоверной информации о финансовом состоянии и деловой активности предприятия.

Все субъекты рыночных отношений заинтересованы в однозначной оценке конкурентоспособности и надежности своих партнеров. В процессе комплексного экономического анализа, обобщения результатов деятельности предприятия на основе качественного и количественного анализа экономических процессов, характеризующихся системой показателей занимает важное место. Оценка деятельности объекта осуществляется на первом этапе комплексного экономического анализа. В это время определяются основные направления аналитических работ. На последнем этапе подводятся итоги анализа. Итоговая оценка считается основным источником информации для каждой конкретной ситуации.

Этапы методики комплексной сравнительной рейтинговой оценки финансового состояния и деловой активности предприятия следующие:

- сбор и аналитическая обработка первичной информации за отчетный период; обоснование системы показателей оценки рейтинга финансового состояния предприятия и их классификация.
- расчет итогового показателя рейтинговой оценки.

- классификация предприятия по рейтингу.

Итоговый рейтинг учитывает все важные показатели производственно-финансовой деятельности предприятия. При его составлении производственный потенциал предприятия, рентабельность выпускаемой продукции, эффективность использования производственных и финансовых ресурсов, состояние и размещение средств и другие индикаторы.

Исходные показатели оценки рейтинга предприятия сгруппированы в 4 группы:

1. Включает более общие и необходимые показатели рентабельности хозяйственной деятельности предприятия. Поэтому в сравнительной оценке используется показатель рентабельности.

В процессе финансового анализа размер чистой прибыли определяется по следующей формуле на основании финансовых результатов предприятия и данных отчета об их использовании:

$$Rq = Ro - Rn$$

Rq - Чистая прибыль

Ro - Общая балансовая прибыль

Rn - подоходный налог

2. Показатели оценки эффективности управления актуальны.

3. Включает показатели оценки деловой активности предприятия.

Этот показатель определяется как отношение денежных доходов от реализации продукции к валюте баланса. Эффективность основных средств рассчитывается как отношение денежных доходов от реализации продукции к стоимости основных средств и нематериальных активов. Для определения оборачиваемости оборотных средств необходимо денежный доход от реализации продукции разделить на стоимость оборотных средств. Оборачиваемость запасов рассчитывается как отношение денежных доходов от реализации продукции к средней стоимости запасов и себестоимости. Оборачиваемость дебиторской задолженности определяется как отношение потока денежных средств от реализации продукции к общей сумме дебиторской задолженности. Для определения дебиторской задолженности можно использовать информацию, указанную в приложении к балансу предприятия.

4. Включает показатели оценки ликвидности компании и рыночной устойчивости. Текущая ликвидность рассчитывается как отношение оборотных активов к сумме срочных обязательств. Критический коэффициент ликвидности характеризуется как соотношение денежных средств и дебиторской задолженности к срочным обязательствам. Для расчета индекса основных средств необходимо разделить стоимость основных средств и внеоборотных активов на конкретные источники средств. Как известно, в процессе экономического анализа вышеуказанные показатели рассчитываются либо на конец отчетного периода, либо по средней сумме статей баланса. С помощью этой формулы можно определить не только рейтинг текущего финансового положения экономического субъекта, но и уровень эффективности использования производственных и финансовых ресурсов.

Финансы как экономическая категория по определению являются разделительной категорией и находятся в прямой зависимости от производственного процесса. Однако финансы обладают способностью влиять на производственный процесс. Влияние финансов на производственный процесс осуществляется количественно и качественно. Влияние финансов на производство отражается в объеме мобилизованных и использованных финансовых ресурсов. Размер финансовых резервов, соответствующий потребностям общества, приводит к обеспечению производственного процесса, его развитию и расширению, более оптимальному удовлетворению потребностей всего государства, повышению благосостояния населения. Напротив, недостаток финансовых резервов приводит к ухудшению финансовой безопасности, снижению эффективности производства, напряжению общего финансового положения страны, ухудшению благосостояния населения.

Объем финансовых резервов зависит от производственного процесса. Таким образом, в результате повышения эффективности производственного процесса и расширения его объемов увеличивается объем валового внутреннего продукта, национального дохода и, в конечном итоге, финансовых резервов. Это позволяет полнее удовлетворять потребности членов общества. В свою очередь, эффективное и правильное использование создаваемых финансовых резервов приводит к обеспечению непрерывности производства, расширению его объемов, т. е. повышению эффективности производства в результате применения более производительного

прогрессивного оборудования и технологий и в конечном итоге приводит к увеличению объема финансовых резервов.

Предприятия (объединения) находятся в расчетных отношениях на основании договора, заключаемого с работодателем, работодателем и предприятиями и организациями-заказчиками в целях ведения обычной деятельности и выполнения задач (планов), которые они перед собой ставят. В условиях рыночной экономики объем таких расчетов расширился, а их своевременное и правильное проведение поставлено в качестве важной задачи. В законодательстве предусмотрено применение экономических санкций к стороне, не обеспечивающей своевременный и правильный расчет.

Поскольку расчеты, связанные с отгрузкой и реализацией товаров грузополучателям и покупателям, происходят в течение отчетного года, т.е. в течение квартала или месяца, между сторонами (предприятиями) временно создается задолженность одной стороны перед другой. Эти долги делятся на две части: должника и кредитора.

Дебиторская задолженность означает задолженность других предприятий, объединений, организаций и частных лиц перед предприятием (например, перед нами). Большое количество такой задолженности или ее увеличение из года в год считается негативной ситуацией для предприятия, и всегда следует рассматривать возможность ее ликвидации.

Кредиторская задолженность – это задолженность предприятия, объединения и организации (нашей) перед другими предприятиями, объединениями, организациями и физическими лицами. Увеличение этих долгов – это нехорошо. Увеличение дебиторской и кредиторской задолженности приводит к ухудшению финансового положения предприятия, несвоевременному проведению расчетов, нарушению гармоничности производственного процесса.

В связи с этим при укреплении финансового положения каждого предприятия (объединения) и повышении его платежеспособности одним из вопросов, подлежащих решению, должна стать расчетная дисциплина и необходимый контроль за динамикой дебиторской и кредиторской задолженности. Поэтому в ходе проверки инспектор должен выяснить причины возникновения дебиторской и кредиторской задолженности, рассмотреть их действительность и обоснованность, правильность их отражения в бухгалтерском учете и отчете, определить меры, принимаемые в области списания дебиторской задолженности. -кредиторская задолженность и состояние ее эффективности.

Бухгалтерские остатки, являющиеся основными источниками информации для проверки расчетов с дебиторами и кредиторами, могут быть использованы из соответствующих регистров бухгалтерского учета, первичных учетных документов, журналов-ордеров, таблиц и так далее. В ходе проверки следует тщательно проверить состав суммы на синтетическом счете № 84 «Убытки от отсутствия и повреждения материальных ценностей» и ее динамику. Увеличение суммы, отраженное в данной статье, свидетельствует о слабом контроле на предприятии. Поэтому инспектор должен выявить недостатки в этой сфере и виновных в этом людей и внести предложения, которые могут помочь улучшить ситуацию. В ходе проверки должен быть проверен статус своевременного направления материалов в справочные (судебные) органы о возмещении ущерба, причиненного предприятию в связи с соблюдением действующего правила о возбуждении иска, хищении имущества на предприятие и так далее.

Аудитору следует обратить внимание на обоснованность списанной в ходе проверки безнадежной задолженности, выявить лиц, виновных в ее безнадежной задолженности по истечении времени, и дать объективную оценку их действий.

Предприятия (объединения, организации) в процессе своей производственно-финансовой деятельности находятся во взаиморасчетных отношениях с юридическими и физическими лицами. К таким расчетам относятся расчеты с вкладчиками, расчеты по претензиям, расчеты с персоналом за оказанные услуги и различные операции (кроме расчетов). по оплате труда), транспортные организации и другие организации по некоммерческим операциям, расчеты по аренде с жильцами общежития учреждения (союза, организации и т.п.): расчеты с физическими и юридическими лицами по аренде несанитарных помещений. : направление своих детей в детские сады и детские учреждения (союз, организация и т.п.) К ним можно отнести расчеты с родителями за содержание их дома, расчеты с вышестоящей организацией по индивидуальному жилищному строительству и т.д.

Keywords: economic entities, financial independence, accounts receivable, external debt, liquidity

indicators.

Ключевые слова: хозяйствующие субъекты, финансовая независимость, дебиторская задолженность, внешний долг, показатели ликвидности.

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Jurisprudence

CLASSIFICATION OF LEGAL SOURCES IN THE ISLAMIC EAST DURING THE MIDDLE AGES

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Abstract

In the article, the sources of Muslim law in force in the Islamic East in the Middle Ages were analyzed and the specific aspects of this law were researched.

Factors determining the dominance of one or the other of these sources at different times and in different regions have been reviewed.

Keywords: *Islamic religion, legal systems, Islamic law, public administration, Holy Quran, society, Muslim, court rulings, Sharia, educational, caliph.*

Muslim law, emerging alongside the Islamic religion, has, over centuries, regulated state administration, social relations, morality, and legal affairs in many countries of the Islamic East. Playing a significant role in the historical development and progress of Islamic societies, Muslim law today stands alongside other legal systems (Anglo-Saxon, Romano-Germanic). Just as in history, Muslim law today is distinguished from other legal systems by its unique characteristics.

All legal systems are based on force, legality, and compulsion. However, Muslim law also draws upon high cultural values, spirituality, morality, and an educational essence. Over approximately 1400 years, principles of governance, law, social coexistence, justice, humanism, and morality, as mentioned in Islam's sacred texts, have been developed by Muslim jurists, resulting in hundreds of scholarly works. Consequently, various institutions, legal schools, and detailed aspects of the legal-judicial system within Muslim law have been established. Notably, this progress occurred at a time when the Christian West lagged significantly in terms of state administration and legal systems. While even emperors in the Muslim world stood as ordinary Muslims before the law, serfdom and lack of respect for human rights were undeniable realities in several Western countries and in Russia. Compared to the comprehensive Muslim legal system, the rudimentary "barbarian laws" in the West demonstrated the extent of backwardness in these societies.

Among the high moral values of this legal tradition are equality before the law, the state not being a subject of law (now understood as judicial independence), and the protection of women's and children's rights—principles that still hold considerable importance today.

Today, in certain Islamic countries like Iran and Kuwait, Muslim law in many respects stands above constitutional and legal norms. In countries such as Pakistan and Saudi Arabia, Muslim law and Sharia have influence comparable to secular laws. Although secular governance is enshrined in the constitutions of countries like Azerbaijan and Turkey, Muslim law and Sharia remain a valuable source of morality, ethics, humanism, and shared social norms.

The Republic of Azerbaijan, historically and currently, is an integral part of the Islamic world. Since restoring its independence, Azerbaijan has strengthened mutual ties with other Muslim countries, developing relations on a new level. In this context, studying Muslim law and considering its various aspects is also of critical importance.

The foremost source of Muslim law is the Quran, Islam's holiest book. The word "Quran" in Arabic means "reading" or "book of recitation," more specifically referring to the act of reciting or reading the words revealed by Allah to Prophet Muhammad (PBUH) (4, p. 70). According to the foundational principles of Islam, the Quran was revealed over a period of approximately 23 years to Prophet Muhammad by Allah through the Angel Gabriel (4, p. 69). Therefore, the Quran consists of a collection of divine revelations that Allah periodically conveyed to His Messenger. For this reason, Islamic scholars often describe the Quran as the "Word of Allah" or "Divine Revelation." According to Islamic teachings, the beginning of the Quran's revelation by Angel Gabriel to Muhammad in 610 AD is considered the start of his prophethood and the origin of Islam (8, p. 24).

After the Prophet's (PBUH) death, the revelations were initially documented on separate sheets by his scribes and were preserved in the memories of his close companions. The process of compiling the Quran as a unified collection began during the caliphate of Abu Bakr at the suggestion of Umar, after about seventy companions who had memorized the Quran were martyred in a battle in Yemen (4, p. 69). A team led by Zayd ibn Thabit, who had served as a scribe for the Prophet and knew the text by heart, was entrusted with this task. The compilation was completed during the caliphate of Uthman in 651 AD.

The current Quran consists of 114 surahs (chapters) divided into over 6200 verses. The surahs are separated by the phrase "Bismillah" (In the name of Allah). They vary in length and chronological order of revelation. According to Quranic commentators and Islamic historians, the longest surah is the second surah, Al-Baqarah, with 286 verses, while the shortest is the 112th surah, Al-Ikhlās, with four verses. Out of the 114 surahs, 90 are attributed to the Meccan period, and 24 to the Medinan period.

The Quran serves as the foundational book that encompasses and regulates all aspects of Islamic society. In addition to religious beliefs, it includes principles on morality, spirituality, administration, and economics, outlining various instructions, prohibitions, and regulations. One of the Quran's key areas of focus is the administration of justice, Islamic jurisprudence (fiqh), and the qualifications required of legal scholars (faqih).

During the caliphate era, Sharia (the "right path"), a codified legal system based primarily on the Quran, emerged to structure and explain the teachings of the Quran. However, unlike the immutable text of the Quran, the interpretation of Sharia varied across different Muslim countries, influenced by local customs and traditions. Sharia and Islamic law are not identical, as Sharia is a broader concept encompassing all aspects of human life. Alongside the Quran, Sharia includes fundamental principles in areas such as supreme governance, the judiciary, warfare against non-believers, and political administration. The principles of Sharia governed all aspects of social life. Muslim law was a part of Sharia, serving to implement it, and Islamic jurists (faqih) have resolved various issues based on Quranic and Sharia principles over the centuries.

Although Sharia forms the basis of fiqh, during different periods and in various regions, jurists have turned to Hadith or Sunnah to resolve particular issues. Hadith, which means "narration" or "report" in Arabic, occupies the second position among the sources of Muslim law. The Hadith consists of narrations concerning events in the life of Prophet Muhammad and his companions, as well as his sayings. Each Hadith has two parts: the list of transmitters and the actual narration. Hadiths emerged between the late 7th and early 8th centuries (4, p. 249).

Some Islamic scholars believe that Prophet Muhammad left three legacies for Muslims: the Quran, his family (Ahl al-Bayt), and his blessed Hadith (6, p. 147). These Hadiths are considered crucial for correctly interpreting Quranic verses and understanding Allah's commands and prohibitions.

In the early days of Islam, Prophet Muhammad resolved important state and social issues by referring to the Quran and Hadith, relying on his own experience and knowledge. However, after his death, his successors and jurists found that the Quran and Hadith were not sufficient to address all legal matters. As a result, they began to use additional methods. For example, they relied on past exemplary actions, the customs of Medina, and their own sense of justice when no other legal tool was available. This principle was reflected in a conversation between the Prophet and his appointed governor to Yemen, Mu'adh ibn Jabal. The Prophet asked him:

- "How will you judge?"
- "According to the Book of Allah."
- "If it is not in the Book?"
- "Then by the Sunnah of the Messenger of Allah."
- "And if it is not in the Sunnah?"
- "I will judge according to my own reasoning and judgment."

The Prophet then said, "Praise be to Allah, who has caused the Messenger's envoy to find something that pleases the Prophet" (1, p. 535).

Therefore, "outside the Quran, the term Sunnah referred to Muhammad's actions and sayings," representing a form of emulation of the Prophet (3, p. 98). In the early days, companions who served and observed the Prophet spread the Sunnah by recounting his actions, words, and even silences, which served as examples in certain circumstances (3, p. 99). Thus, the term "Ahl al-Sunnah" or "Sunnis" originated, meaning "people of the tradition."

Alongside these traditional sources of Muslim law, "Ijma" (consensus) also played a role in judicial rulings. The fifth volume of the Islamic Encyclopedia states: "Ijma is the collective agreement of scholars on accepted norms as a source of law" (7, p. 81).

Initially, *Ijma* represented the consensus of scholars from Medina. According to sources, "Imam Malik frequently used *Ijma* as evidence, although his understanding of it was limited to the consensus of scholars in his city of Medina" (5, p. 58). However, over time, the consensus of scholars from other cities and countries was also recognized as *Ijma*. Thus, when other legal sources were insufficient for reaching a just verdict, judges could resort to *Ijma*.

Qiyas, which means "analogy," involves issuing judgments based on comparisons of similar cases.

The use of analogies facilitated the issuance of *Fatwas*, or legal opinions. Not every jurist could issue a *Fatwa*; this responsibility fell to qualified individuals like *muftis* and judges.

In addition to these traditional sources of Muslim law, the method of *Ijtihad* (reasoned legal interpretation by a *mujtahid*) was also widely used.

Another source of law was customary law based on local traditions. Prophet Muhammad himself used these customs occasionally. Scholars of the Hanafi school of law also extensively applied customary law.

Certainly, legal scholars' works (*Tafsir*) hold a significant place among the sources of Muslim law. Since the 8th century, schools of thought in Muslim jurisprudence produced jurists such as Abu Hanifa and Malik ibn Anas. Later, *madrasas* continued this work.

In the 10th century, professional jurists began training at the world's first universities, like "Al-Azhar" and "Al-Zahiriyya" in Cairo under the Fatimid dynasty. In the second half of the 11th century, the establishment of the "Nizamiyya" *madrasas* under the Seljuk Empire's powerful vizier, Nizam al-Mulk, furthered the training of jurists in Baghdad and other major cities of the Caliphate.

By the first half of the 14th century, under the efforts of Rashid al-Din, a prominent statesman of the Ilkhanate, a *madrasa* in Tabriz continued the training of jurists. In the 15th and 16th centuries, the Safavid and Ottoman Empires took measures to prepare highly qualified jurists.

Due to the lack of differentiation in sciences and the broad expertise of teachers, graduates of medieval *madrasas* were universally educated, excelling in fields like mathematics, scholasticism, history, state administration, and jurisprudence.

Consequently, law, administration, and politics were subjects every educated person was expected to know. Many educated individuals in the Islamic East who studied with world-renowned scholars at prestigious *madrasas* were also well-versed in *fiqh* (Islamic jurisprudence). Following graduation, they chose careers based on personal preference and circumstance: some engaged in court work, serving as *muftis* or judges; others pursued religious activities in religious institutions, while a third group focused on state administration and scientific research.

One of the notable Arab scholars of the Middle Ages, Ibn Khaldun, held high-ranking positions in the courts of Tunis, Fez, and Granada, taught at Cairo's famous universities of Al-Azhar and Al-Zahiriyya, and served as a judge in Cairo for a time (9, p. 81).

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Medical sciences

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CERVICAL CANCER: CURRENT CHALLENGES AND OPPORTUNITIES

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This scientific and analytical work presents modern global and local regional data regarding the incidence, mortality and five-year survival rate of such a common oncological pathology as cervical cancer. The issues of etiology and pathogenesis, features of distribution, clinical manifestations, modern principles of early diagnosis and prognosis results for future decades are covered in detail. The achieved successes and modern developing directions for the prevention of this pathology in the form of HPV vaccination and the screening programs used are carefully described. The epidemiological characteristics of this pathology in our republic are presented in the context of regions of the country.

Keywords: *oncology, cervical cancer, epidemiology, incidence, human papilloma virus, screening, diagnostics, Pap test, smear for oncocytology, mortality, five-year survival rate, prognosis.*

Cervical cancer (CC) is a disease that occurs as a result of malignant transformation of the epithelium of the cervix. Considering that this nosological form of malignant neoplasms refers to visually accessible localizations, the possibilities for its early detection are practically unlimited. For this, it is sufficient to correctly use accessible and informative methods of morphological and endoscopic diagnosis. In addition, timely detection and treatment of background and precancerous processes of the cervix can prevent the development of CC. It is known that CC is preceded for many years and even decades by precancerous lesions - cervical intraepithelial neoplasia (CIN). Timely diagnosis and treatment of CIN become the prevention of invasive CC. CIN initiates in the cervical transformation zone and is maintained by persistent infection caused by human papillomaviruses (HPV) of high carcinogenic risk. In 1980-1990, the connection between HPV and dysplasia and squamous cell cancer was clearly shown. Using hybridization methods, it was found that 80-100% of CC contain HPV DNA. A rough correlation was found between the frequency of CC and the detection of HPV in the population. Moreover, in squamous cell cancer, HPV type 16 was most often encountered (in more than 50% of cases), while HPV type 18 was more often associated with adenocarcinoma and poorly differentiated cancer. In 95% of cases, HPV is localized in the zone of transitional epithelium, where about 90% of dysplasias, which are classified as cervical precancer, occur. It is precancerous diseases, in which HPV types 16 and 18 are detected, that have the greatest risk of developing into invasive CC. Intraepithelial lesions are, in fact, stages of cervical carcinogenesis. Conventionally, three degrees are distinguished: CIN 1 (mild dysplasia); CIN 2 (moderate dysplasia); CIN 3 (severe dysplasia and pre-invasive cancer - carcinoma in situ, CIS). At

the same time, there are two concepts of the occurrence of CC against the background of persistence of HPV of high carcinogenic risk. The first, classic, reflects the sequential change of CIN 1, 2, 3 to invasive cancer. The second, more recent one, suggests that CIN 2-3, which are severe intraepithelial lesions, can occur bypassing CIN 1 [1].

The diagnostic criteria for CC are as follows [2]: 1) complaints of acyclic bloody, watery, purulent discharge from the genital tract; pain in the lower abdomen and lumbar region of a pulling nature; bleeding due to menopause; 2) anamnesis: there are no pathognomonic complaints; as a rule, the disease has a pronounced pre-invasive stage, which can last from 1 year to 5 years or more; microinvasive cervical carcinoma is most often discovered during accidental presentation; the reason for women diagnosed with CC in stages Ib1-IIa2 to visit a gynecologist is bloody discharge from the genital tract; in later stages (IIb-IVa) there are complaints of pain in the lumbar region, lower abdomen; 3) physical examinations: gynecological examination (condition of the external genitalia; examination of the vagina and cervix on speculum (presence of vaginal infiltration, metastatic foci on the vaginal walls, size, condition of the cervix); presence of pathological discharge (purulent, bloody); bimanual examination (size and shape of the uterus; condition of the appendages; infiltration of the anterior and posterior vaginal fornix); 4) laboratory tests: cytological examination with Papanicolaou staining - PAP test (increase in cell size up to giant, change in the shape and number of intracellular elements, an increase in the size of the nucleus, its contours, different degrees of maturity of the nucleus and other elements of the cell, changes in the number and shape of nucleoli (pronounced cellular polymorphism, increase in cell size, pronounced hypochromia, large nuclei contain one or more nucleoli, there are glandular structures); from cancer cells in the form of rosettes, many cells in a state of mitosis); 5) instrumental studies: ultrasound of the pelvic organs (if CC is suspected, the size of the cervix will be normal or increased, its structure is heterogeneous, the condition of the uterus and ovaries is also assessed); magnetic resonance imaging of the pelvic organs (with CC, the size of the cervix will be normal or increased, its structure is heterogeneous, the condition of the uterus and ovaries is also assessed); computed tomography of the chest, abdominal cavity and pelvis (assessment of pelvic lymph nodes and retroperitoneal space, organic changes in the chest and abdominal organs); cystoscopy according to indications (for the purpose of diagnosing the germination of the tumor process into the bladder); sigmoidoscopy or colonoscopy according to indications (for the purpose of diagnosing the spread of the tumor process to the colon or rectum); skeletal scintigraphy (prescribed for suspected bone metastases); positron emission tomography of the whole body (performed to diagnose the extent of the tumor process or to assess the dynamics of the effectiveness of special treatment).

GLOBOCAN estimates that in 2020, there were 604,000 new cases and 342,000 deaths from CC worldwide, of which 80% occurred in low- and middle-income countries, mainly in sub-Saharan Africa, South-East Asia, and Latin America and the Caribbean [3].

As noted by Torres-Roman J.S. et al. [4], CC remains a major public health problem in low- and middle-income countries. Due to the high burden of this disease, in 2020 the World Health Organization (WHO) adopted a global strategy to decrease the number of new CC cases, with the aim of maintaining an incidence rate below 4 per 100,000 women. Currently, 29 of the 47 countries (and territories) in the Latin American and Caribbean region have implemented vaccination programs for girls and almost all countries have screening services in place, and while certain screening programs in the region achieve considerable coverage, the ambitious goals set by the CC elimination strategy have yet to be achieved. Researchers evaluated the mortality trends of CC among young women from 16 Latin American and Caribbean countries (and territories) and predicted mortality rates until 2030. Downward trends were observed in Chile, Colombia, Cuba, El Salvador, Mexico, Nicaragua, Panama, and Peru for the entire period; whereas Brazil, Argentina, Chile, and Costa Rica showed initial downward trends from – 0.9% to – 6.2% followed by significant upward trends from 2.5 to 4.8% (for the period~ 2006-2017). In the last 4 years of study (2014-2017), Paraguay and Venezuela had the highest mortality rates, whereas Puerto Rico had the lowest mortality. By 2030, authors projected that mortality for CC will increase in some countries that were examined. Colleagues considered CC mortality in young women only because of the lack of research in the Latin American and Caribbean region, which has focused on CC mortality in general. They point out that because HPV infection is the most important risk factor for CC, younger women are likely to have experienced higher rates of HPV infection compared to older women. The authors also note that CC mortality rates among young women in Latin America and the Caribbean are higher than in Eastern Europe. While Western and Southern Europe recorded rates below 2 deaths per 100 000 population in 2017, rates were below 6 deaths per 100 000 population in Northern and Eastern Europe. In conclusion, the researchers emphasize that most countries in Latin America and the Caribbean

experienced a decline in mortality rates between 1997 and 2017. The variations of the mortality rates between countries during the last period of observation can be largely explained by the timing of implementation of nation-wide screening campaigns in different time periods and the variation of public health programs within each country, among others. Despite favorable downward trend, the mortality rate in some Latin America and the Caribbean countries remains high. HPV vaccination, screening, and early diagnosis and treatment are necessary to accelerate a rapid decline in CC mortality by 2030.

As noted by Abu-Rustum N.R. et al. [5], an estimated 13,960 new cases of carcinoma of the uterine cervix (ie, CC) will be diagnosed in the United States in 2023, and an estimated 4,310 people will die of the disease. Overall, CC rates are decreasing in the United States, although incidence remains high among Hispanic/Latino, Black, and Asian populations. In 2020, the global new cases of and deaths from CC were estimated to be 604,127 and 341,831, respectively. It is the fourth most common cancer in individuals assigned female at birth worldwide, with 85% of cases occurring in developing countries, where CC is a leading cause of cancer death in individuals assigned female at birth. Squamous cell carcinoma (SCC), adenocarcinoma (AC) or adenosquamous carcinoma (ASC) are the 3 common histologies of CC. SCC accounts for approximately 80% of all CCs and AC accounts for approximately 20%. In developed countries, the substantial decline in incidence and mortality of SCC of the cervix is presumed to be the result of effective screening and higher HPV vaccination coverage, although racial, ethnic, and geographic disparities exist. However, AC and ASC of the cervix have increased over the past 3 decades, probably because cervical cytologic screening methods are less effective for AC/ASC because the lesions are located deeper than the ectocervix. The ASC subtype is rare and accounts for approximately 5% to 6% of all cervical carcinomas. Presently, there is no difference in treatment between SCC and AC/ASC CC subtypes, although the clinical features and prognosis of disease vary considerably between these subtypes. Persistent HPV infection is a major factor in the development of CC. The incidence of CC appears to be related to the prevalence of HPV in the population. In countries with a high incidence of CC, the prevalence of chronic HPV is approximately 10% to 20%, whereas in low-incidence countries it is 5% to 10%. Screening methods using HPV testing may increase detection of adenocarcinoma. Vaccination with HPV vaccines may also decrease the incidence of both SCC and AC. In 2020, the WHO updated the Female Genital Tumors classification of CC by subdividing the CC lesions into HPV-associated and HPV-independent tumors based on new pathologic findings. Among these subtypes, HPV-associated SCC is the most prevalent, with very rare occurrences of HPV-independent SCC. The HPV-independent AC subtype has a less favorable prognosis compared with HPV-associated AC. The NCCN CC Panel acknowledges that although the prior versions of the WHO classification discussed these tumors based on morphologic features, the integration of the immunohistochemical and molecular profiles has led to a better classification system, which is now adapted in the 2020 WHO Classification of Female Genital Tumors for CC.

Screening plays an important role in improving early diagnosis and treatment outcomes for CC. According to the Guidelines for Early Diagnosis of Cancer by Ilbawi A. et al. [6], screening aims to detect unrecognized cancer or its prior lesions in a typically healthy, asymptomatic population through tests (e.g., HPV test), screenings (e.g., visual inspection of VIA with acetic acid), or other procedures that can be applied quickly and are widely available to the target population. In screening, the target population is assessed for unrecognized cancer or precancer, and most people tested will not be diagnosed with the disease. Screening should be seen as a process and not as the performance of a specific test, examination, or procedure. The screening process includes a system of informing and inviting the target population to participate; administering the screening test; following-up with test results and referral for further testing among those with abnormal test results; ensuring timely pathologic diagnosis, staging and access to effective treatment with routine evaluation to improve the process. A screening programme encompasses the process from invitation to treatment and requires planning, coordination and monitoring and evaluation.

As pointed out by Pimple S.A., Mishra G.A. et al. [7], CC is highly preventable and can be easily treated if detected at early stages. However, there is disproportionate high burden of CC incidence and mortality in low-middle income country settings that lack organized screening and prevention programs. Robust evidence for prevention and screening of CC is currently available. However, there are barriers for country specific adoption and implementation. These pose unique challenges such as organizing prevention and screening services delivery through the current health infrastructure, access to screening facilities, follow-up management and adequate linkages for confirmatory diagnosis and subsequent treatment. Overall rates of CC screening and cancer screening among women remain suboptimal in many low- and middle-income countries.

Brisson M. et al. [8] demonstrate in their work that in May, 2018, WHO issued a global call to eliminate CC as a public health problem. To inform its global strategy to accelerate CC elimination, WHO created the CC Elimination Modelling Consortium (CCEMC) to examine the following key questions: what elimination threshold should be used; what prevention strategies can lead to elimination; when could elimination be reached for different countries; and how many cancers could be averted. The current working definition of elimination is an age-standardised CC incidence of four or fewer cases per 100 000 women-years. Alternative definitions, such as an incidence of ten or fewer cases per 100 000 women-years and an 80-90% reduction in incidence, have also been suggested. The only previous multicountry modelling study of CC elimination suggests that global elimination is possible through girls-only human papillomavirus (HPV) vaccination at 80-100% coverage with a perfectly effective 9-valent vaccine and twice-lifetime HPV-based screening. Herewith less than 30% of low- and middle-income countries have introduced HPV vaccination compared with more than 85% of high-income countries. Additionally, only about 20% of women in low- and middle-income countries have ever been screened for CC compared with more than 60% in high-income countries. Given that models necessarily include simplifying assumptions, the goal of the consortium is to use multiple models, taking into account their respective strengths and limitations, to illustrate the robustness of predictions. A systematic comparative modelling approach was used. To form the CCEMC, WHO selected three models that met the predefined eligibility criteria: HPV-ADVISE, Harvard, and Policy1-Cervix. The models projected reductions in CC incidence over time based on standardised HPV vaccination and cervical screening scenarios determined after consultations at various WHO technical expert, advisory group, and global stakeholder meetings. Three elimination thresholds were examined (CC incidence of four or fewer cases per 100 000 women-years, ten or fewer cases per 100 000 women-years, and $\geq 85\%$ reduction in incidence). The three CCEMC models (HPV-ADVISE, Harvard, and Policy1-Cervix) have been used extensively to inform recommendations on cervical screening and HPV vaccination in Australia, Canada, the UK, the USA, and at a global level [8]. Although developed independently, the models have common features. First, they are transmission-dynamic models of HPV infection and the natural history of CC. Second, they include the following components: sexual behaviour and HPV transmission, natural history of CC, vaccination, and screening, diagnosis, management, and treatment of cervical lesions and cancer. HPV transmission and cervical carcinogenesis are modelled for the HPV types in the 9-valent vaccine (HPV types 16, 18, 31, 33, 45, 52, 58) and other high-risk types. The models simulate type-specific HPV transmission through sexual activity, based on different risk groups and sexual mixing. The models reproduce the type-specific natural history of CC, from persistent HPV infection to CC via precancerous cervical lesions (cervical intraepithelial neoplasia grade 1 to 3). All models assume that HPV vaccines are prophylactic and capture post-vaccination herd effects. They can also simulate complex cervical screening and treatment algorithms at the individual level, by tracking and simulating each woman's screening history. Finally, all models were calibrated to highly stratified sexual behaviour and epidemiological data, validated to clinical trials or post-vaccination data, or both, and reproduce the age-specific CC incidence estimates from the Global Cancer Observatory (GLOBOCAN) 2018 for all 78 low- and middle-income countries.

A comparative modelling analysis by Brisson M. et al. [8], which includes projections from three independent transmission-dynamic models, provides consistent results predicting that CC can be eliminated as a public health problem by the end of the century, based on WHO's proposed elimination threshold (i.e., CC incidence of four or fewer cases per 100 000 women-years). This modelling study shows that girls-only HPV vaccination would lead to CC elimination in most low- and middle-income countries, if high coverage is reached ($>90\%$ coverage) and the vaccine provides long-term protection. However, countries with the highest CC incidence at present (>25 cases per 100 000 women-years), more than 90% of which are in sub-Saharan Africa, would not reach elimination by vaccination alone. To achieve CC elimination in all 78 low- and middle-income countries, these models predict that scale-up of both girls-only HPV vaccination and twice-lifetime screening is necessary, with 90% HPV vaccination coverage, 90% screening uptake, and long-term protection against HPV types 16, 18, 31, 33, 45, 52, and 58. If this global elimination strategy, which includes a combination of intensive scaling up of HPV vaccination and cervical screening, is implemented, the results suggest that CC elimination can be achieved in all countries by 2100. In doing so, CC incidence would be reduced by 97% and more than 74 million cases would be averted over the next century.

An interesting and important study was conducted by Simms K.T. et al. [9], who in their work modeled the global situation with CC for future decades depending on the coverage of the population with HPV vaccination and screening. In this study, the authors aimed to quantify the potential cumulative effect of scaled up global vaccination and screening coverage on the number of CC cases averted over

the 50 years from 2020 to 2069, and to predict outcomes beyond 2070 to identify the earliest years by which CC rates could drop below two absolute levels that could be considered as possible elimination thresholds—the rare cancer threshold (six new cases per 100 000 women per year, which has been observed in only a few countries), and a lower threshold of four new cases per 100 000 women per year. In this statistical trend study and modeling, our colleagues conducted a statistical analysis of existing trends in CC worldwide using high-quality cancer registry data included in the Cancer Incidence in Five Continents series published by the International Agency for Research on Cancer. Next, the authors used the comprehensive and extensively validated simulation platform, Policy1-Cervix, to do a dynamic multicohort modelled analysis of the impact of potential scale-up scenarios for CC prevention, in order to predict the future incidence rates and burden of CC. Data are presented globally, by Human Development Index (HDI) category, and at the individual country level. As a result of the study, the following conclusions were drawn. In the absence of further intervention, there would be 44.4 million CC cases diagnosed globally over the period 2020-2069, with almost two-thirds of cases occurring in low-HDI or medium-HDI countries. Rapid vaccination scale-up to 80-100% coverage globally by 2020 with a broad-spectrum HPV vaccine could avert 6.7-7.7 million cases in this period, but more than half of these cases will be averted after 2060. Implementation of HPV-based screening twice per lifetime at age 35 years and 45 years in all low- or middle-income countries with 70% coverage globally will bring forward the effects of prevention and avert a total of 12.5-13.4 million cases in the next 50 years. Rapid scale-up of combined high-coverage screening and vaccination from 2020 onwards would result in average annual CC incidence declining to less than six new cases per 100 000 individuals by 2045-2049 for very-high-HDI countries, 2055-2059 for high-HDI countries, 2065-2069 for medium-HDI countries, and 2085-2089 for low-HDI countries, and to less than four cases per 100.000 by 2055-2059 for very-high-HDI countries, 2065-2069 for high-HDI countries, 2070-2079 for medium-HDI countries, and 2090-2100 or beyond for low-HDI countries. However, rates of less than four new cases per 100 000 would not be achieved in all individual low-HDI countries by the end of the century. If delivery of vaccination and screening is more gradually scaled up over the period 2020-2050 (eg, 20-45% vaccination coverage and 25-70% once-per-lifetime screening coverage by 2030, increasing to 40-90% vaccination coverage and 90% once-per-lifetime screening coverage by 2050, when considered as average coverage rates across HDI categories), end of the century incidence rates will be reduced by a lesser amount. In this scenario, average CC incidence rates will decline to 0.8 cases per 100 000 for very-high-HDI countries, 1.3 per 100 000 for high-HDI countries, 4.4 per 100 000 for medium-HDI countries, and 14 per 100 000 for low-HDI countries, by the end of the century. At the same time, the researchers emphasize that more than 44 million women will be diagnosed with CC in the next 50 years if primary and secondary prevention programmes are not implemented in low- or middle-income countries. If high coverage vaccination can be implemented quickly, a substantial effect on the burden of disease will be seen after three to four decades, but nearer-term impact will require delivery of cervical screening to older cohorts who will not benefit from HPV vaccination. Widespread coverage of both HPV vaccination and cervical screening from 2020 onwards has the potential to avert up to 12.5-13.4 million CC cases by 2069, and could achieve average CC incidence of around four per 100 000 women per year or less, for all country HDI categories, by the end of the century.

In our country, according to Decree of the Government of the Republic of Kazakhstan dated February 20, 2024 No. 102 [10], the list of diseases against which mandatory preventive vaccinations are carried out as part of the guaranteed volume of medical care at the expense of the republican budget includes routine preventive vaccinations against diseases caused by HPV (Annex 1). According to Annex 2 of this Resolution, girls aged 11 and 11.5 years will be vaccinated.

Now, as for this pathology in our republic. CC in the structure of all malignant tumors of both sexes of the population in 2022 took 6th place with a share of 5.51% (2021 - 4th place, 5.54%), in women - stable 2nd place - 9.7% (9.7%) [11].

The incidence rate per 100 thousand population increased from 9.4 to 9.92. In 10 regions of the republic, the incidence rate is higher than the national average: Pavlodar - 17.2 per 100 thousand people (2021 - 16.7) – the highest level, East Kazakhstan – 14.3 (10.8), North Kazakhstan – 14.3 (10.2), Atyrau – 13.2 (13.8), Zhetysay - 11.7, Karaganda - 11.7 (12.0), Abay - 11.1, Akmola - 11.1 (11.9), Mangistau - 11.1 (9.7), Kostanay - 10.8 (10.6) regions.

Low incidence rates in Zhambyl region - 5.8 per 100 thousand population (5.7), Turkestan region - 6.1 (5.2), Aktobe region - 8.3 (11.6), Kyzylorda region - 8.5 (8.2) areas.

CC in the structure of causes of death from malignant tumors of the population of both sexes in 2022 rose from 9th to 8th position, with a share of 4.6% (2021 - 4.3%), mortality from CC is stable at

3.1 per 100 thousand population (3.1).

The mortality rate from CC in 10 regions is higher than the national average: Akmola - 4.2 per 100 thousand population (2021 - 3.1) - maximum level, West Kazakhstan - 4.1 (4.8), Pavlodar - 3.8 (5.6), Almaty - 3.7 (2.5), Zhetysu - 3.7, Atyrau - 3.4 (4.0), East Kazakhstan - 3.3 (3.8), Karaganda - 3.2 (4.7), Kostanay - 3.2 (2.4) regions and Almaty city - 3.4 (2.9).

Below the national average mortality rate was registered in the Kyzylorda region - 1.7 (3.5) - the best result; North Kazakhstan - 2.0 (2.6), Aktobe - 2.2 (3.0), Turkestan - 2.3 (2.2), Mangystau - 2.8 (3.0), cities of Astana, Shymkent – and Abay region - 2.9 per 100 thousand population [11].

In 12 regions, a 100% level of morphological verification of the diagnosis is ensured. The lowest or worst indicator for the third year in a row was recorded in the Kyzylorda region - 94.3%. Below the national average, this figure was noted in Akmola - 98.8%, Atyrau - 98.9%, Kostanay - 98.9%, Mangystau - 97.6%, Pavlodar - 96.6% regions and Almaty city - 98.5 %.

In a number of regions, the frequency of diagnosis of stage I-II CC was lower than the national average (88.1%) - in Akmola - 76.2% - the worst result in the country, in Karaganda - 77.2%, Pavlodar - 81.3%, Zhetysu - 82.9%, Abay - 83.8%, Kostanay - 84.3%, Aktobe - 85.5%, West Kazakhstan - 85.7% regions. In the Atyrau region there is a 100% result.

The proportion of stage IV CC is higher than the republican average (2.7%) in the following regions: the worst result is in the Zhetysu region - 6.1%; next come: Karaganda - 5.1% (2021 - 5.6%), Akmola - 4.8% (2.3%), Kostanay - 4.5% (4.4%), North Kazakhstan - 3.9% (7.4%), Shymkent city - 3.8% (5.9%), Almaty - 3.7% (5.1%), Almaty city - 3.6% (1.8%), Zhambyl - 2.9% (0.0) regions. No advanced forms were registered in 3 regions. The lowest neglect is in the East Kazakhstan region - 1.0% (0.7%).

Indicators of late diagnosis of this pathology, as visually accessible localization (III-IV stages) are higher than the national average - 11.9% (15.4% in 2021) were noted in the Akmola region - 23.8% (2021 - 26.4 %) - worst result; Karaganda - 22.8% (35.2%), Pavlodar - 18.8% (20.8%), Zhetysu - 17.1% (24.2%), Abay - 16.2% (12.8%), Kostanay - 14.6% (15.6%), Aktobe - 14.5% (9.6%), West Kazakhstan - 14.3% (32.4%) regions. The least neglect is in the Mangystau region - 6.0% (20.8%).

Across the country, the five-year survival rate of patients with CC registered in 2018 was 59.9% in 2022, with a decrease from the level of 2021 (67.5% for those registered in 2017), and with a significant range in by region, from the maximum – 72.9% (2021 – 70.7%) in the North Kazakhstan region, to the minimum – 34.9% (64.4%) in the Atyrau region [11].

Next, regarding CC screening. CC screening is a periodic, comprehensive examination of women of a certain age group as part of a special medical program to prevent and reduce incidence and mortality from CC.

Type of screening - population. The purpose of screening is to identify pre-invasive diseases of the cervix with subsequent recovery. The screening method is a cytological examination of a smear for oncocytology from the cervix (traditional and liquid cytology) - Pap test. Interval - 1 time in 4 years. Target group: women aged 30-70 years who are not registered in the dispensary for CC. The expected results are a decrease in incidence and mortality from CC.

Screening steps:

1) Preparatory - formation of target groups, information support and invitation to screening. The preparatory stage is carried out by the nurses of the primary health care organization responsible for preventive measures and includes: annual compilation of a list of women subject to screening in the coming year by November 15 of the current year, followed by monthly correction; informing target groups of the female population about the need for screening; screening invitation; ensure timely screening.

2) Screening - filling out a statistical card of a preventive medical examination (screening) of an outpatient (form 025-08/y), a register of patients subject to cytological screening and taking material for cytological examination from the cervix. The screening examination of the target groups of the female population is carried out by a specially trained midwife of the primary health care organization.

3) The final one is obtaining the results of cytology, informing the woman and developing further management tactics, fill out accounting and reporting statistical documentation. Responsible for the final stage of screening is the obstetrician-gynecologist of primary health care [12].

Cytological screening of CC is a complex of organizational and medical measures aimed at early detection of precancerous and neoplastic diseases of this localization and at reducing the mortality of this cohort of patients. For traditional cytology, a smear containing 8-12 thousand cells of stratified squamous epithelium (including cells of metaplastic epithelium) is considered adequate; for liquid cytology - 5 thousand cells. For both methods, the number of cells of endocervical epithelium and/or

metaplastic epithelium (from the transformation zone) must be at least 10 (single or in clusters). If more than 75% of the cells of the stratified squamous epithelium are covered with erythrocytes, leukocytes, etc., then the quality of the smear is considered unsatisfactory.

Interpretation of the results of a cytological study is carried out according to the Bethesda-terminology cytological system:

Intraepithelial changes and malignant processes are absent (NILM). This group includes cytological conclusions about the normal state of the epithelium, as well as the presence of various non-neoplastic diseases. Normally, squamous epithelial cells, groups of cells of columnar epithelium and metaplastic epithelium, a small number of leukocytes, and rod/mixed microflora are found in preparations. In the presence of non-neoplastic processes, their nature and, if possible, the cause are specified: atrophic changes, reactive changes associated with inflammation, including typical regeneration. In addition, the presence of microorganisms is indicated: *Trichomonas vaginalis*, fungi, morphologically corresponding to *Candida* spp., bacterial vaginosis, cellular changes corresponding to the defeat of Herpes simplex virus, squamous epithelial cells with atypia of unknown significance (ASC-US), squamous epithelial cells with atypia of unclear significance, not excluding the presence of a high degree of intraepithelial changes (ASC-H). Low-grade squamous intraepithelial changes (LSIL) include lesions associated with HPV and CIN I, high-grade squamous intraepithelial changes (HSIL) include CIN II, CIN III, carcinoma in situ and cases suspected of invasion, squamous cell carcinoma, cervical (glandular) epithelium with atypia of unknown significance, cells of the cervical (glandular) epithelium, possibly neoplasia, endocervical adenocarcinoma in situ, endocervical adenocarcinoma, endometrial adenocarcinoma, secondary adenocarcinoma, unclassified carcinoma, other malignant tumors.

There are certain features when taking material for oncocytology: firstly, the examined woman should be informed about the exclusion of sexual intercourse, vaginal manipulations, including douching, baths, tampons, etc. 2 days prior to sampling. Taking material for cytological examination is carried out by the midwife of the examination room of the department of medical examinations of the primary health care organization: the traditional method (2 glasses - with obligatory fixation in 96% alcohol, it is preferable to use glass slides with a polished edge, which are easily marked) or the liquid cytology method (one container with stabilizing liquid); the code or surname of the patient, identical to the code and surname in the form for sending material for cytological examination, should be clearly marked on the glasses or container [12].

At the same time, when using the traditional method, the biomaterial is delivered to the cytological laboratory as soon as possible after its collection in specialized containers for glass slides with 96% alcohol. If there are visible visual changes in the cervix, then the material is taken from the woman and, without waiting for the results, she is referred for an examination by an obstetrician-gynecologist.

A cytological study is carried out in centralized cytological laboratories at oncological institutions, where an archive of cytological preparations of patients involved in the screening examination is formed, regardless of the result, for a period of at least 10 years with the formation of a computer database.

What material and technical equipment is required to take material for a Pap test? It is as follows: soap and water for washing hands, a light source for cervical examination, a gynecological chair, a disinfected speculum and gloves, an Eyre spatula, a glass slide and a marking pen, a container with a stabilizing solution for liquid cytology, a fixative solution (96% alcohol), a container with warm water for lubricating and warming the vaginal mirrors, a 0.5% chlorine solution for disinfecting gloves and instruments, or another approved for this purpose. And, of course, the registration form itself.

For carrying out liquid cytology, you additionally need: a disposable cervix brush, a container with a stabilizing solution for liquid cytology, and a fixing solution.

At the same time, a smear for oncocytology cannot be taken: during menstruation, earlier than 48 hours after sexual contact or after using lubricants, vinegar or Lugol solution, tampons or spermicides, after vaginal examination or douching, and also during the treatment of genital infection.

The results of CC screening are as follows. In 2022, 771,282 women of the target group aged 30 to 70 years were examined during cytological screening (in 2021 - 757,454).

During cytological screening in 2022, 392 cases of CC were identified (319 in 2021). The detection rate increased from 0.42 to 0.51 per 1000 women examined [11].

High detection of CC during screening is ensured in Aktobe, Almaty, Atyrau (1.59 is the best result), East Kazakhstan, Kyzylorda, Pavlodar, North Kazakhstan, Turkestan regions and Shymkent city.

The detection rate in these regions ranges from 0.55 to 1.59 per 1000 women examined. Compared to 2021, there is an increase in detection in 10 regions, with the exception of Akmola, Aktobe, Zhambyl, Kostanay, Mangistau, North Kazakhstan regions and Shymkent city. The worst result in Astana

city is 0.15 per 1000 women examined.

Cytologically, cervical precancer was detected in 1.16% of those examined (2021 – 0.99%). The detection rate of precancer below 0.6% (the planned indicator for 2022, according to the Comprehensive Plan) was noted in Aktobe, Karaganda and Kostanay regions.

A high proportion of stage I CC (70% or more) was detected in 6 regions of the country (in 8 in 2021): Kostanay, Mangistau (94.7% - best result), North Kazakhstan, Turkestan regions, cities of Almaty and Astana. Low levels of early detection of CC (below 50%) were not observed in any region.

Localized processes (stages I-II) were identified in 99.2% of all cases of detected cancer (96.5% in 2021). In the Akmola and Karaganda regions, cases of SS were identified not only in the localized, but also in the widespread stages of the process. A total of 3 cases of SS were identified in stage III and not a single case in stage IV (in 2021 - 11 and 0, respectively) [11].

Summarizing the above, we can conclude that cervical cancer occupies a significant place among all available nosological forms of malignant tumors. At the same time, despite the small percentage of patients detected at stages III and IV of the disease, as a visually accessible localization, taking into account a number of factors, early diagnostic indicators do not allow oncologists and gynecologists to "sleep peacefully." Variability, nonspecificity and veiledness of symptoms, its similarity with various non-tumor processes, leads to neglect of the tumor process. All this requires both oncologists and, first of all, primary health care workers and, of course, gynecologists to increase the level of oncological alertness, inform the population about early symptoms that may indicate this pathology or the onset of proliferative changes and carrying out high-tech diagnostic measures and, as a result, timely treatment. Patients at risk with precancerous diseases should undergo routine examination within the prescribed time frame. The development of screening technologies and methods of primary prevention in the form of vaccination of adolescent girls against HPV allows us to hope for a reduction in the incidence of this disease in the female population.

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Pedagogical sciences

TRAINING AND EDUCATION OF CHILDREN INVOLVED IN INCLUSIVE EDUCATION IN VARIOUS EDUCATIONAL INSTITUTIONS

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MÜXTƏLİF TƏHSİL MÜƏSSISƏLƏRİNDƏ İNKLÜZİV TƏHSİLƏ CƏLB OLUNAN UŞAQLARIN TƏLİMİ VƏ TƏHSİLİ

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Abstract

One of the important points in the process of social-psychological adaptation is the ability to enter and change social roles. The efficiency of adaptation is not determined by the number of roles used. So it also depends on how effective their choice is. Psychological adaptation in children with disabilities plays a very important role in the system of social and interpersonal relations. As is known, psychological adaptation depends on a number of variables. Basically, we can mention here the individual characteristics of the personality, psychological defense mechanisms and the demands of the social environment. Biologically, psychological adaptation directly depends on the state of the nervous system in the human body, its ability to regulate the processes of inhibition and awakening. Stress experienced in daily life, long-term emotional physical and psychological load, lack of opportunity to rest or lack of it also result in people's inability to adapt to the environment they find themselves in. At this time, the state of depletion of physiological resources in the body is also observed.

If we approach from the psychological aspect, we can note that the social sphere occupies an important and important place in the adaptation process. That is why one of the important criteria of psychological adaptation is the ability to critically evaluate the position of a person in a social group, real possibilities and abilities. These two elements mentioned above interact with each other and ensure people's value system and adaptation to the environment.

Xülasə

Sosial-psixoloji adaptasiya prosesində vacib olan məqamlardan biri sosial rollara daxil olmaq və onları dəyişmək qabiliyyətidir. Adaptasiyanın səmərəliliyi isə sadəcə istifadə olunan rolların sayına görə müəyyən olunmur. Belə ki, o həm də onların seçiminin nə dərəcədə effektiv olmasından asılıdır. Sağlamlıq imkanları məhdud uşaqlarda psixoloji adaptasiya sosial və şəxsiyyətlərarası münasibətlər sisteminə çox mühüm rol oynayır. Məlum olduğu kimi, psixoloji adaptasiya bir sıra dəyişənlərdən asılıdır. Əsas etibarilə biz burda şəxsiyyətin fərdi xarakterik xüsusiyyətlərini, psixoloji müdafiə mexanizmlərini və sosial mühitin tələblərini də qeyd edə bilərik. Bioloji olaraq, psixoloji adaptasiya insan orqanizmində sinir sisteminin vəziyyətindən, onun tormozlanma və oyanma proseslərini eyni qaydaya salmaq qabiliyyətindən bilavasitə asılıdır. Gündəlik həyatda yaşanan stress, uzunmüddətli emosional fiziki və psixoloji yüklənmə, dincəlmək imkanının azlığı və ya yoxluğu da insanların düşdüyü mühitə adaptasiya oluna bilməməsi ilə nəticələnir. Bu zaman orqanizmdə fizioloji resursların tükənməsi halı da müşahidə olunur. Psixoloji aspektdən yanaşsaq, adaptasiyaprosesində vacib və mühüm yeri sosial sahənin tutduğunu qeyd edə bilərik. Məhz buna görə də psixoloji adaptasiyanın vacib kriteriyalarından biri insanın sosial qrupdakı tutduğu mövqeni, real imkan və qabiliyyətlərini tənqidi qiymətləndirmə bacarığının olmasıdır. Yuxarıda qeyd olunan bu iki element bir-biri ilə qarşılıqlı əlaqədə olub, insanların dəyərlər sistemini, mühitə uyğunlaşmasını təmin edir.

Keywords: adaptation, organism, values, criterion, psychological

Açar sözlər: adaptasiya, orqanizm, dəyərlər, meyar, psixoloji

Sosial adaptasiya – fəal şəkildə şəxsiyyətin və ya qrupun yeni sosial normaları qavraması, yeni sosial mühitə və onun üçün yeni olan şəraitə uyğunlaşması prosesidir. Müasir psixologiyada sosial adaptasiya prosesində adaptant – yəni adaptasiya olunan şəxsiyyət və sosial mühit bir-birinə qarşılıqlı təsir göstərən adaptiv – uyğunlaşma sistemi kimi təqdim edilir. Onu da qeyd edək ki, adaptasiya prosesi ilə uyğunlaşmaya qabiliyyəti bir-birindən fərqləndirmək lazımdır. Fərq ondan ibarətdir ki, adaptasiya olunmağın obyektiv və subyektiv meyarları vardır. Obyektiv meyar dedikdə, fərdin cəmiyyətdə mövcud olan norma və yaşayış qaydalarını gerçəkləşdirmə səviyyəsi nəzərdə tutulur. Subyektiv meyar dedikdə isə, fərdin, qrupun və ya cəmiyyətin qoyduğu şərtlərdən məmnunluğu başa düşülür. Əgər fərdin subyektiv adaptasiya meyarı cəmiyyətin qoyduğu şərtlərə uyğun gəlmirsə, bu halda uyğunsuzluq baş verir.

İnklüziv təhsil xüsusi qayğıya ehtiyacı olan uşaqlarda müsbət sosial davranış nümunələrinin formalaşmasına, eyni zamanda təlim və təhsildəki potensialının artmasına şərait yaradır. Inklüziv kontingentli məktəblərdə təhsil alan xüsusi qayğıya ehtiyacı olan uşaqların təlimə uğurlu adaptasiyası üçün iki kriteriya xüsusilə vurğulanır. Bunlar isə aşağıdakı iki meyardır:

1. Sağlamlıq imkanları məhdud insanların daxili rahatlığı. Bu anlayışı digər sözlə desək, onların emosional məmnuniyyət duyğusu da adlandıra bilərik.

2. Sağlamlıq imkanları məhdud insanların xarici davranış adekvatlığı. Bu zaman isə biz həmin insanların ətraf mühitə daha asan və dəqiq uyğunlaşma imkanından danışa bilərik.

İstər məktəbdə, istərsə də məktəbəqədər təhsil müəssisəsində inklüziv təhsilə cəlb olunan uşaqların təlimi və təhsili üçün həssaslıq və ustalıq tələb olunur. Yalnız belə olduğu təqdirdə onlar sağlam həmyaşıdlarının olduğu mühitə asanlıqla adaptasiya oluna bilərlər. İlkin olaraq uşaqların xarakteri və yaşadıqları çətinliklərin intensivliyi ilə bağlı sorğu aparılmalı və onların mümkün səbəbləri haqqında nəticə çıxarılmalıdır. Nəzərə almaq lazımdır ki, insanın bütün inkişaf aspektləri bir-birinə bağlıdır. Inklüziv təhsilə cəlb olunan uşaqların təlim məşğələsinə adaptasiyası üçün bir sıra psixopedaqoji şərtlər var. Bunlar aşağıdakılardır:

- Xüsusi qayğıya ehtiyacı olan uşaqlara kompleks şəkildə psixoloji və pedaqoji cəhətdən düzgün yardım göstərmək;

- Xüsusi qayğıya ehtiyacı olan uşaqlarla məşğul olan mütəxəssislərin həmin uşaqlarda özlərinə qarşı inam və sevgi hissini yarada bilmək;

- Uğurlu təlim prosesinin reallaşdırılması üçün verilən informasiyanın aydın və dolğun şəkildə dərk olunmasını təmin etmək;

- Sağlamlıq imkanları məhdud uşaqlarla keçirilən məşğələlər zamanı uşağın psixi vəziyyətində yarana biləcək neqativ dəyişikliklərin aradan qaldırılmasına köməklik etmək.

Adaptasiya prosesi birtərəfli proses deyildir. Adaptasiya prosesində mühit və şəxsiyyət bir-birinə qarşılıqlı təsir göstərir.

Psixoloji adaptasiya prosesi insan fəaliyyətinin dörd istiqaməti üzrə baş verir: idraki, maarifləndirici, dəyər-orientasiya, ünsiyyət. Normada bütün bu istiqamətlər bütöv dinamik sistem yaradır. Hər bir digərləri ilə harmonik şəkildə birləşir. Adaptasiya prosesi dinamik və energetik baxımdan plastikliyi və intensivliyi ilə səciyyələnir. Sağlamlıq imkanları məhdud şəxslərin cəmiyyətə sosial-psixoloji adaptasiyasına bir sıra amillər təsir göstərir. Buna həm cəmiyyətdə həmin şəxslər üçün formalaşan təsəvvür və düşüncələr, "stigma"lar, ətraf mühitin təsiri və digər amilləri misal göstərmək olar.

Sağlamlıq imkanları məhdud insanların şəxsi inkişafında, onların cəmiyyətə adaptasiya prosesinə təsir edən amillərdən biri kimi də medianın rolunu qeyd edə bilərik. Kütləvi İnformasiya Vasitələri (KİV) ənənəvi olaraq cəmiyyətin məqsədə çatmağında, dərkinə və insanların hərəkətlərinə təsir edir. Belə ki, media inklüziv qərarvermədə mühümdür, çünki o, sağlamlıq imkanları məhdud insanlara münasibəti bilavasitə cəmiyyətə çatdırır. Müasir dünyada Kütləvi İnformasiya Vasitələri (KİV) həyatımızda elə yer tutub ki, hətta biz gündəlik yaşayışımızı onsuz təsəvvür edə bilmirik. Bizim üçün televizorda ən son yenilikləri izləmək, futbol matçının nəticəsini internet vasitəsi ilə öyrənmək, FM dalğadan hava proqnozunu dinləmək çox lazımlı işlər sırasına daxil olub. 20-ci əsrin əvvəllərində informasiya texnologiyalarının inkişafı - informasiyalı cəmiyyətin bünövrəsini qoydu. Media cəmiyyətin inkişafında xüsusi rol oynayır. Onların təsiri erkən yaşlarda başlayır və həyat boyu davam edir. O, artıq insanların şüuruna, tərbiyəsinə, mövqe dəyərlərinə, zövqünə, baxış tərzinə, vərdislərə, seçimlərə təsir edir. İnsan məlumatı olmadığı və ya rastlaşmadığı problemlər haqqında KİV-dən məlumat alır və münasibətini təyin edir. Bu baxımdan qeyd etmək yerinə düşərdi ki, sağlamlıq imkanları məhdud insanların mediada təsvirinin necə verilməsinin, onların mediada hansı tezlikdə görünməsinin, cəmiyyətdə necə nəzərə

alınmasına böyük təsiri var. Xüsusi qayğıya ehtiyacı olan şəxslər üçün nəzərdə tutulan media proqramları, məsələn, televiziya sənədli filmləri olduğu halda sağlamlıq imkanları məhdud şəxslər əsas proqramlarda az hallarda görünürlər. Onlar göründükdə isə çox zaman stiqma və ya stereotip yanaşma olur. yaxud yazıqlıq obyektı və super-qəhrəman hərəkəri, dözüümü obyektı kimi görünürlər. Sağlamlıq imkanları məhdud olan şəxslərin mediada təsvirinin hörmətli şəkildə verilməsi daha inklüziv və tolerat cəmiyyətlərin təşviqinə kömək edə bilər. Nəzərə almaq lazımdır ki, media struktur və funksiya inkişafında sabit cəmiyyəti məqsəd kimi götürür. Lakin medianın inkişafı ayrı-ayrılıqda nəzərə alınsa, o, cəmiyyətlə birlikdə deyil, maraq və ideyaların ifadəsində cəmiyyətin tələblərindən fərqli şəkildə özünü göstərə bilər. Alman sosioloqu N. Luman hesab edir ki, cəmiyyətimiz və hətta yaşadığımız dünya haqqında öyrənəcəklərimizi biz mediadan alırıq. Digər tərəfdən elə mediadan alınan informasiya mənbəyinin inanılası tərəfinin olmadığını qeyd edir. Media sağlamlıq imkanları məhdud olan şəxslərin tərəfindən necə təsvir edilməsi cəmiyyətdə əlilliyi olan şəxslərin qarşılaşdığı çətinliklər barədə maarifləndirmə aparmağa, stereotipləri, zərərli yanaşma və davranışları azaltmağa, sağlamlıq imkanları məhdud şəxslərin töhfələri və potensialları barədə maarifləndirməni artırmağa kömək edə bilər. Yazılanları ümumiləşdirərək, medianın inklüziv təhsil və sağlamlıq imkanları məhdud şəxslər barədə, onların cəmiyyətdə müsbət portretinin çəkilməsini dəstəkləmək üçün aşağıdakı vasitələrdən istifadə edə biləcəyini söyləyə bilərik:

- Sağlamlıq imkanları məhdud şəxslərin üzləşdiyi çətinliklər barədə maarifləndirmə aparmaq;
- Tabu mövzu olması ideyasına qarşı çıxmaq üçün əlillik barədə müzakirəni ictimaiyyətə gətirmək;
- Sağlamlıq imkanları məhdud şəxslərin işdə, məktəbdə formalaşdırılması və s.-də təmsil olunmaması kimi məsələlərin həllinə yönəlmək üçün daha yaxşı resursları araşdırmaq;
- Sağlamlıq imkanları məhdud şəxslərin bütün dünyada hər bir icmada mövcudluğu, onların əhəlinin digər təbəqələri ilə eyni emosiyalara, maraq, istedad, bacarıq və davranışa, onların eyni yaş və situasiyada olan digər insanlarla eyni şəxsiyyət kompleksinə və təcrübəyə malik olması fikrini təşviq etmək.
- Inklüziv təhsilin sağlamlıq imkanları məhdud şəxslərin fərdi və psixoloji inkişafına müsbət təsir göstərdiyini cəmiyyətə çatdırmaq. Çünki sağlam həyat tərzı, yüksək intellektual, mənəvi dəyərlərin qiymətini, yetişməkdə olan nəsllə aşıllamaq lazımdır.

Kütləvi informasiya vasitələri, həmçinin, sağlamlıq imkanları məhdud şəxslərlə bağlı cəmiyyətdə yaranan stereotiplərin aradan qaldırılmasında da əsas rol oynaya bilər.

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PHONETIC SKILLS IN THE PROCESS OF FORMATION COMMUNICATIVE COMPETENCIES IN A FOREIGN LANGUAGE

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Abstract

This article discusses the features of the formation of phonetic skills in foreign language lessons, the use of teaching techniques and ways to improve phonetics in the educational process. The author reveals the theoretical basis for the use of different methods in teaching phonetics in English language classes, and also clarifies the typical difficulties faced by learners in the process of mastering this competence.

Keywords: *phonetics, communicative activity, analytical-imitative approach, articulation, pronunciation skills, rhythmic-intonation model, phonemic hearing.*

Learning a foreign language in modern society is becoming more and more in demand. In the past, all the principles of mastering any foreign language, and in particular English, were reduced to simple reading, understanding and translating the text. In this case, at the first stage of training, the student does not say anything on his own behalf. He only repeats phrases and linguistic phrases of a teacher or a phonographer. From repeated repetition, the material is quite firmly absorbed. It is only at the next stage of learning that the student can say a few phrases of his own. At the same time, the repeated repetition of the learned and new material continues.

This method works primarily with the "unconscious" part of a person's memory. But its disadvantage is the frequent inability of students to speak a foreign language fluently (without a psychological barrier). At the initial stage of learning, it is necessary to lay the foundation for good pronunciation, which involves correct intonation, observance of pauses, knowledge of the peculiarities of the stress of words in a sentence, as well as correct articulation. The well-developed pronunciation side of the students' utterance prepares them for speaking as a type of speech activity. Knowledge of phonetic skills will allow students to pronounce all sounds of English normatively; to learn the differential signs of sounds (glasnost and consonance). Phonetic skills will help students learn the rhythm (alternating stressed and non-stressed syllables) of an English phrase, the logical stress of significant words, the stress of service words (auxiliary verbs in negative form).

Pronunciation errors interfere with the implementation of the main purpose of the language - communication, i.e. mutual understanding. Students get acquainted with the volume of phonetic material studied at school at the initial stage of education. The sequence of introducing new sounds and intonation is determined not by their relative difficulty, but by the speech patterns that students become familiar with. The methodology distinguishes between imitative and analytical-imitative methods of familiarization with new phonetic material. The imitative method means an emphasis not on the conscious assimilation of the features of articulation, but on the auditory perception of speech and its imitation. This justifies itself in the children's audience, but by the fifth grade, children partially lose their imitation skills because they cannot imitate correctly.

A simple imitation without awareness of the peculiarities of a foreign language sound is not effective enough, since students tend to perceive foreign language speech. The analytical-imitative approach combines various ways of creating new sound images: both articulation description and imitation. In the course of following the rules and instructions given by the teacher, students learn the concepts of alveoli, interdental sound, inhalation, and so on. Thanks to such training, imitation becomes more accessible and effective. Familiarization with the basic rhythmic and intonation models is carried out in the process of mastering speech patterns. Here, the unity of imitation and unification as ways of introducing new material is clearly manifested (fused utterance on one exhale, without pauses, with one

accent, with an increase (understanding the tone, and so on). For conscious work on sound, it is necessary to provide material that is valuable in terms of content: songs, rhymes, aphorisms, poems, proverbs and sayings, counting books.

One of the means of forming and improving pronunciation skills is phonetic charging, the purpose of which is to prevent and remove the appearance of possible phonetic difficulties (auditory, pronouncatory, rhythmic-intonation), neutralize the influence of the sound environment in the native language, and rebuild the articulation apparatus from the Russian way of life to a foreign one. Phonetic exercises are performed depending on the tasks where students may encounter phonetic difficulties. Phonetic exercises can be performed before reading or exercising in oral speech in order to relieve phonetic difficulties and prevent phonetic errors. In this case, you need to group words based on a single phonetic difficulty.

When teaching phonetics, the use of song material plays an important role. Folk songs are of invaluable importance in educating the personality of young people. Their wisdom, melody and contagiousness instill a high aesthetic taste, teach friendship, kindness, collectivism, tolerance, help to learn the history and culture of the people of the country of the studied language. In the country of native English speakers, folk song with its content and melody plays a huge role in the upbringing and unity of the younger generation, inheriting the best traditions of their people. Students, getting acquainted with the song, quickly comprehend lexical constructions, idioms, phraseological turns and melodic intonation pattern of the language.

Traditionally, phonemic hearing training is carried out through exercises for distinguishing and recognizing sounds and goes along with pronunciation training during the oral introductory course. In the process of this work, it is rational to use, along with traditional exercises, control and training tasks of a test nature - phonetic tests. Such tests, in addition to the control and training function, can also perform a diagnostic function: the data obtained as a result of their conduct will indicate the need to increase or reduce the volume of training.

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Philological sciences

APPROACHES TO THE STUDY OF ENGLISH MODAL VERBS

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ПОДХОДЫ К ИЗУЧЕНИЮ АНГЛИЙСКИХ МОДАЛЬНЫХ ГЛАГОЛОВ

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Abstract

Various approaches to the study of English modal verbs are considered, from the study of their structural-semantic features to the processes caused by the development of corpus linguistics and the globalisation of English.

Аннотация

Рассмотрены различные подходы к изучению английских модальных глаголов, начиная с исследования их структурно-семантических особенностей до процессов, вызванных развитием корпусной лингвистики и глобализацией английского языка.

Keywords: *modal verbs, modality, corpus linguistics.*

Ключевые слова: *модальные глаголы, модальность, корпусная лингвистика.*

Постановка и актуальность проблемы. Обучение грамматике английского языка предполагает овладение модальными глаголами. Эволюция взглядов на то, что именно составляет содержание обучения модальным глаголам в английском языке, показывает, что мнения по этой проблеме существенно менялись в ходе развития теории и методики преподавания иностранных языков, начиная с конца первой половины XX в. [1-9]. Если рассмотреть весь этот период преобразования взглядов на преподавание грамматики, то можно заметить, что в нем выделяются несколько подходов. Если вначале модальные глаголы рассматривались с точки зрения ограниченного набора правил, показывающих их «дефектность» или отличительные особенности структурного употребления, то постепенно внимание все больше обращалось на структурно-семантические особенности использования модальных глаголов в речи. Это, в свою очередь, вызвало необходимость более тонко различать стилистические особенности функционирования модальных глаголов и модальности в английском языке. Достижения коммуникативной лингвистики сделали актуальным исследование в области модальной аутентичности, включая идиоматические коллокации и т. н. случаи фразовой и текстовой модальности. Более того, процессы глобализации английского языка с очевидностью продемонстрировали не только распространение его в мире, но и усиление влияния региональных (диалектных) особенностей употребления модальных глаголов и их распространение в глобальном английском, включая и новые тенденции. Одной из них стало употребление немодальных глаголов в модальной функции.

Таким образом, становится актуальной проблема классификации модальных глаголов. Традиционная классификация дифференцирует модальные глаголы на основе формально-грамматического, семантического критериев, а также с точки зрения частоты их употребления в аутентичных текстах. Очевидно, что в связи с новыми направлениями лингвистических исследований, развитием и глобализацией английского языка такая классификация становится недостаточной и требующей дополнения.

Рассмотрим более подробно подходы к изучению модальных глаголов в английском языке, выявляя тем самым критерии для их классификации.

Формально-структурный подход к изучению модальных глаголов. На формально-структурном этапе с большим вниманием модальные глаголы рассматриваются в сочетании с формами инфинитива как часть составного модального сказуемого (modal compound predicate). Взяв за основу происхождение большинства модальных глаголов от претерито-презентных, их расценивают как недостаточные, дефективные (defective), т. к. они не имеют одной или

нескольких форм, присущих любому нормальному глаголу, а также характеризуются определенным набором правил. Так, основной чертой этой группы является их тесная и органическая связь с инфинитивом, вследствие чего они присоединяют эту форму без частицы *to*. Данное явление было унаследовано от древнеанглийского периода и осталось устойчивым. Особое положение здесь занимает глагол *ought*, который в среднеанглийский период начал сопровождаться инфинитивом с *to* и в новом английском закрепил это сочетание. Кроме этого, модальные глаголы имеют несколько других характерных особенностей. В третьем лице единственного числа настоящего времени они не присоединяют окончания *-s*, не имеют неличных и аналитических форм, образуют вопросительные и отрицательные формы без вспомогательных глаголов.

Структурно зависимое и структурно свободное от предложения употребление модальных глаголов

Особое внимание в рамках этого подхода уделяется и случаям структурно зависимого и структурно свободного от предложения употребления модальных глаголов (*structurally dependent and structurally free use of modal verbs*). В большинстве своем модальные глаголы структурно свободны от предложения. Когда использование того или иного модального глагола определяется отношением говорящего к содержанию предложения, речь идет о его независимом употреблении:

e. g. Your quarrel is absurd. You should call him.

Иногда использование определенного модального глагола зависит от структуры предложения, особенно от типа придаточного предложения:

e. g. It is possible that the results might be announced next week.

В этом случае значение модального глагола как таковое ослабляется вследствие того, что этот глагол становится больше частью предложения, чем носителем самостоятельного значения.

Изучение модальных глаголов в рамках формально-структурного подхода

В настоящее время в формально-структурном подходе изучения модальных глаголов можно наблюдать и некоторые новые тенденции. Так, употребление частицы *to* после глагола *ought* в утвердительных предложениях остается неизменным, тогда как в вопросительных, отрицательных, вопросительно-отрицательных предложениях и кратких ответах использование *to* становится факультативным [1]:

e. g. Ought I (to) warn her?

He oughtn't (to) have left for America. "Oughtn't I (to) invite Alice Parker?" - "Yes, I think you ought (to)".

Происходят определенные изменения форм глаголов *need* и *dare*, которые все чаще уподобляются формам большинства английских глаголов, употребляясь с вспомогательным глаголом *do*:

e. g. Well, we don't need much cheese - the recipe tells you to stir in about eight ounces. / "What do you need to build it?" I asked.

And my throat was on fire! I didn't dare breathe out!

She doesn't dare say anything.

В вопросительных и отрицательных предложениях с глаголом *dare*, где он осмысливается в качестве немодального, и вспомогательным глаголом *do* частица *to* может отсутствовать [1]:

e. g. Does she dare (to) tell him what she thinks about him?

He didn't dare object to her claim.

В случае если модальные глаголы *need* и *dare* имеют форму прошедшего времени или настоящего времени с подлежащим в третьем лице единственного числа, они обычно присоединяют инфинитив с частицей *to* [1]: *e. g. The chief of the World Health Organisation Cancer Unit said Britain needed to change its eating habits in the battle against cancer.*

Mr. Gandhi needs to win at least 200 seats nationally to be reasonably certain of being called on to form the next government.

Only highly trained professionals dared to interact with a computer.

Peterson said America has nothing to fear in world competition if it dares to be original in both marketing and product ideas.

Таким образом, формально-структурный подход подразумевает изучение модальных глаголов с точки зрения их «дефектности», используя ограниченный набор грамматических правил.

Семантический подход к изучению модальных глаголов. В основе семантического подхода лежит отделение полувспомогательных (модальных) глаголов от вспомогательных. Сложность возникла в связи с тем, что глагол может использоваться в различных функциях - от сильно выраженной модальной до чисто вспомогательной. С развитием семантики основное внимание сосредоточилось на значениях модальных глаголов. Этот аспект стал доминирующим не случайно. Значения модальных глаголов чрезвычайно важны для понимания того, как они функционируют.

Связь оттенков значений модальных глаголов

Зачастую выбор модального глагола для выражения того или иного действия становится достаточно сложным, т. к. градация оттенков одного значения может быть выражена несколькими глаголами:

e. g. *You might / should / 'd better / I'd rather you (saw) / must / will / see the film.* (Глагол *will* употреблен в значении абсолютной уверенности, такие примеры встречаются довольно редко).

В данном случае можно наблюдать постепенное нарастание оттенков настойчивости от совета до приказа. Похожая ситуация происходит при передаче разных оттенков значения вероятности (от наименьшей степени до абсолютной уверенности) модальными глаголами *might, could, may, should, must, will*:

e. g. *That might / could / may / should / must / will / be James phoning at this hour.*

Однако связь оттенков значений может проследиваться не только у нескольких, но и у одного модального глагола. Так, значение возможности у глагола *may* может иметь пять разновидностей [1]:

- возможность как таковая (*It may be written with a pen*);
- вероятностная возможность (*He may come; It may have drizzled*);
- пожелание возможности (*Mrs. Long wished all the Juniors luck in the Class and stated, "Have fun! And may you all continue to show at Westminster in the years to come!"*; *May all your days be happy!*);
- побуждение к осуществлению возможности (*May you start singing the hymn!*);
- разрешение возможности (*You may perform that act on the next succeeding day which is not a Saturday, Sunday, or legal holiday; You may put on my sweater*).

Новые тенденции в изучении системы модальных глаголов в рамках семантического подхода

Среди новых тенденций в рамках семантического подхода следует отметить развитие значений необходимости и желания. После глагола *need* возможно употребление не только герундия, но и сложного дополнения (герундиальной конструкции) [1]:

e. g. *You need your car servicing. / I need my report checking.*

Предложения с перфектным инфинитивом *must have done* могут иногда заменяться перфектными формами сослагательного наклонения [1]: e. g. *Martin would have liked to break the man's neck. I wouldn't have liked to sleep in a downstairs bedroom.*

Факторы, влияющие на толкование значений модальных глаголов

Еще одним немаловажным вопросом является рассмотрение факторов, оказывающих влияние на толкование значений модальных глаголов. Самый значимый из них, безусловно, контекст.

Именно контекст помогает в точности определить значение того или иного модального глагола. В случае если контекста недостаточно, есть вероятность того, что слушающий не поймет значения предложения или расценит его как двусмысленное. Так, например, высказывание *'You must speak French'* может быть истолковано по-разному: *'Вы должны (вам необходимо) говорить по-французски'* или *'Вы, должно быть, говорите по-французски?'*. В данном примере для полного и правильного понимания предложения контекста явно недостаточно, поэтому необходимо добавление информации: *'You must speak French at the conference'* (для выражения необходимости); *'You have lived in France for some years, you must speak French'* (для выражения значения вероятности).

Кроме этого, контекст помогает различать модальный глагол *can* и омонимичный ему немодальный глагол *can* (консервировать):

e. g. *They are going abroad this winter. They will save all they can.*

Their cellar is getting flooded. They will save all they can.

На значение модального глагола может также влиять суффикс прилагательного, следующего за ним:

e. g. *You must be very careful* (необходимость).

You must be very careless (вероятность) [1].

Другим фактором, влияющим на интерпретацию значений модальных глаголов, являются фонетические особенности речи. Ударность и безударность, использование редуцированных и нередуцированных форм, степень слитности модального глагола с отрицанием помогают разграничить: 1) модальный глагол *can* и его омоним, 2) значения одного модального глагола [1]:

1) Безударный глагол *can* в предложении *They can fruit* (Они могут плодоносить) является модальным, а ударный глагол *can* в аналогичном предложении *They 'can fruit* (Они консервируют фрукты) будет смысловым.

2) Наличие / отсутствие ударности у модального глагола *may*, например, позволяет выразить два значения - разрешения и вероятности:

e. g. *You may take back your belongings.* (Вы можете забрать свои вещи). / *You \may take back your belongings.* (Вы, возможно, заберете свои вещи).

Использование редуцированной формы глагола также может повлиять на его интерпретацию:

e. g. *He m'st \take responsibility for the accident.* (Ему приходится брать ответственность за происшествие).

He 'must \take responsibility for the accident. (Должно быть, он ответственен за происшествие).

Максимальная и минимальная степени слитности модального глагола с отрицательной частицей *not* тоже могут дифференцировать его значения:

e. g. *Mustn't Rebecca solve her problems?* (Разве Ребекка не должна решить свои проблемы?) / *Must Rebecca not solve her problems?* (Нужно ли, чтобы Ребекка не решила свои проблемы?)

Итак, семантический подход к изучению модальных глаголов охватывает такие вопросы, как связь оттенков их значений, факторы, влияющие на толкование значений модальных глаголов, а также рассматривает новые тенденции в этой области.

Стилевой подход к изучению модальных глаголов. Изучение модальных глаголов на семантическом уровне подготовило почву для более пристального и подробного исследования стиливых различий между ними, что позволяет рассмотреть и понять, как в зависимости от стиля повествования выбирается тот или иной модальный глагол или одно из его значений.

Стилистические особенности системы модальных глаголов

В настоящее время можно наблюдать ряд стилистических особенностей в системе модальных глаголов. Например, получила развитие тенденция употребления глагола *can* вместо *may* в значении разрешения и его распространения из разговорного в нейтральный стиль [1]:

e. g. *"You can go on farther", said the king. Here you can order books with or without CDs.*

В отрицательных и отрицательно-вопросительных предложениях употребление глагола *can* предпочтительнее во всех стилях: e. g. *Why can't I call my home right now? "You can't do this to us", Diane screamed. "We are Americans".*

Некоторые стилистические особенности имеются и в области употребления эквивалентов модальных глаголов. Так, стилистические черты архаизма вопросительному предложению придает использование модального эквивалента *have to* без вспомогательного глагола *do* [1]:

e. g. *Have I to bring the money on Monday? Have we to meet uncle Bob tomorrow?* Эквивалент *be able to*, в свою очередь, придает предложению оттенок официальности: e. g. *Are you able to put an approximate number of such operations you've been involved in? / Are you able to connect with Mr. Thompson?*

Для газетно-публицистического стиля характерно употребление модального эквивалента *be to*, выражающего значение принятого решения, с последующим использованием вспомогательного глагола *will* для образования формы будущего времени [1]:

e. g. *The price of oil is to rise during next week. The cost of four-star petrol will rise by 15p and the cost of unleaded petrol will rise by 12p.*

Также в публицистическом стиле распространяется тенденция употребления двухтрех модальных глаголов, относящихся к одному смысловому глаголу [1]:

e. g. *I have been loath to believe that any nation, even our present enemies, could or would be willing to lose upon mankind such terrible and inhumane weapons.*

All in all, the fact that it is the major factor in this dispute could, should or would have been drawn to his attention. But the expert is dealing also with the financial aspect of the claim.

Таким образом, в рамках стиливого подхода к изучению модальных глаголов

рассматриваются стилистические особенности их употребления и функционирования.

Изучение фразовой и идиоматической модальности. Исследования в области модальной аутентичности подразумевают изучение фразовых и идиоматических модальных сочетаний, их функционирование и совершенствование. С развитием коммуникативной лингвистики этот вопрос стал еще более актуальным.

Так, модальные фразы *'d rather*, *'d sooner* и *had better* претерпевают некоторые формально-структурные изменения. Следует особо подчеркнуть, что иногда, в первую очередь в американском английском, полные формы *would rather*, *would sooner* осмысляются как *had rather* / *had sooner*, *should rather* / *should sooner* [1]:

e. g. *I'd rather (= had rather) you let me do the driving.*

I'd sooner (= had sooner) live in town than on a farm.

I'd rather (= should rather) ask her about London.

It's the game that you'd sooner (= should sooner) try.

Что касается глагола *had* в сочетании *had better*, то он постепенно редуцируется и исчезает:

e. g. *I suppose, I better go and get hair done.*

We better settle this right now.

Кроме этого, сравнительная степень *better* после сокращенной формы *'d* может заменяться превосходной степенью *best*:

e.g. *You'd best finish the job and follow on after.*

You'd best get that whisky.

■ Не можете найти то, что вам нужно? Попробуйте сервис подбора литературы.

Идиоматические выражения, в свою очередь, также являются немаловажным аспектом в изучении системы модальных глаголов, т. к. составляют особую грамматическую категорию и помогают понять живую разговорную речь, оригинальные публицистические и художественные тексты, которые, как правило, насыщены устойчивыми речевыми оборотами. Рассмотрим основные идиоматические модальные сочетания.

Выражения, в состав которых входят глаголы *can* / *could*:

- *can't* / *couldn't* *help doing smth* (быть не в состоянии удержаться от чего-либо):

e. g. *One cannot help wondering whether Molotov and the rest of the "anti-party group" are not being used as China's whipping-boys by Khrushchev and his followers;*

- *can't/couldn't but do smth* (не могу не; ничего не остается как):

e. g. *I couldn't but suggest moving to my apartment;*

- *one cannot but wonder* (нельзя не задуматься):

e. g. *One cannot but wonder whether these doubts about the success of Khrushchev's agricultural policy have not at least something to do with the big surprises provided by this Congress;*

- *as can* / *could be* (сочетание, усиливающее значение предложения):

e. g. *The scene is as terrible as can be.* (Трудно представить что-либо более ужасающее, чем эта сцена);

- *can't* / *couldn't possibly do smth* (быть не в состоянии сделать что-либо; быть невозможным для выполнения):

e. g. *Grimes couldn't possibly hit a blind woman, could he?*

Выражения, в состав которых входят глаголы *may* / *might*:

- *may* / *might (just) as well do smth* (с таким же успехом можно (было) и; пожалуй, лучше будет):

e. g. *Well, we may as well have got that money and thrown it down the toilet! / You might as well hand it to them as a gift.*

- *It might have been worse* (могло бы быть и хуже);

- *if I may say so* (значение разрешения в данном случае ослаблено):

e. g. *My Lord, I think the case is being made if I may say so sir, to give the jury the impression that the police just document;*

- *I might have known + would* (сочетание, выражающее ироничное отношение говорящего к действию, типичному для кого-либо):

e. g. *I had no idea you would be on this glorious voyage. But I might have known! / I might have known that he would write it incorrectly;*

- *try as I might* (как я ни старался):

e. g. *Try as I might to confess my sins and accept salvation, no answer came to me from heaven.*

В придаточных уступительных предложениях наряду с употреблением глагола *might* в сочетании *try as I might...* в этом же значении используются модальные глаголы *will, would* и *could*:

e. g. Look at it how you will, there is nothing a man can succeed in.

Go where we would there was no door marked 'exit'.

He committed suicide; try as you could you couldn't prevent it;

- come what may; be that as it may (что бы ни случилось; что бы ни происходило):

e.g. The peace-keeping force will be sent home in six months, come what may. / Come what may, I shall be there tonight.

Be that as it may, the Commission went on to say that it was "not fully convinced" that the balanced slate would ever make its appearance in Britain either.

Выражения, в состав которых входит глагол *must*:

- must needs (непременно должен):

e.g. In some cities games were broadcast throughout the week and then on weekends the announcer was silenced, and fans must needs drive to the city from all the broadcast area to discover how their heroes were faring.

- I must be going; I must be off (Мне пора уходить);

- I must tell you that; I must say (значение долженствования в данном случае ослаблено):

e. g. Speaking of accountants, I must tell you that one of the perks of my job is to be able to get out and about in the real world, meeting real people.

Выражения, в состав которых входит глагол *be to*:

- What am I to do? (Как мне быть?);

- What is to become of me? (Что со мной станется?);

- Where am I to go? (Куда же мне деваться?).

Выражение, в состав которого входит глагол *should*:

- How should I know? (Почем я знаю?).

Выражение, в состав которого входит

глагол *will*:

- I won't have smb do smth (я не допущу, чтобы):

e. g. I won't have you make the biggest mistake in your life.

Выражение, в состав которого входит глагол *dare*:

- I dare say (я полагаю):

e. g. Now he must go away and I dare say I shall never see him again.

Итак, исследование фразовой и идиоматической модальности является важной составляющей грамматического знания. Этот подход к изучению модальных глаголов раскрывает не только роль фразовых модальных сочетаний и идиоматических коллокаций в языке, но и способствует освоению живой разговорной речи и пониманию художественных и публицистических текстов.

Изучение текстовой модальности. Разнообразие средств современной лингвистической коммуникации является ценным материалом для исследования языка во всех его проявлениях. Изучение текстовой модальности значительно дополняет содержание обучения модальным глаголам. Это позволяет не только определить влияние дискурса на использование того или иного модального глагола в речи, но и понять, как функционируют модальные глаголы, как они воздействуют на участника коммуникационного процесса.

Рассмотрим этот вопрос подробнее на примере дискурса публицистических текстов императивной модальной направленности.

Они близко граничат с текстами бытового и научного характера и состоят из тезиса, аргументов и вывода. Проанализируем, каково влияние дискурса на выбор определенного модального глагола и как модальные глаголы воздействуют на получателя информации.

В статье *Should You Decide to Use Outdoor Signs and Displays?*, посвященной проблемам деловой рекламы, говорится:

"If you are a business owner and you want to make a splash in advertising to your customers, you may have considered outdoor signs and displays as an option. They may not have the flash of the Internet or TV, but they sure cover the basics, telling potential customers what you 're selling and when you 're selling it. But does that mean you should make this the key to the way you market your business? ... Your outdoors signs are there not just to put out whatever sale you might have, but to be very proactive about it. You want a sign that is going to be so big and direct that the customer going by can't help but forget

if they actually need your product or whether they should ignore your sale. You want them to make the decision to choose your business. ."

В заголовке и вводной части наблюдается использование глагола *should* для того, чтобы задать ключевой вопрос, тему всего повествования. Употребление глагола *may* в сочетании с инфинитивом прошедшего времени позволяет начать ход рассуждения, а повторное использование *may* с отрицанием и противопоставлением служит для усиленного фокусирования внимания на поставленной проблеме. Повторяющийся в аргументирующей части глагол *want* в модальной функции, устойчивое сочетание *can't help but*, а также антонимическое употребление глаголов *need* и *should (ignore)* призваны пробудить интерес читателя, задержать информацию в его памяти, уверить его в правильности и правоте приводимых аргументов. Немного иначе используются модальные глаголы в статье *Shopping with Children - are you better online or in store?:*

"For many people shopping with younger children can often lead to problems. ... The limitations of children can be a lot lower then those of adults, which is why it is important that you stay alert to their needs. A child cannot just stop, when they are tired or hungry ... It is important that you consider the time of your shop-

ping trip. As most of us are unable to do our shopping until the weekend you should bare in mind the key times when crowds of shoppers start to emerge. If you have to do shopping at the weekend, it is a good idea to get to the shops as early as you can to avoid the weekend crowds. Also if you are however doing your shopping in the weekday then you should think about doing it early afternoon as you will avoid the morning rush... As well as planning the time of day that you intend on doing your shopping it is important that . you should set a time frame of how long you intend on spending at the shops... Another consideration that may benefit you if you have a busy lifestyle with young children to look after is doing your shopping online..."

В этом примере тема повествования задается использованием утвердительной и отрицательной форм глагола *can*. А в аргументирующей части рекомендации, выраженные при помощи модальных глаголов *should*, *have to*, *may*, сравнительной конструкции с глаголом *can*, усиливаются такими выражениями, как *it is important that*, *another consideration is*.

Таким образом, можно наблюдать влияние дискурса на употребление того или иного модального глагола, а также проследить, как воздействуют используемые глаголы на восприятие читателя.

Изучения модальных глаголов в период глобализации английского языка. Современный подход к изучению системы модальных глаголов связан с распространением и глобализацией английского языка. В рамках этого подхода рассматриваются глаголы, обретающие свойства модальных, употребление модальных коллокаций, а также такое явление как составные модальные конструкции (*multiple modal combinations*).

Глаголы, обретающие свойства модальных. В настоящее время существует несколько глаголов, которым свойственны черты модальных и которые могут употребляться в этом качестве. К таковым можно отнести глаголы *want*, *bear* и *help*.

Глагол *want* в значении долженствования, предупреждения, совета все чаще употребляется в разговорном стиле вместо глаголов *ought*, *must*, *should* [1]:

e. g. You will want this recording if you don't already have the video.

You want to calm down.

Усилению этого значения способствует наличие отрицания:

e. g. That's enough darling, you don't want to put too much on it, it's just a waste. / You don't want to believe a word that he says.

Кроме этого, *want* может сочетаться с модальным глаголом *may*:

e. g. Now you may want to leave everything to your surviving spouse and then on to the children, that's natural.

He may want additional technical help to get this job.

Следует отметить также глагол *bear*, синонимичный по значению глаголам *need* и *want*:

e. g. The boys bear watching [1]. Модальные свойства становятся характерными и для глагола *help*, который начинает употребляться без частицы *to*:

e. g. Remove old, unproductive fruit trees by cutting them down to shoulder height before using the stump as a lever to help dig out all the roots. /I want you to help me do that now.

Употребление модальных коллокаций Некоторые новые тенденции можно проследить и в употреблении модальных коллокаций. Так, глагол *could* в значении вероятности может

употребляться в сочетании со своим эквивалентом *be able to* [1]:

e. g. I could be able to install the program without any help.

They could be able to reach the place by the boat they had.

Также становится возможным употребление двух модальных эквивалентов [1]:

e. g. The sportsmen have to be able to cope with any difficulties.

With or without professional help, you will have to be able to do some of these jobs yourself.

Составные модальные конструкции

Составные модальные конструкции, или так называемые двойные модальные глаголы (*double modals*), образуют особое звено в цепочке вопросов, касающихся модальных глаголов. Составная модальная конструкция – это комбинация из двух (реже трех) форм модальных глаголов, взаимодействующих друг с другом. Употребление конструкций типа *might could*, *might should*, *might ought to*, *might would*, *may could*, *may will*, *should ought to*, *could might* ограничено территориально и характерно для диалектной речи:

e. g. You might could go there by sea. Особенность таких конструкций заключается в том, что они довольно сложны для изучения, т. к. не поддаются какой-либо систематизации. С одной стороны, допустив, что все модальные глаголы поочередно взаимодействуют друг с другом, можно насчитать более ста комбинаций. В этом случае изучение двойных модальных глаголов сводится к собиранию примеров их употребления и исследованию функционирования каждого из них.

С другой стороны, нет однозначного мнения по поводу того, как именно следует расценивать такие комбинации: в качестве целостных образований или как два грамматически неравнозначных элемента. Последнее положение заключается в том, что первый элемент составной модальной конструкции адвербиализован по аналогии с широко известным примером слияния глаголов *may* и *be* и образования формы *maybe*:

e. g. - My neighbour has been accused of stealing money. - Might could be. = Maybe could be. / You might ought reconsider that. = You maybe ought reconsider that.

В настоящее время периодически появляются случаи употребления составных модальных конструкций в современной речи, не ограниченной диалектными рамками:

e. g. So, if this bipartisan commission had actually studied the fair tax, they might would have had a different conclusion.

What I've been talking about is directing our energy toward something that was halfway practical, something that might could get done.

Такие примеры заставляют задуматься над причинами их появления, ведь даже на тех территориях, где составные модальные конструкции активно используются, их употребление остается локальным. Одновременно, они проникают в грамматику глобального английского.

Заключение и выводы. Изучение системы модальных глаголов английского языка – длительный и сложный процесс. В течение этого периода взгляды на содержание обучения модальным глаголам значительно менялись. В рамках структурного подхода они рассматривались с точки зрения их «дефектности» и формально-структурных особенностей. Развитие семантики направило внимание исследователей на изучение значений модальных глаголов, их связей и взаимодействий. Углубленное исследование семантической стороны привело к обращению более пристального внимания на стиливые особенности системы модальных глаголов. Далее, в связи с быстрым развитием коммуникативной лингвистики, стал актуальным вопрос идиоматической, фразовой и текстовой модальности. Современный подход к изучению модальных глаголов охватывает сферу глобализации английского языка и связанные с этим новейшие тенденции.

Таким образом, проблема классификации модальных глаголов становится еще более актуальной. Очевидно, что традиционные взгляды на данный вопрос не охватывают всей полноты содержания обучения модальным глаголам. Поэтому в дополнение к формально-грамматическому, семантическому критериям, критерию частотности употребления в аутентичных текстах следует взять во внимание такие основания для классификации, как стиливая, идиоматическая, фразовая, текстовая модальности, а также учитывать новейшие тенденции, связанные с глобализацией английского языка.

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Technical sciences

ESSENTIAL TECHNIQUES FOR OBJECT POOLING IN MOBILE GAMES: OPTIMIZING UNITY 3D PERFORMANCE

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Abstract

This article explores pooling objects to a direction point. How to weigh objects has an impact on other objects by a rigid body, how to use prefabs and count pooling speed, and of course demand of objects in Unity Engine. Saving and Getting values and how to view them by using program language C#.

Keywords: Programming, technology, Unity Engine, coroutine, instance, game object, rigid body, collider2D, bool, sprite, impact to value, Save and Load value.

In Unity Engine more prefer using C#, because I use only this perfect language. Initially, before providing examples I would like to say it was my quiet experience where I was challenged with. Well, let's start it! We should make two stages for pooling object success. First stage, we need to download and install Unity Engine, and Visual Studio up to the 2019 version depending on your preference or your computer completion.

Initially, prior to creating a 2D platform. You should set the setting that you prefer. Begin with downloading and installing Unity Hub then you can choose the version and install it too. Set SDK NDK, and JDK at the last version, believe me, it is not an easy deal.

Secondly, We should create PoolManager.cs script in the scripts folder. Furthermore, We should add the line using UnityEngine.Pool, do not forget this it is significant. So, this script will be attached to our PoolManager empty object, and it is our manager guy who responds to the pooling system.

In Unity documentation, it has been provided like this [4]:

```
using System.Text;
using UnityEngine;
using UnityEngine.Pool;

// This component returns the particle system to the pool when the OnParticleSystemStopped event is received.
[RequireComponent(typeof(ParticleSystem))]
public class ReturnToPool : MonoBehaviour
{
    public ParticleSystem system;
    public IObjectPool<ParticleSystem> pool;

    void Start()
    {
        system = GetComponent<ParticleSystem>();
        var main = system.main;
        main.stopAction = ParticleSystemStopAction.Callback;
    }

    void OnParticleSystemStopped()
    {
        // Return to the pool
        pool.Release(system);
    }
}
```

Of course, it is useful although it is a bit old version. Instead, I would like this my own part of the code which has been shown below [1].

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;
public class BoolManager : MonoBehaviour
{
    Vector3 mouseStart;
    [SerializeField] Renderer _renderer;
    [SerializeField] float _sencetivity = 0.01f;
    [SerializeField] float _speedMultiplier = 0.03f;
    [SerializeField] Transform _pointerLine;
    [SerializeField] Bomb _bombPrefab;//, _for more various bullets arbombPrefab, _tmbombPrefab,
    _ckbombPrefab;
    // Our Start void
    void Start()
    {
        _renderer.enabled = false;
    }
    // Our Update void use this void carefully
    void Update()
    {
        MovementAndShooting();
    }
    void MovementAndShooting()
    {
        //currentGun.gameObject.SetActive(true);
        if (Input.GetMouseButtonDown(0))
        {
            _renderer.enabled = true;
            mouseStart = Input.mousePosition;
        }
        if (Input.GetMouseButton(0))
        {
            Vector3 delta = Input.mousePosition - mouseStart;
            transform.right = delta;
            _pointerLine.localScale = new Vector3(delta.magnitude * _sencetivity, 1, 1);
        }
        if (Input.GetMouseButtonUp(0))
        {
            Vector3 delta = Input.mousePosition - mouseStart;
            Vector3 velocity = delta * _speedMultiplier;
            _renderer.enabled = false;
            Bomb newArchBomb = Instantiate(_bombPrefab, transform.position, Quaternion.identity);
            newArchBomb.SetVelocity(velocity);
        }
    }
}

```

You might have a question why he used so consequently `[SerializeField]`, first I should provide you with what is this. In Unity documentation, it looks like this:

"Force Unity to serialize a private field [3]."

When Unity serializes your scripts, it only serializes public fields. If you also want Unity to serialize your private fields you can add the `SerializeField` attribute to those fields.

Unity serializes all your script components, reloads the new assemblies, and recreates your script components from the serialized versions. This serialization is done with an internal Unity serialization system; not with .NET's serialization functionality.

The serialization system can do the following:

- CAN serialize public non-static fields (of serializable types)
- CAN serialize nonpublic non-static fields marked with the `SerializeField` attribute.
- CANNOT serialize static fields.

- CANNOT serialize properties.

Serializable types

Unity can serialize fields of the following types:

- All classes inheriting from `UnityEngine.Object`, for example `GameObject`, `Component`, `MonoBehaviour`, `Texture2D`, `AnimationClip`.
- All basic data types, such as `int`, `string`, `float`, `bool`.
- Some built-in types, such as `Vector2`, `Vector3`, `Vector4`, `Quaternion`, `Matrix4x4`, `Color`, `Rect`, `LayerMask`.
- Arrays of a serializable type
- Lists of a serializable type
- Enums
- Structs

Note: If you put one element in a list (or array) twice, when the list gets serialized, you'll get two copies of that element, instead of one copy being in the new list twice.

Note: If you want to serialize a custom Struct field, you must give the Struct the `[System.Serializable]` attribute.

Hint: Unity won't serialize Dictionary, however you could store a `List<>` for keys and a `List<>` for values. See [ISerializationCallbackReceiver](#) for an example."

Well, after this nobody has a question why is this. I used simple of various variants. Most likely I can say a little bit of experiment, especially using `Vector3` in a 2D game. I know several ways how to pool objects. Yes, you can add the line maybe in red color, thus you try all of this in the `update()` method it won't be preferable. While working on the direction of how it will go to the point, especially the count value of `bool` and the value of drop-down the object somewhere will require a line. The length of the vector is the square root of $(x^2 + y^2 + z^2)$ I meant magnitude. If you would like to compare the magnitudes of some vectors, I advise you to compare squared magnitudes of them using `sqrMagnitude` because computing squared magnitudes is faster instead. So, you know how to count the direction of pooling from point A to point B, and you have examples, which I made with the experiment and shared with you. Honestly, so many consequently examples of pooling objects are, although I decided to have an experiment on this exercise and found that you would acknowledge it. In this case, you should know about the Save & Load system (binary or `PlayerPrefs`) which will be useful in reducing and increasing the damage and health of objects. Let me explain the method that I use, it is a simple way by using `PlayerPrefs`. Such as [2]:

```
if (archer >= 1)
{
    var p = Instantiate(archerBulletPrefab,
        currentGun.position - currentGun.right,
        currentGun.rotation);

    p.AddForce(-forceFinal, ForceMode2D.Impulse);
    archer--;
    int numberToShow = archer;
    PlayerPrefs.SetInt("numArchshow", numberToShow);
    currentGun.gameObject.SetActive(false);
}
```

In this example, I illustrate `setInt` "Save" a value as well. Furthermore, you will be able to set and get the value where you want, for example save a value in the object script and get its value in another pooling script. To get the value you should use it like this:

```
public void ourMethod()
{
    boolT = PlayerPrefs.GetInt("numArchshow ");
}
```

However, though you want to use it in bigger projects I recommend using the Binary tip of Save & Load methods. Well, now you know enough to install Engine, create a project, set options, Pool object, count speed, and Save & Load the value that you need.

Moreover, we can discuss another example which is a little bit strange, because it is for a lot of objects that we will create to get one object by damaging or on indicated zone `bools` must be destroyed

by themselves here we go [6]:

```
public List<GameObject> pooledObjects;
public GameObject objectToPool;
public int amountToPool;
```

Creating a list of objects as classical.

```
pooledObjects = new List<GameObject>();
for (int i = 0; i < amountToPool; i++) {
    GameObject obj = (GameObject)Instantiate(objectToPool);
    obj.SetActive(false);
    pooledObjects.Add(obj);
}
```

The author made the list of objects and turned it off by what we know already and this is ".SetActive(false)" It is more useful for massive attack objects and then do not worry about if it will bounce the target. But he recommended putting it into void Start() which is more for beginners, I recommend putting it into the Coroutine rather than putting it into the void Update() that a number of developers do.

And now we can accord the next example that I found to explain it to you. By the example below we can see how there would be various variants to achieve a solution [5]:

```
using System;
using UnityEngine;

[Serializable]
public class PoolItem
{
    public GameObject Prefab;
    public int PoolCount;
}
```

Yes, he wanted to first create a pool item we constantly call "prefab" and attach the script then determine how it will work. Honestly, this is not the wrong way, by the way, setting up settings prior is more preferred. Then he goes to create Pool Manager.

```
using System;
using System.Collections.Generic;
using UnityEngine;
using UnityEngine.Pool;

public class PoolManager : MonoBehaviour
{
    // Default pool size for each pool item
    public static int DEFAULT_POOL_COUNT = 1;

    // Data Setup
    [SerializeField] private List<PoolItem> poolableObjects = new List<PoolItem>();

    // Collection checks will throw errors if we try to release an item that is already in the pool.
    [SerializeField] private bool collectionChecks = true;

    // Maximum collection size allocated per pooled object
    [SerializeField] private int maxPoolSize = 10;

    private Dictionary<string, IObjectPool<PooledGameObject>> pool;
```

```

public Dictionary<string, IObjectPool<PooledGameObject>> Pool => pool;

// Pool is ready to be used
public bool IsReady { get; private set; }

public Action OnCleanup;
public Action OnRelease;

public void InstantiatePool()
{
}

public void CleanupPool(bool garbageCollect = true)
{
}

public void ReleasePooledObject()
{
}

private void CreateObjectsPool(PoolItem item)
{
}

private void InitializeObjectsPool(PoolItem item, int count)
{
}

private PooledGameObject CreatePooledItem(GameObject prefab)
{
    GameObject go = Instantiate(prefab, Vector3.zero, Quaternion.identity, transform);
    go.name = prefab.name;
    var pooledGO = go.AddComponent<PooledGameObject>();
    pooledGO.Initialize(this, prefab.name);
    return pooledGO;
}

private void OnGetFromPool(PooledGameObject pooledGO)
{
    pooledGO.SetActive(true);
}

private void OnReleaseToPool(PooledGameObject releaseGO)
{
    releaseGO.transform.SetParent(transform);
    releaseGO.SetActive(false);
}

private void OnDestroyPoolObject(PooledGameObject destroyedGO)
{
    Destroy(destroyedGO.gameObject);
}
}

```

I want to note that these all code examples come from medium.com. So, all these codes are default, we can understand them easily and also we can fill them out as we want to. I was not surprised when I saw for destroy he used classically in the function OnDestroyPoolObject(),

Destroy(destroyedGO.gameObject), yes it is correct and the default method.

In conclusion, Some programmers use OnTriggerEnter2d() classes, this way is also correct but we can see that somewhere, and sometimes it gives issues. For work in this class, you should attach a capsule 2D collider to the objects, in the detection moment will be an explosion, but not any objects that have the same value or tags this is difficult because the collider attached to the objects must be in the detection area. That is why we have an issue while working on an explosion. So, we met with several ways to make the pooling of objects, the Save-Load System, and the explosion a little bit, because the explosion is another big theme that would be discussed in another article. I try to give you separate ways with highlighted examples that will be helpful for your future projects as well.

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BUILDING SECURE WEB APPLICATIONS: CRUCIAL SECURITY PRACTICES FOR DEVELOPERS

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Abstract

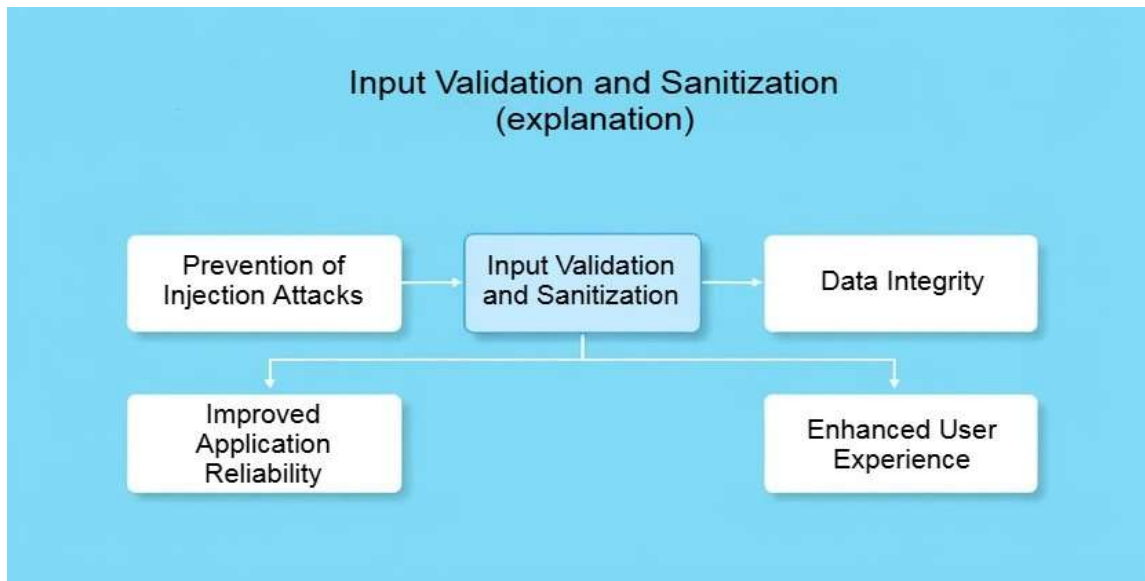
This article focuses on the essential security practices that developers must implement to build secure web applications. As web applications increasingly become targets for cyber threats, understanding and adopting these practices is critical for protecting user data and maintaining application integrity.

Keywords: Authentication and Authorization, Data Encryption, Secure Coding Practices, Regular Security Audits and Penetration Testing, Content Security Policies (CSP), Third-Party Libraries and Dependencies, Secure APIs.

*In our day's interconnected world, where web applications are increasingly ubiquitous, the security of these digital platforms has become paramount. With the rise of cyber threats, such as data breaches, identity theft, and service disruptions, developers are tasked with not only delivering robust and user-friendly applications but also ensuring that they are fortified against potential vulnerabilities. This challenge necessitates a comprehensive understanding of best practices in security, particularly in the areas of authentication, data protection, and secure coding. Key security practices such as **authentication and authorization** serve as the first line of defense in verifying user identities and controlling access to sensitive information. **Data encryption** adds an additional layer of protection, safeguarding data both in transit and at rest against unauthorized access. Equally important are **secure coding practices**, which help developers write code that is resilient against common vulnerabilities. **Regular security audits and penetration testing** enable teams to identify and rectify potential weaknesses before they can be exploited by attackers. Implementing **Content Security Policies (CSP)** further enhances security by preventing a variety of attacks such as cross-site scripting (XSS). Additionally, the careful management of **third-party libraries and dependencies** is crucial, as these can introduce vulnerabilities if not properly vetted. Finally, securing **APIs** is essential for protecting data exchanges and ensuring that integrations with other systems do not become points of exploitation. This guide will delve into these vital security practices, shedding light on how developers can effectively implement them to build secure web applications that protect both user data and organizational integrity. By adopting a proactive approach to security, developers can mitigate risks and contribute to a safer digital landscape, ensuring that web applications are not only functional but also safeguarded against evolving threats.*

Input Validation and Sanitization:

Validation involves verifying if user input meets specific requirements, length, or range before it is accepted. I can mention here from the dissertation of Michael Williams Dalton, Stanford University that I liked: "This dissertation explores the potential of DIFT by developing practical DIFT platforms, and then using these platforms to design robust, comprehensive DIFT policies to prevent security attacks on real-world applications. We focus on input validation vulnerabilities such as cross-site scripting, buffer overflows, authentication bypass, and SQL injection", honestly, it is interesting to observe how he explains Input validation by Dynamic Information Flow Tracking. Sanitization involves eliminating or neutralizing any potentially harmful or undesired characters or elements from user input or output, such as HTML tags, scripts, or SQL commands. In other words, it is when safe user input might be used in an SQL query. I want to explain several benefits:



1. **Prevention of Injection Attacks:** Proper input validation helps protect against injection attacks, such as SQL injection, command injection, and cross-site scripting (XSS). By ensuring that only expected formats and types of input are accepted, developers can prevent attackers from executing malicious code.

2. **Data Integrity:** Implementing input validation ensures that only valid and correctly formatted data is processed by the application. This enhances data integrity and consistency, reducing the risk of errors and maintaining the quality of data in databases.

3. **Improved Application Reliability:** Validating user input can help catch errors before they reach the core application logic. This reduces the chances of unhandled exceptions and system crashes, leading to increased reliability and a smoother user experience.

4. **Enhanced User Experience:** By providing immediate feedback on input errors (e.g., incorrect formats or missing fields), validation improves usability. Users can correct errors in real-time, leading to a more intuitive and satisfactory interaction with the application.

Authentication and Authorization:

Authentication and Authorization are separate processes of identity and access management (IAM) and work together. I suppose amount of us met with this while when necessary to let commit and get access to web content or purchase the product. However, we could see different auth systems, the process of confirming a user's identity is known as authentication, and it involves providing the user with appropriate access to system resources. I want to share with you several types of authentication factors given by Matt Kosinski IBM:

- **Knowledge factors:** Something only the user knows, such as a password, PIN, or the answer to a security question.
- **Possession factors:** Something only the user has, such as a one-time PIN (OTP) sent to their personal mobile phone through SMS text message or a physical security token.
- **Inherent factors:** Biometrics, such as facial recognition and fingerprint scans.

As you observe I constantly read IBM articles they are very useful. I also want to mention what Matt Kosinski IBM wrote about types of authentications such as Single-factor authentication, Multifactor authentication, Two-factor authentication, Passwordless authentication, and Adaptive authentication and that is cool, but now I want to explain several benefits in my opinion significant either:

- **Increased Security:** increased security afforded by robust authentication and authorization measures is essential in today's threat landscape. By ensuring that only authorized users gain access to sensitive systems and data, organizations can protect themselves from a wide range of security risks, enhance user trust, and maintain compliance with regulations.

- **User Accountability:** User accountability refers to the principle that users are responsible for their actions while accessing and using information systems and data. This involves verifying a user's identity, tracking their activities, and holding them accountable for any actions taken within a system.

- **Protection Against Identity Theft:** Proactively protecting against identity theft involves a multifaceted approach that combines technology, user education, and effective data management

practices. By implementing strong authentication measures, regularly monitoring data, providing education, and having response protocols in place, individuals and organizations can significantly reduce the risk of identity theft and its potentially devastating impacts.

- **Access Management:** Access management refers to a set of processes and technologies that facilitate the granting, monitoring, and revocation of user access rights to various systems, applications, and data based on defined permissions and roles.

- **User Confidence:** User confidence is a vital asset for any organization, particularly in a technology-driven world where concerns about security and privacy are paramount.

It is so suitable to my mindset that I decided to share it with you with astonishing. I am excited about how IBM developers explain several types and look so deep into aspects. So, I decided to explain some advantages rather than types of Authorization.

Now, time to meet closely with the Authorization let's see several advantages of:

- **Controlled Access:** Controlled access is a fundamental aspect of information security, ensuring that sensitive resources are protected while allowing legitimate users the access they need to perform their roles effectively.

- **Policy Enforcement:** Policy enforcement is a critical aspect of organizational security and compliance.

- **Efficient Resource Management:** Efficient resource management is a cornerstone of organizational success, driving productivity, reducing costs, and enhancing overall performance.

- **Risk Mitigation:** Risk mitigation is the process of identifying, assessing, and implementing strategies to reduce or eliminate risks that could potentially impact an organization's operations, assets, or objectives.

Data Encryption:

Encryption involves converting easily readable plaintext into indecipherable ciphertext to conceal sensitive information from unauthorized individuals. Many organizations employ encryption in data security to safeguard sensitive data from unauthorized access and data breaches. Data Encryption has two types:

- **Asymmetric encryption:** (public key cryptography): Data is secured by employing two distinct keys for encryption and decryption. The public key is available for anyone to encrypt data, while only those possessing the private key can decrypt the data.

- **Symmetric encryption:** Data is secured and unsecured using a confidential shared key that is common to all parties participating in a transaction.

Well, I need to explain each of the types separately. Besides, each of them has its own algorithms. For example: Asymmetric encryption has **Elliptic Curve Cryptography (ECC)** and **Rivest Shamir Adleman (RSA)** which we initially observe below:

- **Elliptic Curve Cryptography (ECC):** ECC is an encryption method based on elliptic curves over finite fields. It provides strong security with shorter key lengths, making it suitable for resource-constrained devices like smartphones and IoT devices

- **Rivest Shamir Adleman (RSA):** RSA is an asymmetric encryption algorithm named after its inventors. It relies on prime numbers to generate key pairs and is used for secure data transmission and digital signatures in protocols like HTTPS, SSH, and TLS.

Additionally, Symmetric encryption has **Twofish**, **Triple DES (3DES)**, **Data Encryption Standard (DES)**, and **Advanced Encryption Standard (AES)**, let's take a look closely at each of them:

- **Twofish:** Twofish is a fast and secure symmetric key block cipher that operates on 128-bit data blocks and supports key lengths of 128, 192, or 256 bits.

- **Triple DES (3DES):** Created as an improvement to DES, 3DES uses the DES algorithm three times on each data block, which greatly increases the key length and enhances security.

- **Data Encryption Standard (DES):** IBM introduced DES in the 1970s as the standard encryption algorithm, but its 56-bit key length made it vulnerable to brute-force attacks.

- **Advanced Encryption Standard (AES):** AES is a widely adopted symmetric encryption algorithm, praised for its data encryption capabilities and used by organizations and governments worldwide, including the US government and NIST.

Secure Coding Practices:

Secure coding is about developing software that can resist security vulnerabilities by integrating security best practices, techniques, and tools early in development, aligning every feature with security measures from the beginning of the software development lifecycle. Furthermore, I want to assert several secure coding standards:



- **SEI CERT:** The CERT Secure Coding Standards offer guidelines for writing secure and reliable software, covering various programming languages and addressing common security vulnerabilities and coding errors.
- **Common Weakness Enumeration:** CWE is a community-developed list of common software weaknesses and vulnerabilities, providing a standardized way to categorize and identify security flaws. Each weakness is assigned a unique identifier and detailed description, aiding in vulnerability assessment and mitigation.
- **ISO/IEC 27001:** It's a global standard for managing information security systems (ISMS). While not a coding standard, it provides a framework for implementing security controls and managing risks across an organization's software development lifecycle.
- **OWASP Top Ten:** The OWASP Top Ten outlines the ten most crucial security risks for web applications and provides advice on addressing them through secure coding techniques. Examples include injection attacks, broken authentication, and exposure of sensitive data.
- **NIST Secure Coding Guidelines:** NIST offers secure coding guidelines for various programming languages and platforms to help developers prevent common vulnerabilities.

Regular Security Audits and Penetration Testing:

Regular security audits and penetration testing will be essential ways to protect your customers and keep your reputation. These assessments replicate web application attacks to uncover vulnerabilities before they can be exploited by real attackers. Let's discuss Important Elements of Security Audits, here are some:

- **Access Control and Authentication Review** - Assess if the system has suitable user access management and authentication policies in place. Ensure permissions align with the principle of least privilege, and check for weak password policies or missing multi-factor authentication.
- **Security Awareness** - Assess the company's staff training in security best practices, including the identification of phishing attacks or social engineering tactics. Since human mistakes can lead to security breaches, training is a crucial aspect of the audit.
- **Compliance Review** - Ensure that all systems, including software and hardware, adhere to the specified security standards and regulations, such as ISO/IEC 27001, NIST, or industry-specific standards (for example, PCI-DSS for the protection of financial data). It is crucial to conduct regular audits and assessments to verify compliance and address any potential security vulnerabilities. Additionally, stay informed about any updates or changes to security standards and regulations to ensure ongoing compliance.

Content Security Policies (CSP):

Content Security Policy (CSP) provides server administrators with the capability to mitigate or entirely prevent attackers from exploiting cross-site scripting (XSS) vulnerabilities. This is achieved by specifying the specific Internet domains that web browsers should acknowledge as authorized sources of executable scripts. Browsers that conform to CSP guidelines will exclusively execute scripts that are

sourced from preapproved domains, disregarding all other scripts, including inline scripts and HTML event handling attributes. By enforcing these restrictions, CSP effectively enhances web application security by minimizing the risk of XSS attacks. I recommend you improve your CSP to keep your content in trusted security. I know two common features to do it:

- HTTP headers;
- Meta tags in the HTML of the page.

The web server has the capability to enhance security by including an HTTP header known as Content-Security-Policy (CSP) in each response it sends. This header can be customized to specify a range of properties, providing granular control over the security policies implemented by the web server. I advise try to memorize the following information, it will help you in the future believe me:

- The `form-action` specifies the URLs that can be used as part of an action in a `<form>` tag. This means that the browser restricts where form results can be sent. It's important to note that the `form-action` does not revert to `default-src`, so this property is mandatory if you are using form elements on your website.

- The `img-src` attribute pertains to the specific locations from which images can be fetched or retrieved for use.

- The `object-src`: specifies the locations from which plugins can be obtained.

- The `media-src` attribute refers to the specific locations from which rich media content, such as videos, can be fetched or retrieve for use.

- The `"script-src"` directive in Content Security Policy (CSP) headers specifies the locations from which external scripts can be loaded. If your website or application does not utilize client-side scripting. In that case, it is important to set the value of the `"script-src"` directive to `"none"` in order to enhance security and mitigate the risk of cross-site scripting attacks.

Third-Party Libraries and Dependencies:

A third-party component is software created by one entity and can be distributed as open-source or sold to other entities for reuse in development. There are many advantages, however, I can explain several significant benefits:

- **Enhanced Functionality:** Using third-party libraries typically offers sophisticated features, tools, and optimizations that might be challenging to develop on your own. This can significantly improve the application's overall performance

- **Community Support:** Widely used libraries typically boast a vibrant community that provides documentation, tutorials, and forums for resolving problems. This community assistance can be extremely helpful in addressing issues rapidly.

- **Cross-Platform Compatibility:** Numerous libraries are created to function across various platforms, which can simplify deployment and lessen the intricacies of handling platform-specific code.

- **Focus on Core Competencies:** Leveraging third-party libraries enables developers to concentrate on areas where they possess particular expertise or where their application can stand out, instead of duplicating existing solutions.

Secure APIs:

API security is essential for modern web applications, as APIs can have vulnerabilities like flawed authentication, lack of rate limiting, and code injection. Organizations should regularly test APIs to identify these vulnerabilities and apply best security practices to address them. In addition, I prefer to explain five benefits below:



- *Increased Trust*: Builds user confidence in the application by demonstrating a commitment to security.
- *Preparedness for Incident Response*: Improves the capacity to swiftly address security incidents and breaches, thereby reducing potential harm.
- *Improved Data Integrity*: Protects data from unauthorized alterations, ensuring that the information exchanged is reliable.
- *Enhanced Authentication and Authorization*: Ensures that only authorized users can access sensitive data and functionalities.
- *Protection Against Vulnerabilities*: Safeguards APIs from common threats like broken authentication, code injection, and unauthorized access.

In conclusion, we know how to create secure applications now, as well. Honestly, everything depends on your preference, wherever you choose you will be able to improve as required exactly modern times. Building secure web applications is a critical responsibility for developers in today's digital landscape, where cyber threats are increasingly sophisticated and prevalent. By prioritizing security throughout the development process, from planning and design to deployment and maintenance, developers can significantly reduce vulnerabilities and protect users' data and privacy. Implementing crucial security practices—such as input validation, proper authentication and authorization, secure coding practices, data encryption, and regular security auditing—can help mitigate risks and safeguard applications against a multitude of threats. Additionally, staying informed about the latest security trends and vulnerabilities, as well as adhering to industry standards and best practices, is essential for maintaining robust security.

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PRINCIPLES OF DATA STRUCTURES AND DATA ANALYSIS IN MODERN APPLICATIONS

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Abstract

This article, "Principles of Data Structures and Data Analysis in Modern Applications," delves into the significance of data structures and analytical techniques within contemporary tech ecosystems. It begins by highlighting the foundational importance of data structures and progresses through basic to advanced structures like arrays, trees, and graphs. It covers essential algorithms for data analysis, with emphasis on data visualization and machine learning, as well as big data's influence on analysis methods. Ethical and legal considerations are addressed, highlighting the responsibilities of managing data securely and ethically in modern applications.

Keywords: *Importance of Data Structures in Modern Applications, Basic Data Structures, Advanced Data Structures, Algorithms for Data Analysis, Data Analysis Technique, Data Visualization, Machine Learning in Data Analysis, Big Data and Data Analysis, Ethical and Legal Considerations in Data Analysis.*

Introduction. *Data structures are central to both theoretical computer science and practical programming, offering an abstraction for organizing and processing data. They bring distinct characteristics to how data is structured, how syntax operates, and how functions perform, serving as the foundational components of computer applications. Data structures profoundly influence application complexity by impacting performance. Performance analysis of computer applications examines system efficiency with criteria like execution time and resource usage, aiming for balanced resource use to prevent inefficiency or bottlenecks. The interconnectedness of data structures and performance makes their analysis essential to any application. Key goals in performance analysis of data structures include (i) straightforward characterizations of functional behavior in terms of time and space complexities, expressed in general growth rates, and (ii) benchmarks for comparing efficiency across data structures of the same type. However, a clear, accessible presentation of these concepts is crucial, especially for learners outside computer science. Typical discussions on data structures and performance can be limited by assumed familiarity with programming or advanced mathematics, often leaving out newer programmers, analysts, or researchers in other digital fields who are interested in efficiency and usability. The following exposition provides an introduction to basic data structure and performance concepts, free of specialized terminology and complex mathematics, to reach a broader audience. As fundamental elements of computer applications, data structures shape essential functions across various fields—from physics to epidemiology—where social and economic impacts can be profound. Design flaws or mismanagement of data structures can lead to unnecessary costs and inefficiencies. By selecting appropriate structures and following best practices, developers can minimize wasted resources. A guiding principle in data structures is that simpler structures should be preferred when they fulfill the same computational needs. For instance, arrays are often preferable to linked lists in list structures, and binary trees to ternary trees in tree structures, based on their efficiency for equivalent tasks.*

Importance of Data Structures in Modern Applications:

In the digital age, data structures have become indispensable in building efficient, scalable, and reliable applications. As the backbone of data organization and management, data structures support everything from simple data storage to complex processing tasks in modern computing. From search engines and social media platforms to financial analytics and artificial intelligence, applications today handle vast amounts of data that require optimized access, processing, and storage. Selecting the appropriate data structure is critical, as it determines not only an application's performance but also its ability to scale and adapt to increasing demands. This discussion explores the vital role of data structures in modern applications, highlighting their contributions to performance, resource management, and user experience in a data-intensive world. I want to share with you several benefits:

- **Enhanced Data Processing:** *Advanced data structures such as stacks, queues, and heaps are essential components in algorithmic operations. These structures facilitate intricate processes, enabling more advanced functionalities in software applications. They play a crucial role in implementing complex*

operations like sorting algorithms, efficient search mechanisms, and priority-based task management systems.

- **Data Security and Integrity:** Certain data structures contribute to improved data integrity and security by implementing structured storage and retrieval mechanisms. This is particularly valuable in fields dealing with sensitive information, such as healthcare systems and financial applications, where data protection is paramount.

- **Optimized Performance:** Selecting an optimal data structure can lead to substantial improvements in computational efficiency and memory utilization. This optimization enhances the overall responsiveness of applications and minimizes processing delays, which is particularly crucial for systems that operate in real-time environments.

- **Scalability:** Data structures such as trees, hash tables, and graphs enable applications to handle growing data volumes effectively. These structures facilitate scalable performance, allowing systems to manage increased information loads while maintaining operational efficiency.

- **Improved Code Readability and Maintenance:** Well-organized data frameworks improve code readability and modularity, leading to better maintainability and streamlined debugging.

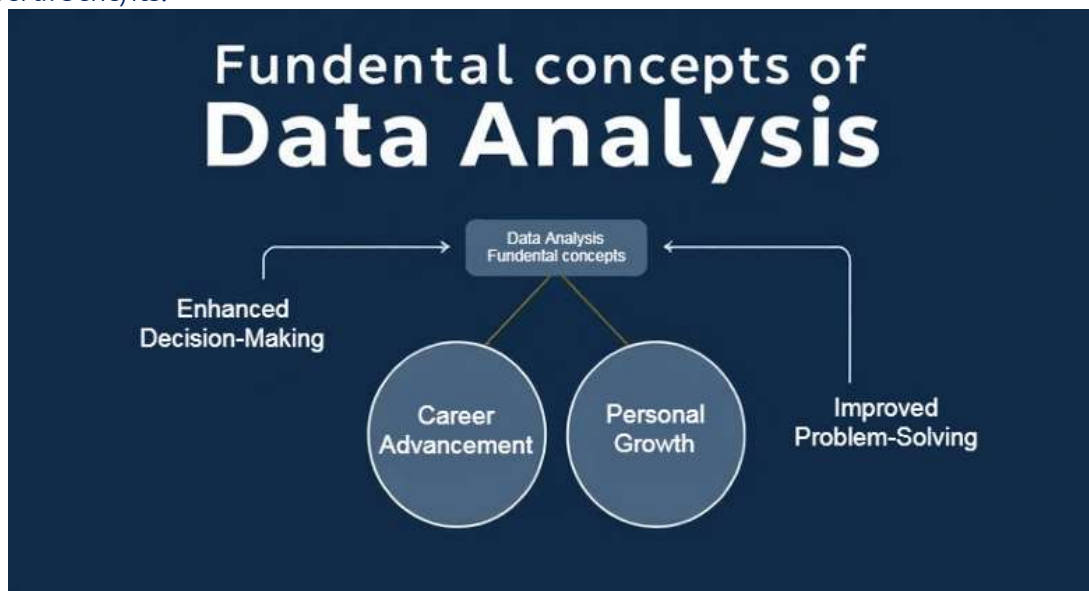
- **Efficiency in Data Management:** By efficiently organizing and managing vast amounts of data, data structures significantly improve data access, insertion, deletion, and update speeds, essential for high-performance applications.

- **Reduced Resource Consumption:** Efficient data structures minimize resource consumption, such as memory and CPU usage, leading to lower operational costs and increased energy efficiency.

- **Real-Time Data Analysis:** Data structures enable real-time data processing in fields such as AI, finance, and social media, facilitating instant insights and automated decision-making.

Fundamental Concepts of Data Analysis

Recent technological advancements have led to a massive surge in data generation across various sectors, including industry, agriculture, education, medicine, and social networking. This data deluge, primarily driven by computerized systems, online transactions, and smartphone usage, poses a significant challenge. To harness the potential of this vast data, effective data analysis techniques are crucial. By transforming raw data into meaningful information and knowledge, organizations can make informed decisions and gain valuable insights. This process is particularly vital in fields like finance and biology, where analyzing large datasets, such as genome data, can revolutionize research and applications. Here are several benefits:



- *Enhanced decision-making: is the process of using data and analytical techniques to improve the quality and efficiency of decision-making processes. By harnessing the power of data, organizations can gain valuable insights, reduce uncertainty, and make more informed choices.*

- *Improved problem-solving: refers to the application of data analysis and analytical techniques to enhance the process of identifying, analyzing, and resolving problems. By leveraging data, organizations can gain a deeper understanding of the root causes of problems, develop more effective solutions, and make data-driven decisions to prevent future issues.*

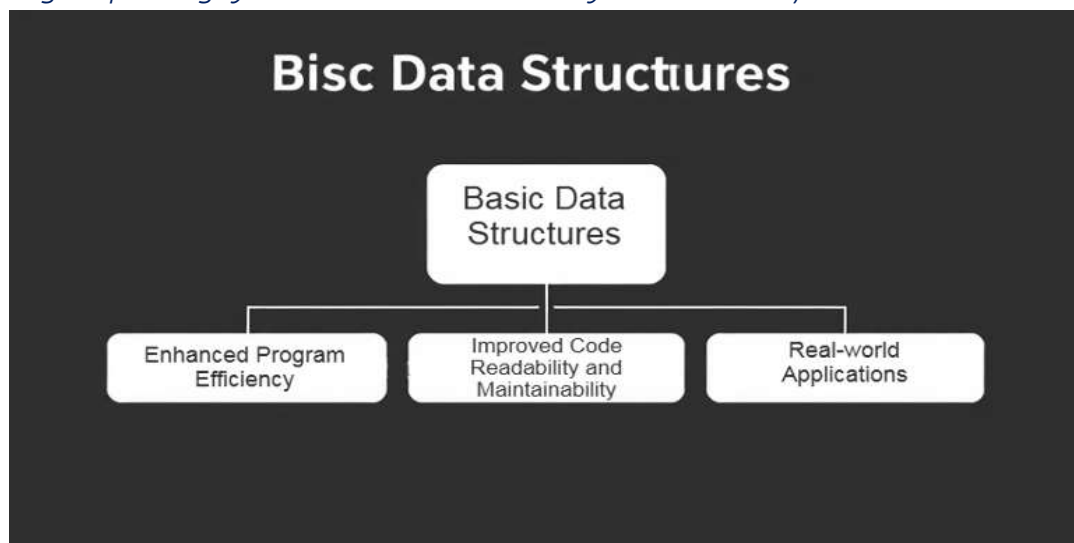
- *Career advancement: have become increasingly valuable in today's data-driven world. By mastering these skills, you can significantly enhance your career prospects and open up new opportunities.*

- *Personal growth: is a lifelong journey of self-improvement and development. Data analysis can be a powerful tool to enhance this journey by providing insights into your habits, behaviors, and goals.*

Every data is characterized by its structural pattern and it can be visualized in a variety of ways. Each data instance comprises a feature vector of parameters, and data instances occupy a point in the multi-dimensional feature space, where the dimensional number of the feature vector indicates the dimension of the feature space.

Basic Data Structures

Arrays and linked lists are essential data structures that underpin many modern applications. Arrays, which store elements in contiguous memory locations, offer fast access via indexing but require a fixed size. Linked lists, on the other hand, are dynamic structures that link elements together, allowing for flexible growth and shrinkage. However, accessing elements in linked lists can be slower than in arrays due to the need for traversal. Stacks and queues are specific types of linked lists with distinct access patterns. Stacks follow a LIFO principle, meaning the last item added is the first to be removed. This is useful for tasks like function call management and undo operations. Queues, operating on a FIFO principle, process elements in the order they are added. This makes them suitable for scenarios like task scheduling in operating systems. I want to share with you several benefits:



- *Enhanced program efficiency: is a critical goal in software development. By selecting and implementing appropriate data structures, developers can significantly improve the performance of their applications.*

- *Improved code readability and maintainability: data structures play a crucial role in enhancing code readability and maintainability by providing a structured and organized way to represent data.*

- *Real-world applications: data structures are the backbone of many real-world applications, powering everything from simple software to complex systems.*

Advanced-Data Structures

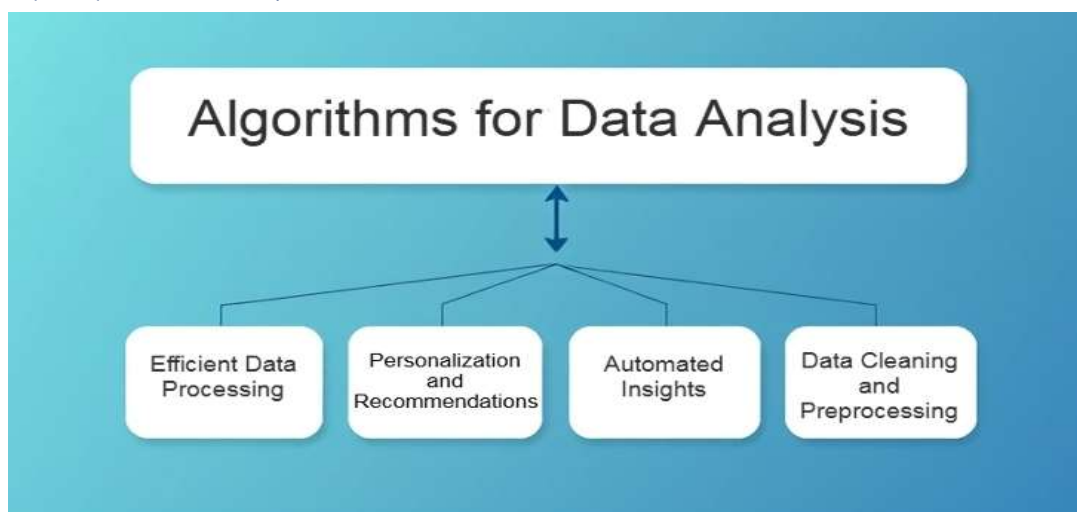
Trees and graphs are versatile data structures used to represent hierarchical and network-like relationships. Trees, with their root and branching structure, are ideal for organizing hierarchical data like file systems or organizational charts. Binary trees, a specific type, limit each node to two children, making them suitable for efficient searching and sorting. Graphs, composed of nodes and edges, offer greater flexibility to model complex relationships. They can represent social networks, road maps, or

dependencies in software projects. Both trees and graphs are invaluable tools for handling interconnected data. Hash tables provide efficient key-value storage and retrieval. By using a hash function to calculate an index, they offer near-constant time complexity for operations like search, insertion, and deletion. This makes them ideal for dictionaries, caches, and database indexing. Heaps, a specialized tree-based structure, maintain a specific ordering property. In a max heap, the parent node is always greater than or equal to its children, while in a min heap, it's less than or equal to. Heaps are particularly useful for implementing priority queues, where elements are processed based on their priority level. Let's explain several benefits:

- **Improved Efficiency for Complex Operations:** Advanced data structures, such as balanced trees, graphs, and hash tables, enable quicker and more efficient management of complex tasks like calculating shortest paths, processing based on priority, and sorting large datasets.
- **Scalability for Large Data:** Data structures like B-trees and quad trees are built to manage large volumes of data effectively, making them vital for highly scalable applications, including big data processing and distributed databases.
- **Better Data Visualization and Analysis:** Spatial data processing is significantly enhanced by complex data structures like k-d trees and R-trees, which are vital for applications in geolocation, mapping, and 3D modeling.
- **Enhanced Search Capabilities:** To enhance data retrieval speed, applications like databases, search engines, and file systems often employ data structures like tries, B-trees, and skip lists, which are optimized for search efficiency.
- **Optimized Memory Usage:** By optimizing memory allocation and reducing redundancy, advanced data structures are ideal for applications dealing with large datasets or high-throughput systems.
- **Efficient Data Compression and Storage:** By leveraging specialized data structures such as tries and Huffman trees, file compression algorithms can significantly reduce storage requirements for large or repetitive data.
- **Support for Graph-Based Applications:** To model and analyze complex relationships in networks, social media, and recommendation systems, graph structures are indispensable.
- **Enhanced Algorithm Performance:** Advanced data structures power sophisticated algorithms, leading to faster and more efficient solutions in machine learning, data mining, and image processing.

Algorithms for Data Analysis

Sorting and searching are essential operations in data analysis. Efficient sorting algorithms like QuickSort, MergeSort, and HeapSort organize data, making it easier to process and analyze. Searching algorithms like Binary Search quickly locate specific data within sorted structures. Graph algorithms, including Dijkstra's algorithm for shortest paths and Kruskal's algorithm for minimum spanning trees, are crucial for analyzing interconnected data. These algorithms efficiently navigate and optimize networks, finding applications in fields like network routing and social network analysis. Let's explore the benefits of these techniques:



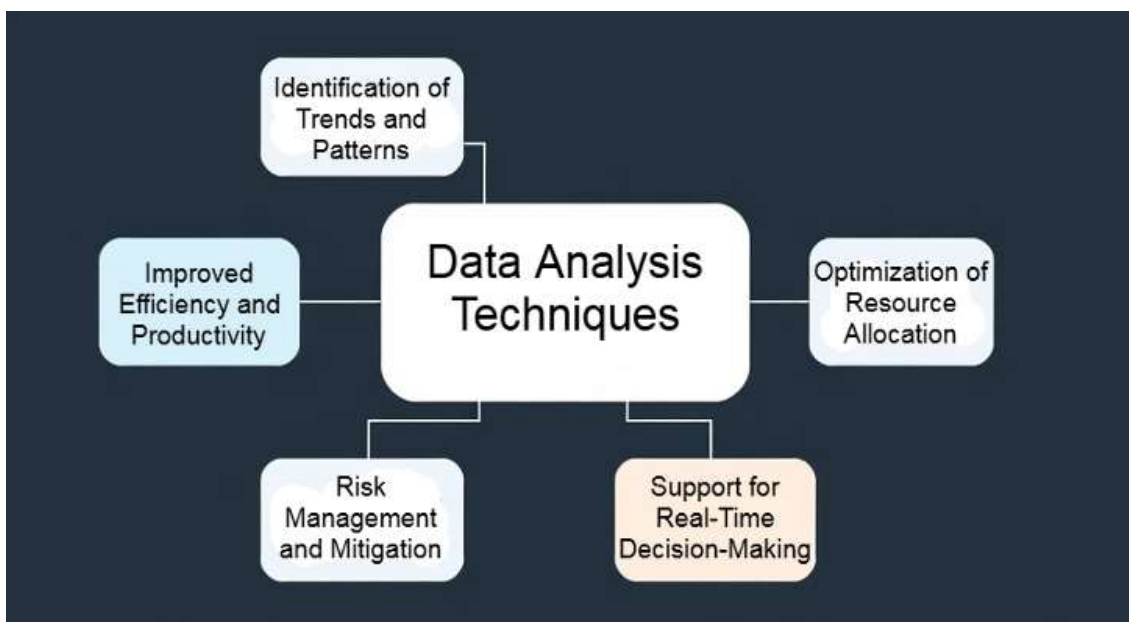
- **Efficient Data Processing:** Algorithms optimize data processing, speeding up transformations,

filtering, and summarization, which is crucial for efficiently handling large datasets and uncovering meaningful insights.

- **Personalization and Recommendations:** Recommendation systems, powered by algorithms like collaborative filtering, personalize user experiences, making them essential for e-commerce, streaming, and social media platforms.
- **Automated Insights:** Algorithms streamline data exploration, reducing manual effort and uncovering valuable insights, enabling analysts to focus on strategic decision-making.
- **Data Cleaning and Preprocessing:** Algorithms enhance data quality by cleaning, normalizing, and structuring raw data, ensuring accurate and reliable insights from data analysis.

Data Analysis Techniques

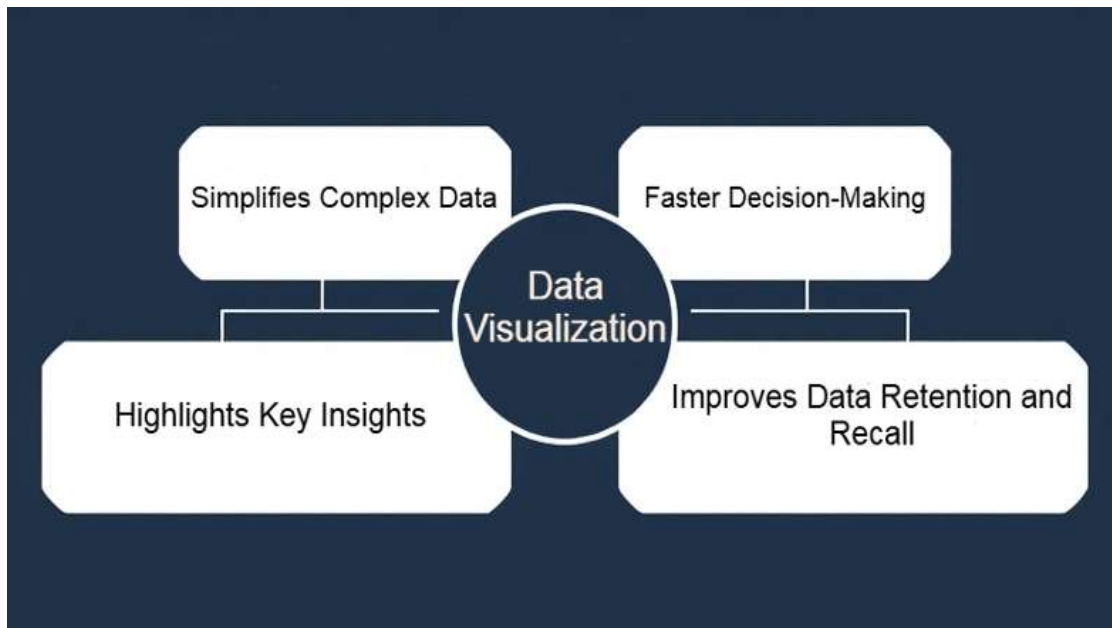
Descriptive statistics provide a summary of data, highlighting key characteristics like central tendency (mean, median, mode) and spread (standard deviation). These fundamental techniques offer a preliminary understanding of the data's distribution. Inferential statistics, on the other hand, go beyond description, allowing analysts to draw conclusions about a larger population based on a sample. Techniques like hypothesis testing, confidence intervals, and regression analysis are essential for making informed decisions and drawing meaningful insights from data. Let's explore the benefits of these statistical techniques:



- **Identification of Trends and Patterns:** Data analysis helps us gain valuable insights by uncovering hidden patterns, trends, and correlations within data, such as customer behavior, market shifts, and potential opportunities.
- **Improved Efficiency and Productivity:** Analyzing data enables the optimization of processes and workflows, resulting in improved efficiency and productivity.
- **Risk Management and Mitigation:** Anomaly detection and risk analysis techniques help businesses identify and address potential risks proactively.
- **Optimization of Resource Allocation:** Data analysis helps optimize resource allocation, ensuring resources are used effectively and reducing costs.
- **Support for Real-Time Decision-Making:** Real-time data analysis empowers businesses to quickly respond to changing conditions, making it essential for dynamic fields like finance, e-commerce, and logistics.

Data Visualization

Data visualization turns raw data into visual representations like bar charts, line graphs, and scatter plots. These visuals make it easier to spot patterns, trends, and anomalies, making data-driven insights accessible to both technical and non-technical audiences. Interactive dashboards further enhance data exploration, allowing users to dynamically interact with data through various charts and graphs. These dashboards are powerful tools for real-time data analysis and decision-making, commonly used in business intelligence and performance monitoring. Let's explore the benefits of data visualization:



- **Simplifies Complex Data:** Data visualization simplifies complex datasets by transforming them into visual formats like charts, graphs, and maps, making information easier to understand.
- **Faster Decision-Making:** Visualized data empowers stakeholders to quickly understand trends and patterns, facilitating faster, data-driven decision-making across the organization.
- **Highlights Key Insights:** Visualized data empowers stakeholders to quickly understand trends and patterns, facilitating faster, data-driven decision-making across the organization.
- **Improves Data Retention and Recall:** Visual information is more memorable than text or numbers, making data visualization an effective tool for communicating important information.

Machine Learning in Data Analysis

Supervised learning is a machine learning technique where an algorithm learns from labeled data to make predictions or classifications. It's like teaching a child to identify different fruits by showing them examples with labels. Common techniques include decision trees, support vector machines, and neural networks. Unsupervised learning, on the other hand, involves learning from unlabeled data. It's like asking a child to group similar objects without any prior instructions. Clustering algorithms (like K-means and hierarchical clustering) and dimensionality reduction techniques (like PCA) are commonly used in unsupervised learning to discover hidden patterns and structures within data. I want to explain several benefits:

- **Automated Data Processing:** Machine learning automates data analysis tasks, reducing the need for manual data handling and improving efficiency, especially with large datasets.
- **Predictive Analytics:** By identifying trends and patterns in historical data, machine learning models can make accurate predictions, helping organizations anticipate future events and behaviors.
- **Personalization:** Machine learning enables customized experiences by analyzing user behavior and preferences, widely used in recommendation engines, targeted marketing, and customer service.
- **Anomaly Detection:** Algorithms can detect outliers or unusual patterns, which is essential for fraud detection, security monitoring, and quality control.
- **Efficient Data Handling in Big Data:** Machine learning techniques are designed to manage and analyze vast amounts of data, making them ideal for big data applications and reducing data processing time.
- **Uncovers Hidden Insights:** Machine learning can reveal complex patterns, correlations, and insights that may be challenging for traditional data analysis methods to identify.
- **Adaptive to New Data:** Machine learning models can adjust to new data, continuously refining their predictions and keeping analyses relevant in changing conditions.

Big Data and Data Analysis

Big data refers to massive datasets that are too large or complex to be processed using traditional tools. Technologies like Hadoop, Spark, and NoSQL databases have emerged to handle these vast datasets efficiently. These tools enable distributed and parallel processing, allowing for the analysis of huge amounts of data in real-time. Distributed file systems like HDFS and cloud-based storage solutions

are essential for storing and managing big data. Let's explore the benefits of big data:



- **In-Depth Insights:** Big data allows for the analysis of massive amounts of information, leading to deeper and more comprehensive insights that would be unattainable with smaller datasets
- **Trend and Pattern Identification:** Big data analysis reveals trends and patterns hidden within massive datasets, enabling predictive analytics and aiding in anticipating customer behavior, market shifts, and operational improvements..
- **Personalization at Scale:** By analyzing vast amounts of user data, big data enables highly personalized recommendations, improving customer engagement and satisfaction.
- **Operational Efficiency:** Big data helps optimize business processes by pinpointing inefficiencies, improving resource allocation, and reducing costs.
- **Supports Innovation:** Big data analysis fuels innovation by uncovering emerging trends, identifying new product opportunities, and pinpointing areas for improvement, keeping businesses competitive.

Ethical and Legal Considerations in Data Analysis

Ethical data analysis fosters trust and transparency, building stronger relationships with customers and stakeholders. By adhering to ethical principles, organizations can protect their reputation and avoid legal repercussions. Additionally, ethical data practices can lead to more accurate and reliable insights, driving better decision-making and innovation. Let's explore these benefits further:

- **Informed Consent:** Ethical data collection requires transparency and informed consent. Individuals should be fully aware of how their data will be used, enabling them to make informed decisions about sharing personal information.
- **Bias and Fairness:** Data analysis must be free from biases that can lead to unfair outcomes, particularly in sensitive areas like hiring, lending, and law enforcement. Algorithms must undergo regular audits to identify and mitigate biases in both the data and the model itself.
- **Transparency and Accountability:** Transparency and accountability are crucial in data analysis. It's essential to provide clear explanations of data analysis processes and the decisions derived from them, fostering trust among users and stakeholders.
- **Data Accuracy and Integrity:** Ensuring data accuracy is paramount, as flawed or misleading data can lead to poor decisions and potentially harmful consequences, especially in critical sectors like healthcare and finance.
- **Intellectual Property and Data Ownership:** Respecting data ownership and intellectual property rights is crucial. It's essential to use data legally and ethically, especially when working with third-party or proprietary data.
- **Ethical Use of AI and Automation:** As AI becomes more prevalent in data analysis, ethical considerations surrounding automation, decision-making, and potential impacts on employment and social equity are becoming increasingly important.
- **Legal Compliance:** Organizations must strictly adhere to relevant data laws and regulations to avoid fines, sanctions, and legal repercussions, particularly in heavily regulated industries.
- **Impact on Society:** Data analysis has societal implications, and ethical analysis involves

considering the broader consequences of data use, including potential impacts on privacy, inequality, and public trust.

In conclusion, data structures and data analysis techniques are integral to the performance and success of modern applications, powering everything from basic data management to advanced machine learning and big data analytics. By selecting optimal data structures and applying effective algorithms, developers and data scientists can create solutions that are both efficient and scalable, meeting the growing demands of real-time data processing and complex data analysis. Furthermore, ethical and legal considerations remind us of the responsibilities inherent in data handling, ensuring that innovation is pursued with respect for privacy and societal impact. As technology evolves, a deep understanding of these principles will remain essential for building robust, insightful, and responsible applications

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BIG DATA ANALYTICS: TURNING MASSIVE DATA SETS INTO ACTIONABLE INSIGHTS

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Programmer, developer, poet

Abstract

This article delves into the power of Big Data Analytics to convert vast data sets into actionable insights that drive decision-making in modern organizations. It highlights the importance of data-driven strategies, predictive analytics, and real-time processing in aligning business operations with market demands. By examining key components and practical applications, this piece demonstrates how organizations can use analytics to foster growth, efficiency, and innovation in a data-centric world.

Keywords: Data-Driven Decision-Making, Predictive Analytics, Real-Time Processing, Actionable Insights.

Introduction. In today's digital landscape, organizations are inundated with vast amounts of data generated from various sources. **Big Data Analytics** plays a crucial role in transforming these massive data sets into actionable insights that drive informed decision-making. Central to this process is **Data-Driven Decision-Making**, which enables businesses to guide their strategies based on empirical data rather than intuition. This approach allows for greater alignment with market demands and improved operational efficiency. **Predictive Analytics** enhances this capability by using algorithms and machine learning to uncover patterns and forecast future outcomes. This foresight empowers organizations to anticipate trends and proactively address potential challenges. The emergence of **Real-Time Processing** further transforms data analysis by enabling immediate responses to changing conditions. This agility is essential in a fast-paced environment, where timely insights can significantly impact performance and customer satisfaction. Ultimately, the objective of Big Data Analytics is to generate **Actionable Insights**—clear recommendations that organizations can implement to foster growth and innovation. By harnessing these insights, businesses can enhance their decision-making processes and create lasting value. As we delve into the realm of Big Data Analytics, we will explore its key components, including data-driven decision-making, predictive analytics, real-time processing, and the extraction of actionable insights, illustrating how organizations can thrive in an increasingly data-driven world.

**Data-Driven Decision-Making:**

Data-Driven Decision-Making: DDDM is a critical approach that leverages data analysis to guide strategic decisions within organizations. By relying on empirical evidence rather than intuition or gut feelings, businesses can make more informed choices that align with their goals and market demands. This methodology has become increasingly important as the volume and variety of data available have grown, allowing organizations to gain deeper insights into customer behavior, operational efficiency, and market trends. I want to explain some components:

- **Data Collection:** The first step in DDDM is gathering relevant data from various sources, such as customer interactions, sales records, market research, and social media. This data can be both structured (e.g., numerical data in databases) and unstructured (e.g., text from reviews or social media posts).
- **Data Analysis:** Once the data is collected, organizations must analyze it to extract meaningful insights. This process may involve statistical analysis, data mining, and the use of algorithms to identify patterns and correlations. Tools like business intelligence software, data visualization platforms, and machine learning frameworks can assist in this analysis.
- **Insight Generation:** The goal of data analysis is to produce actionable insights. These insights can inform various aspects of the business, such as marketing strategies, product development, customer service improvements, and operational optimizations.
- **Decision Implementation:** Once insights have been generated, organizations need to implement data-driven strategies into their operations. This could involve adjusting marketing campaigns based on customer preferences, streamlining processes to eliminate inefficiencies, or innovating new products based on market demands.
- **Monitoring and Evaluation:** After implementing data-driven decisions, it's crucial to monitor the outcomes and evaluate the effectiveness of these strategies. Continuous feedback loops allow organizations to adjust their decisions based on real-time data and evolving market conditions.



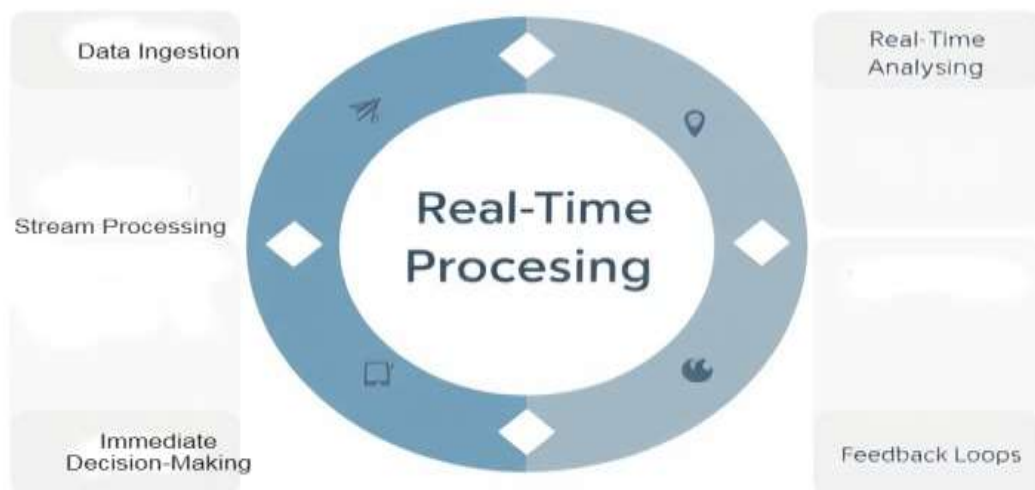
Predictive Analytics:

Predictive Analytics is a branch of advanced analytics that uses statistical algorithms, machine learning techniques, and historical data to predict future outcomes. By analyzing patterns and trends within data, predictive analytics enables organizations to make informed decisions and forecast potential scenarios, often before they occur. This proactive approach is invaluable for businesses seeking to optimize their strategies, enhance customer engagement, and mitigate risks. Let's look at several components:

- **Data Collection:** The foundation of predictive analytics lies in gathering relevant data from diverse sources. This can include historical transaction records, customer demographics, behavioral data, and even external factors such as market trends and economic indicators.

- **Data Preparation:** Once data is collected, it must be cleaned and organized to ensure accuracy and reliability. This preparatory step often involves handling missing values, removing duplicates, and transforming data into formats suitable for analysis.
- **Modeling Techniques:** Predictive analytics utilizes various statistical and machine learning models to analyze the prepared data. Common techniques include regression analysis, decision trees, neural networks, and time-series forecasting. The choice of model often depends on the specific problem being addressed and the nature of the data.
- **Training and Validation:** After selecting a model, it is trained on a subset of historical data to learn patterns. The model is then validated using another subset of data to assess its accuracy in making predictions. This step is crucial to ensure that the predictive model generalizes well to unseen data.
- **Prediction and Insights:** Once validated, the predictive model can be applied to new data to generate forecasts and insights. For example, businesses can predict sales trends, customer churn rates, and potential operational bottlenecks. These insights enable organizations to make proactive decisions that can drive growth and improve efficiency.
- **Implementation and Monitoring:** The final step involves implementing the insights derived from predictive analytics into business strategies. Continuous monitoring is essential to assess the effectiveness of the predictions and refine models over time based on new data and changing conditions.

Real-Time Processing



Real-Time Processing:

Real-time processing refers to the immediate processing and analysis of data as it is generated, allowing organizations to respond quickly to changing conditions and make timely decisions. This capability is increasingly crucial in today's fast-paced digital environment, where businesses must react swiftly to market trends, customer behaviors, and operational challenges. Real-time processing enables organizations to harness data's full potential, turning it into actionable insights almost instantaneously. Real-time processing has several benefits that I want to explain:

1. **Data Ingestion:** The first step in real-time processing is the ingestion of data from various sources, such as sensors, user interactions, social media feeds, and transactional systems. This data can be structured or unstructured and is often streamed continuously.
2. **Stream Processing:** Unlike traditional batch processing, which analyzes data in large, fixed intervals, stream processing allows for the continuous analysis of data as it arrives. Technologies such as Apache Kafka, Apache Flink, and Amazon Kinesis are commonly used to manage and process streaming data.
3. **Real-Time Analytics:** As data is ingested and processed, real-time analytics tools apply algorithms and models to extract insights. This can include monitoring key performance indicators (KPIs), detecting anomalies, and predicting trends. The goal is to provide actionable insights that can be acted upon immediately.

4. **Immediate Decision-Making:** The insights generated from real-time processing facilitate immediate decision-making. For example, businesses can adjust marketing campaigns based on real-time customer feedback, optimize supply chain operations based on current inventory levels, or enhance customer service by addressing issues as they arise.

5. **Feedback Loops:** Real-time processing often involves creating feedback loops that allow organizations to refine their strategies continuously. By monitoring the outcomes of decisions made based on real-time data, businesses can adapt their approaches and improve their responsiveness.



Actionable Insights:

Actionable insights refer to the valuable, clear, and practical conclusions derived from data analysis that can be directly used to inform decision-making and drive action within an organization. These insights provide essential information that enables businesses to improve operations, engage customers, and achieve strategic goals. Unlike generic data findings, actionable insights are specific, relevant, and applicable, enabling stakeholders to take informed steps. Time to elaborate on some benefits:

1. **Data-Driven Decision-Making:** Actionable insights are the result of rigorous data analysis, providing organizations with a solid foundation for decision-making. By leveraging data, companies can minimize guesswork and base their strategies on empirical evidence.

2. **Clarity and Relevance:** For insights to be actionable, they must be clear and directly related to the organization's goals. This requires effective data visualization and communication of findings so that stakeholders can easily understand the implications.

3. **Specific Recommendations:** Actionable insights should include specific recommendations on what actions to take. For example, instead of saying "increase customer engagement," an actionable insight might suggest "implement a loyalty program targeting frequent buyers to increase repeat purchases by 20%."

4. **Timeliness:** The value of insights diminishes over time, so actionable insights should be generated and communicated in a timely manner. Real-time analytics can enhance the ability to derive timely insights that allow organizations to react quickly to changing conditions.

5. **Prioritization:** Not all insights have the same level of impact. Organizations need to prioritize insights based on factors such as urgency, potential return on investment, and alignment with strategic initiatives. Prioritization helps ensure that resources are focused on the most critical areas.

6. **Measurement and Monitoring:** Once actions are taken based on insights, it's essential to measure the outcomes. Monitoring the effectiveness of decisions ensures that organizations can refine their strategies and adjust their approaches as necessary, creating a continuous feedback loop.

In conclusion, Big Data Analytics is not merely about collecting and storing vast amounts of data; it is about transforming that data into actionable insights that can guide strategic decision-making and foster growth. By embracing data-driven practices, predictive capabilities, real-time processing, and a focus on actionable insights, organizations can navigate the complexities of the modern business landscape with confidence. As the volume of data continues to grow, those who effectively leverage Big Data Analytics will be well-positioned to thrive in an increasingly competitive environment, driving innovation and achieving sustainable success.

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SOFTWARE ENGINEERING BEST PRACTICES: BUILDING SCALABLE AND MAINTAINABLE APPLICATIONS

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Abstract

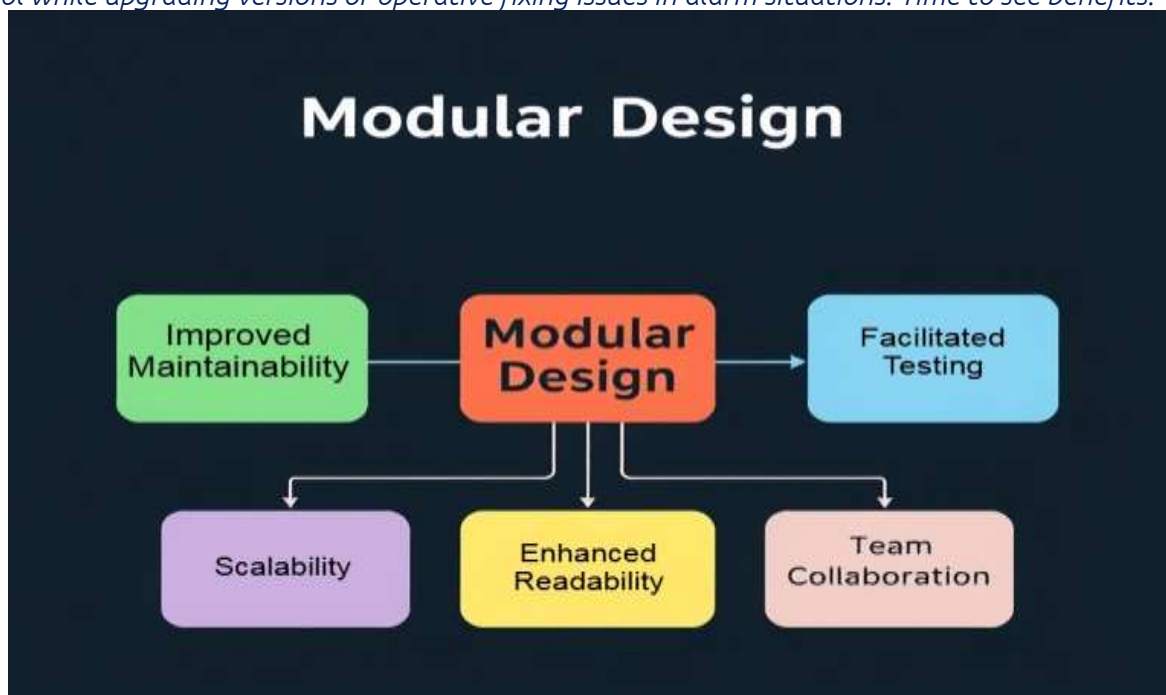
This article emphasizes the importance of creating and developing maintainable applications in software engineering. It delves into the process of breaking down applications into manageable parts and carefully exploring each section. The primary goal is to effectively communicate the critical aspects of the software production and development process. It also highlights the significance of incorporating best practices and standards to ensure the longevity and sustainability of the applications. This approach ultimately contributes to the overall efficiency and success of software projects.

Keywords. Modular design, version control, code readability, documentation, Testing, continuous integration, performance optimization, security practices, centralized version control system, distributed version control system, artifactory, nexus, archiva, avoid hardcoding passwords and credentials, regular code reviews, input validation, availability, application performance, the better quality of service, cost.

Well, we should determine what we need and what we want from a successful application. Depending on this we can start and finish the project, especially, developing the application. In this case, I advise breaking into several parts of our application and carefully explaining each section. In the modern competitive technological world, we must have Scalable and Maintainable Applications, if our goal is to achieve and keep popularity and responsibility among consumers that total response benefits not only us but consumers too.

Modular Design

In this case, we need to break into pieces our application. It is important if we want to make a suitable and comfortable project. For our project to be successful we ought to deeply observe each of the pieces and modulate visuals. Furthermore, it will help you not only make successful software but also control while upgrading versions or operative fixing issues in alarm situations. Time to see benefits:



1. **Improved Maintainability:** With clearly defined modules, developers can make changes in one part of the codebase without impacting other components, making maintenance easier.

2. **Enhanced Readability:** Smaller, focused modules make the code easier to read, understand, and navigate.

3. **Facilitated Testing:** Modules can be tested independently (unit testing), making it simpler to identify and fix bugs.

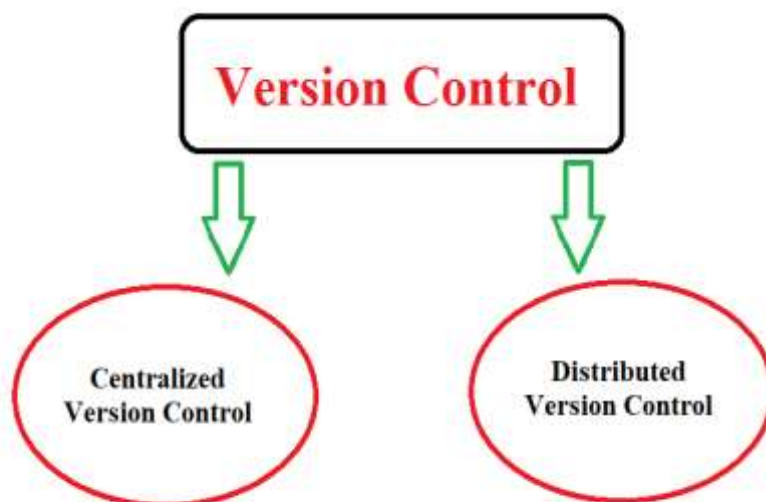
4. **Scalability:** New modules can be added with minimal disruption to existing code. This is particularly crucial in rapidly evolving projects.

5. **Team Collaboration:** Different team members or teams can work on different modules simultaneously, improving overall development speed and collaboration.

Modular design is a fundamental principle in software engineering that enhances the quality and maintainability of applications. By breaking down complex systems into smaller, manageable modules, developers can build more robust and adaptable software.

Version Control:

The Version Control VC is a significant part of modulating keep flow tracking changes in the code. Wasting time developers will catch issues where should be upgrading or fixing errors and after the upgrade to the next version. Also upgrading to the next version comes from the responsibility of modern competition, we need to keep the focus on the Auditory of users if we want to get benefits and of course, increase and spread. We often attempt to Version Control System VCS allows every change and it is important who did it and also when, it is just like when we keep auditing the history of applications. We should know about the types of Version Control Systems:



1. Centralized Version Control.

The Centralized Version Control System (CVCS), is when you store every change of versions by a single server. In this type of version after upgrading the version of the application users can check the file to responsibility before it goes to a central server.

2. Distributed Version Control.

In the Distributed Version Control System (DVCS), I can describe this as when users after downloading the upgraded application make changes depending on their species and these changes will be stored in files, except binary files of course.

Code Readability and Documentation:

I am convinced by the assertion that code should be clear and readable it is a crucial moment, I was so many consequences in front of these like codes and I prefer that with soft code it will make easy production. Furthermore, if documentation is soft, it is easy for you to understand of fundamentals. Think about it: if you buy a Kitchen machine for instance, would it be easy to read and use it as a manual? So just imagine that the code is like a manual and it is preferable to make it clear. I want to share several benefits:

- **Avoid Complex Logic:** Simplify complex expressions and logic. Use comments to explain the

intent behind complex code blocks.

- **Use Comments Judiciously:** Write comments to explain why the code exists, but avoid stating the obvious. Update comments when modifying the code to prevent misleading information.
- **Descriptive Naming Conventions:** Use clear, descriptive names for variables, functions, and classes. Follow naming conventions (e.g., camelCase for JavaScript, snake_case for Python).
- **Keep Functions Short:** Functions should perform a single task and ideally fit on one screen. Break large functions into smaller, well-named helper functions.
- **Consistent Formatting:** Maintain consistent indentation and spacing. Use blank lines to separate logically distinct sections of code. Follow a style guide (e.g., PEP 8 for Python, Google Java Style Guide).
- **Version Control:** Maintain version history and changes in documentation (e.g., using CHANGELOG files). Use version control systems to track and manage document changes.
- **API Documentation:** Provide detailed API documentation if your software exposes an interface (e.g., REST API). Use tools like Swagger/OpenAPI to automate and generate documentation.
- **Code Examples and Tutorials:** Include examples that showcase how to use your code effectively. Write tutorials for new users, especially if the project is complex.
- **API Documentation:** Provide detailed API documentation if your software exposes an interface (e.g., REST API). Use tools like Swagger/OpenAPI to automate and generate documentation.
- **Inline Documentation:** Use docstrings or comments in your code to explain the purpose of modules, classes, methods, and significant code blocks. Adopt a standard format (e.g., Javadoc, Sphinx for Python) for consistency.

Improving code readability and documentation results in more maintainable and understandable codebases. Engaging with your team and sharing best practices can lead to a culture of quality code and thorough documentation, benefitting the entire development process.

Testing and Continuous Integration:

Continuous Integration (CI) is when developers constantly integrate their codes into the repository. It is an easy way to catch errors and immediately fix that issue. As I say frequently: "Issues come but this is the best way to fix them rapidly". I advise you to constantly commit your code it will help decrease conflicts between various parts of your code. On the other hand, the significant thing is that you should keep your large files out of Git repos. For example:



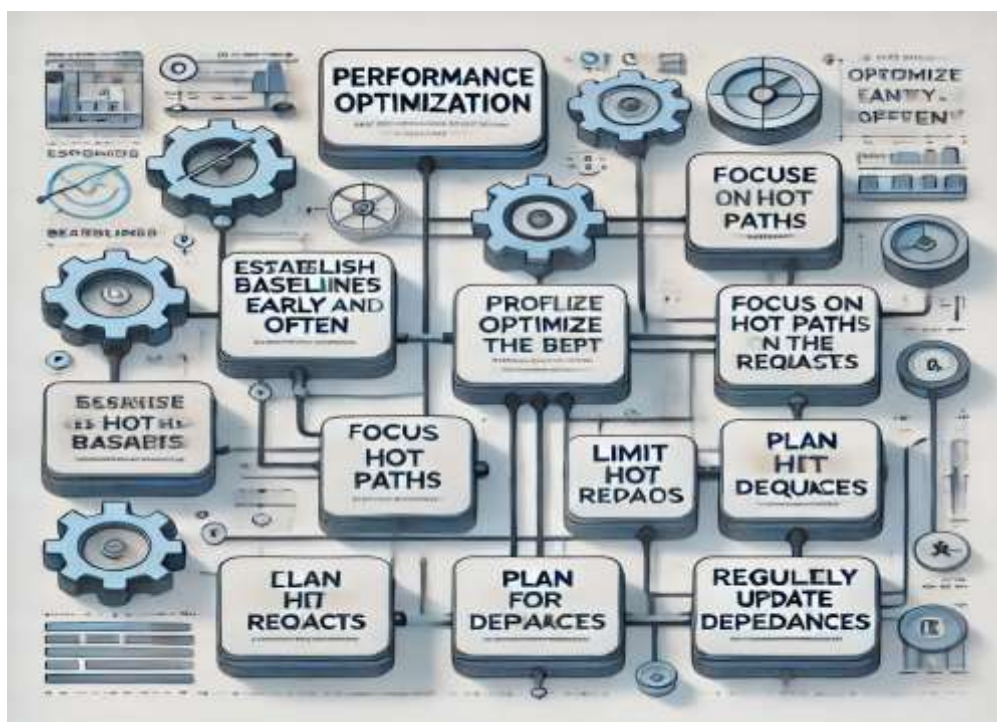
- **Artifactory:** is a popular repository manager created by JFrog that serves as a central hub for storing, managing, and sharing binary artifacts in a software development workflow. It supports various packaging formats and integrates well with DevOps tools, enabling efficient build and release processes.
- **Nexus:** is another popular repository manager that facilitates the storage, management, and distribution of software artifacts. Developed by Sonatype, Nexus provides support for various package formats and integrates seamlessly into the software development lifecycle.
- **Archiva:** is an open-source repository management tool primarily focused on managing and aggregating artifacts used in software development. It is particularly popular in Maven-based projects,

although it can support a variety of other formats.

Integrating testing within a Continuous Integration framework is essential for achieving high-quality software in modern development practices. By embracing automated testing, efficient CI tools, and following best practices, development teams can ensure that they continuously deliver reliable and robust software while maintaining the agility needed to adapt to changing requirements.

Performance Optimization:

In computer Science performance optimization is the increasing process of tuning an application system. We need to implement hardware, middleware, communication networks, operating systems, and application design. Moreover, the essential issue for all types of modeling like computer simulation performance is specific. The performance like hydrostatic bearing depends on the chosen creation of the design. For positive thermal properties, a soft easy deal with single parameter organization is not enough to receive gain performance. Web Performance Optimization covers the design based on performance, performance-based implementation principles also touch the testing, after considering methodologies to the screen and for long-term optimal performance in particular. Several benefits should be memorized:



- **Establish Baselines:** Assess the existing performance metrics of your application to pinpoint areas that need enhancement.
- **Profile Early and Often:** Continuously profile and track your application's performance throughout the development process, rather than only at the project's conclusion.
- **Focus on Hot Paths:** Pinpoint and enhance the key pathways of your application that affect user experience and overall performance.
- **Optimize on the Backend:** Make certain that backend services, databases, and APIs are fine-tuned for speed and efficiency, as they directly influence overall performance.
- **Limit HTTP Requests:** Minimize the number of requests generated by the application by merging files, employing image sprites, and meticulously handling third-party scripts.
- **Plan for Growth:** From the outset, architect your application for easy scalability by implementing a suitable design and anticipating future load demands.
- **Regularly Update Dependencies:** Regularly update your frameworks and libraries to take advantage of performance enhancements and bug corrections.
- **Test for Performance:** Incorporate performance testing into the CI/CD pipeline to guarantee that performance stays consistent following modifications.

Performance optimization is a continuous endeavor that demands focus throughout all phases of software development. By applying different techniques, leveraging appropriate tools, and adhering to best practices, developers can guarantee that their applications operate efficiently, delivering a seamless

user experience and the ability to scale with increasing demand. Ongoing monitoring, testing, and profiling are essential for detecting and addressing performance issues, ensuring that applications maintain optimal performance consistently.

Security Practices:

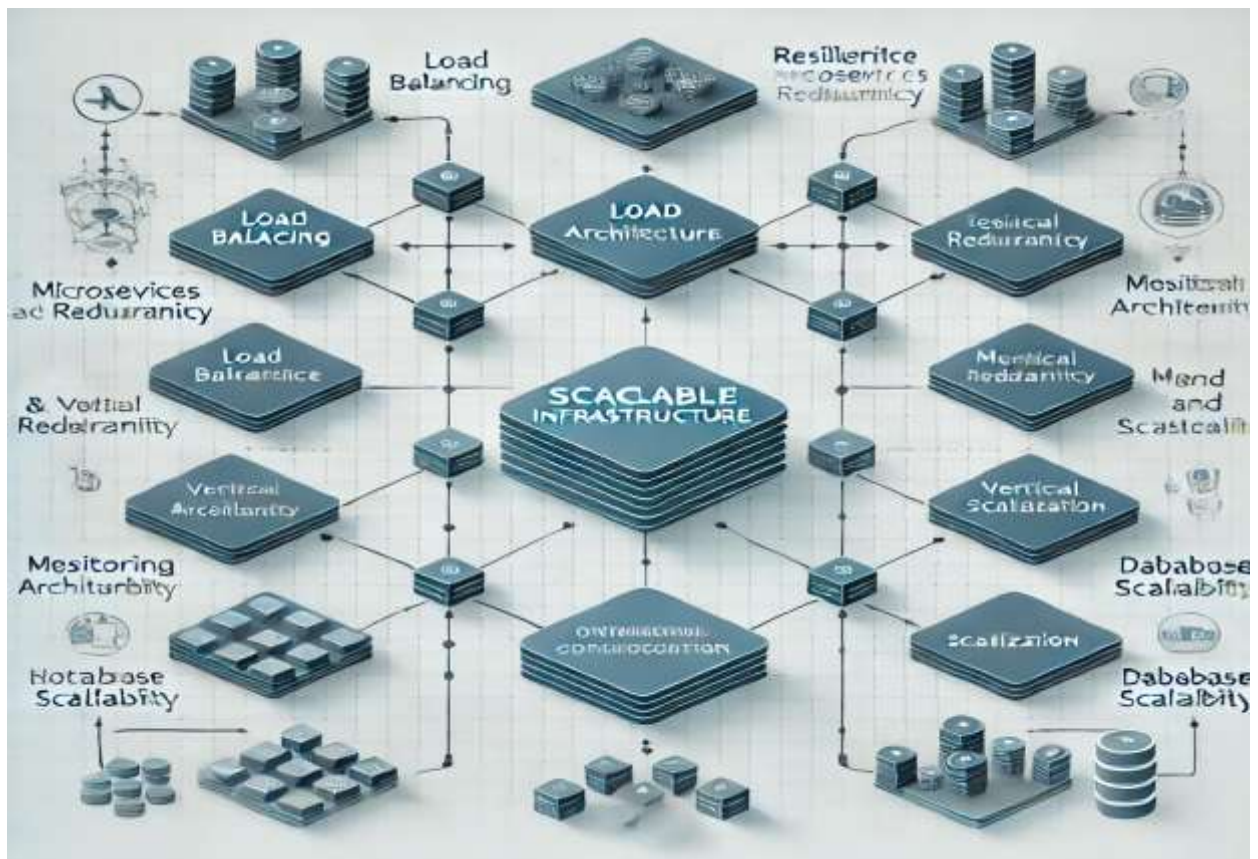
The security of web applications is an aggregate with several interesting parts. So, session management is an essential part of web applications. Furthermore, the client (browser) as we know it as the user authenticates the process at the web application to send access request security functionality such as in e-commerce websites. Commonly successful verification to web applications is set up with actual access credentials as (login) and on top of authentication cookies are improved. I advise you to have control of secure coding practices to increase any kind of risk of bugs and vulnerabilities that attackers can use negative aspects. As other developers, I want to share with you a kind of examples:

- **Protection of Sensitive Information:**
 - **Data security:** Protects sensitive information, including customer details, financial records, and intellectual property, thereby lowering the risk of data breaches.
- **Innovation Support:**
 - **Secure Development Environments:** Integrating security into the development process (DevSecOps) enables organizations to innovate with greater confidence, ensuring that security measures are embedded from the beginning.
 - **Promotion of Digital Transformation:** Strong security measures facilitate the safe implementation of new technologies and digital practices.
- **Risk Mitigation:**
 - **Minimized Vulnerabilities:** Recognizing and resolving security weaknesses decreases the likelihood of cyberattacks and data breaches.
 - **Incident Readiness:** Having an incident response plan allows organizations to react swiftly and effectively to security incidents, thereby mitigating potential damages.
- **Improved Incident Response Time:**
 - **Proactive Measures:** Clear policies and ongoing training enable organizations to recognize threats rapidly and respond more effectively, thereby reducing potential damage.
- **Regulatory Compliance:**
 - **Preventing Penalties:** Complying with applicable regulations (such as GDPR, HIPAA, and PCI-DSS) helps prevent legal complications and financial penalties related to non-compliance.
 - **Enhanced Trust:** Adhering to these standards can build greater trust among customers and stakeholders, demonstrating that the organization prioritizes security and privacy.
- **Business Continuity:**
 - **Disaster Recovery:** Implementing effective security practices safeguards critical data and infrastructure, allowing for quicker recovery from incidents or disasters.
 - **Operational Stability:** Minimizing downtime and disruptions promotes consistent business operations, enhancing overall productivity.
- **Employee Safety and Awareness:**
 - **Safer Work Environment:** Establishing physical security measures safeguards employees and company assets, enhancing overall workplace safety.
 - **Heightened Awareness:** Ongoing training and awareness initiatives equip employees to identify and avoid potential security threats, strengthening the organization's collective security posture.

In summary, investing in security practices not only protects an organization's assets but also contributes to its long-term sustainability, growth, and positive reputation. It fosters a culture of security that can empower organizations to innovate while safeguarding their interests.

Scalable Infrastructure:

Well, Scalable infrastructure is when you depend on the need for efficiency and flexibility of growth or reduce infrastructure's size. This crucial concept allows modern businesses must rapidly adapt to fluctuating workloads and user requirements without falling under superfluous cost or immolation performance. Here I want to share with you some examples:



- **Load Balancing:** Distributing incoming network traffic among several servers prevents any one server from becoming overwhelmed, thereby enhancing responsiveness and availability.
- **Microservices Architecture:** This architectural approach facilitates the development of scalable applications by dividing them into smaller, autonomous services that can be developed, deployed, and scaled independently.
- **Resilience and Redundancy:** Maintaining infrastructure functionality during high-demand periods or outages using methods such as multi-availability zones and failover systems.
- **Monitoring and Autoscaling:** Using monitoring tools enables organizations to track system performance and resource usage, allowing for automatic scaling adjustments (up or down) based on set thresholds.
- **Vertical Scalability:** This involves increasing resources like CPU, RAM, or storage on a single machine, known as "scaling up." Although often simpler, this approach is limited by the machine's maximum capacity.
- **Horizontal Scalability:** This approach, known as "scaling out," adds additional machines or nodes (like more servers) to a system, enhancing redundancy and fault tolerance.
- **Containerization:** Using containers, such as Docker, allows applications to operate consistently across diverse environments, streamlining deployment and scaling.
- **Database Scalability:** This approach involves techniques like database sharding (dividing a database into smaller parts) and replication to help manage higher data loads effectively.

By implementing these strategies, organizations can create a robust scalable infrastructure that meets current demands while being adaptable for future growth.

In conclusion, building scalable and maintainable applications demands a multifaceted approach grounded in well-established software engineering practices. Modular design enables clear structure and adaptability, while version control ensures robust collaboration and accountability. Prioritizing code readability and documentation enhances team efficiency and long-term manageability. Testing, combined with continuous integration, drives reliability, reducing errors at every stage of development. Performance optimization and strong security practices safeguard applications and data integrity, catering to user expectations and regulatory standards. Finally, scalable infrastructure, reinforced by strategies such as load balancing and containerization, allows systems to grow and adapt smoothly to evolving demands. By integrating these best practices, developers not only improve operational efficiency but also position their applications for sustained success in an ever-competitive technology landscape. So

now we have the essential knowledge about successfully observing web applications. Many developers misunderstand how is crucial build scalable and maintainable applications not only in business. Admittedly, you would ask "Why?" I mentioned that because we should understand we are beginning a new technological era. I implied it is not because I think, live, and work with creativity and adapting. The fact is a new beneficial and technological epoch is required.

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THE FUTURE OF HUMAN-COMPUTER INTERACTION A LOOK INTO AR AND VR CYBERVIEW. PHASE 1

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Abstract

This article explores the first phase of the CyberView project, the integration of VR glasses with human vision aims to revolutionize how people perceive and interact with their surroundings. The core objective of this phase is to develop and integrate advanced sensor systems within VR glasses, enabling real-time visualization enhancements that align seamlessly with the human field of view. These sensors capture environmental data and provide overlay information directly within the user's line of sight, augmenting reality without compromising natural vision..

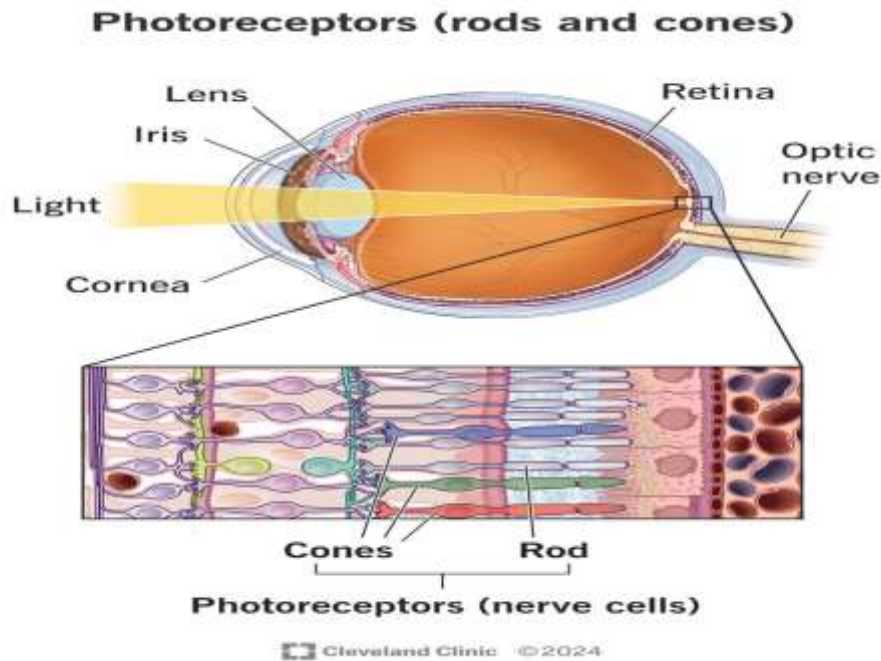
Keywords. *Programming, technology, falling in love, improving the mindset, society, pressing, poets, researchers, impact to mindset, control of hormones.*

It is interesting how to work human photoreceptors. Believe me, it is amazing, once I started to learn about it I was struck because I felt myself as a professor on it for years and it seemed like the common laboratory day, and I felt that I was so close to resolving what I started.! It is incredible how we can make parallels with Human receptors and cameras. So, for being in deal we should ask a couple of questions. Firstly, we need to have some knowledge about the diversity of human photoreceptors and what is the system of them. Secondly, what are the photo cameras and how do they work also what is the difference with human photoreceptors? Which I will describe below. We can determine what they are based on by fundamental principles, and there are two options:

- *Focusing on the image,*
- *Colors process,*

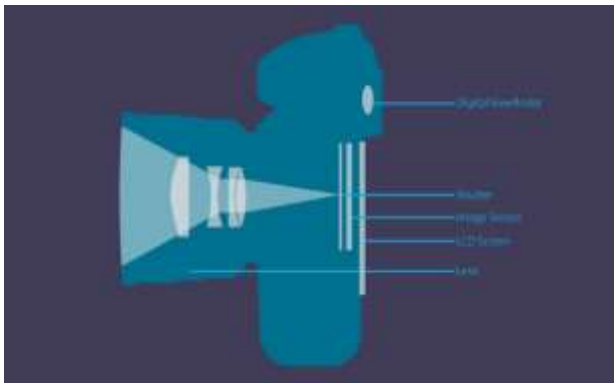
There are many epic materials and resources that I can use in my research, thanks to the guys who made them, I appreciate your work! We should know things are Light, Cornea, Iris Lens, Retina, Cones and Rods, and Optic nerve, especially, about Cones and Rods because they are photoreceptors. Yes, initially I am going to use light and photoreceptors, and their function system which I will include in my new software. The CyberView should totally illustrate everything about how the human view system works in reality with 3D graphics and models, it is like when you have a trip in a human view system without physical influence. You will be able to scale every item for 360 grades, switch, or turn to have an imagination. It will make your work easy. So if we come back to photoreceptors as we know there are two Cones and Rods. What is the Cones and Rods?

- *Cones are the type of photoreceptors that have a shape like a cone, we need them to detect colors and for instance, the Cones need more light than Rods.*
- *Rods as we mentioned, are extremely sensitive to light, Rods are more than 90% photoreceptors. As you suppose, yes they are useless for detecting colors.*



On the other hand, if we look at how to work modern cameras, we can see that they work the same. Everything that you photograph, like lights, zooms into the camera lens. In digital cameras, we have an image sensor chip, so this sensor will break up into millions of pixels your photographed picture. Every piece of these pixels will be stored like a number, in other words, each pixel will be valued and stored. An interesting thing is that when you try to increase to 20 percent brighter your image, the digital cameras program will increase for 20% of numbers. [5]

Now we have a little bit of knowledge about how digital cameras work.



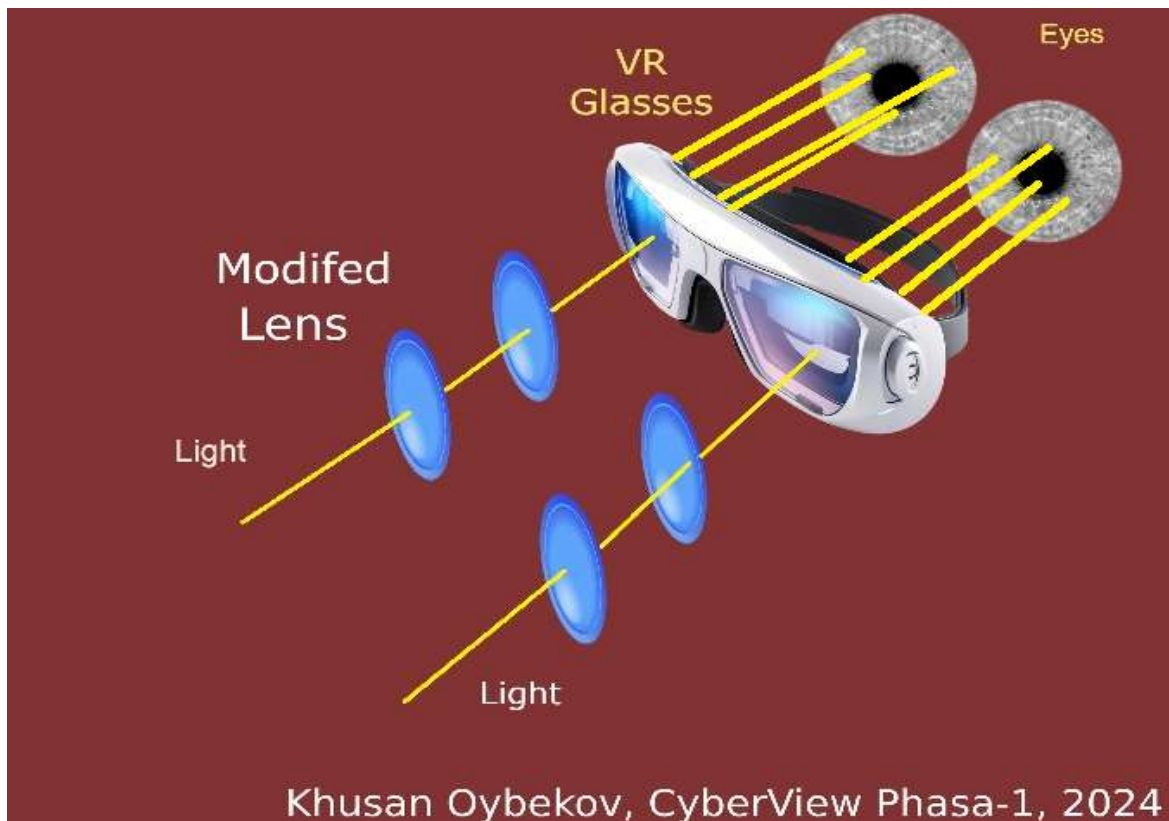
Well, it is time to describe the differences between human eye photoreceptors and digital cameras. As I understand, the human eyes use small muscles that relax and contract while photographing a moving object. The human eyes also can change the parameters of the lens and adjust to viewed images. The digital cameras are not capable of doing the same thing, which is why we need to change the lenses of the cameras. Human eyes accommodate the photoreceptors. Rods are used for detecting light, and Cones for color detection. Cones have 3 types for responding to 3 types of light wavelengths. Moreover, red cones respond to long wavelengths, green ones respond to medium wavelengths, and blues respond to short wavelengths. I always say use your brain which is a powerful PC! Yes, every color that we see as you suppose comes from an incredible combination of our brains, so go to eat nuts 😊.

And Cameras use photosites instead of Cones, to collect the lights. Cameras have more than millions of these light collectors that hold and then convert to the signal which will be accomplished with devices. As we suppose these signals will break into three colors by filters which we have known.

Well, to realize my imagination I broke it into several stages that I called Phases. Of course, it will give us not only one product, by the way, all stages have unique processes and we should understand that depending on the situation stages might change.

All right, in CyberView Phasa-1, we need to make a concept of how to make with the lens or

anything else that will be required for a successful connection VR glass and then, inside of VR glasses, we should make that will help to provide lights to human receptors that will be illustrated in CyberView software. Yes, it is a little more about Biology, meaning CyberView Phasa-2 is more about Biology.



Phase 3 of CyberView begins with the development of software that visually represents all processes, from initiation to sensor integration. I prefer to use C# programming language for it. Also, I can use Java too. For modeling objects, I will use my favorite Blender 3D then will be integrated into my software. I know it will sound crazy but I want to try using my favorite engine Unity 3D to make something like the illustration, it is like you one day sit and hold on your hands cubic-rubric and try to catch that. "Maybe I will produce a new online game. Who knows? The possibilities are endless!"

Phase 4 is more about building models of eyes in a 3D printer, and working in reality on how the receptors will have a connection with lights. We will connect our software which we modified before with 3D model equipment and it will show everything that we didn't see before.

Furthermore, we can work on how to make close space to human view. We know that for this instance we use telescopes. Honestly, it seems to me like the first big computers that were made prior. So, we aren't developed yet? It is just my opinion that we can do more. Firstly, we should know about photons. Photons are something like the smallest light and electromagnetic energy at the same time. The interesting fact is that there is no charge for photons, in other words, it is equal to 0. And for collecting these lights as buckets we use telescopes successfully.

Photons from the sky are gathered by a telescope and focused on the sensor of a digital camera where photo-electrons are created, stored during an exposure, and finally digitized and turned into numbers that we work with on a computer. Yes, you suppose correctly what I am going to mean with this example, we can not only return the view but also improve it, can you imagine that you will be able to just look to space and see everything like dogs or grass or cars? However, we will discuss about it in the next article deeply.

The initial phase of CyberView demonstrates the promising potential of integrating VR glasses with human vision to enhance perceptual capabilities. By embedding advanced sensors that provide real-time, contextually relevant overlays, CyberView enables a seamless blend between digital information and the natural environment. This technology not only assists users in navigating their surroundings with greater precision but also opens the door to innovative applications across fields such as accessibility, education, and professional training. As development progresses, CyberView aims to make augmented vision an intuitive and accessible tool, enhancing the everyday experiences of its users and laying the groundwork for a more interconnected and insightful way to interact with the world.

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BREAKING BARRIERS WITH VISION: GLASSES THAT TRANSLATE SPEECH INTO ASL FOR DEAF USERS. ASLIFY ECHOVISION PHASA-1.

Oybekov Khusan(Xusan)
Programmer, developer, poet

Abstract

This article explores the development of an innovative assistive device-smart (**ASLify EchoVision**) glasses equipped with an animated American Sign Language (ASL) translator. Designed specifically for individuals who have lost the ability to hear, this device aims to bridge communication barriers by translating spoken language into ASL in real time, displayed at the bottom of the glasses lens. With the potential to profoundly enhance everyday interactions, these glasses allow users to "see" conversations as they happen, offering a seamless, accessible experience that fosters inclusion and independence for the Deaf and hard-of-hearing community.

Keywords. American Sign Language (ASL) translator, device, software, AI, Esp 32 module, Arduino. AR glasses, glasses, real-time, user.

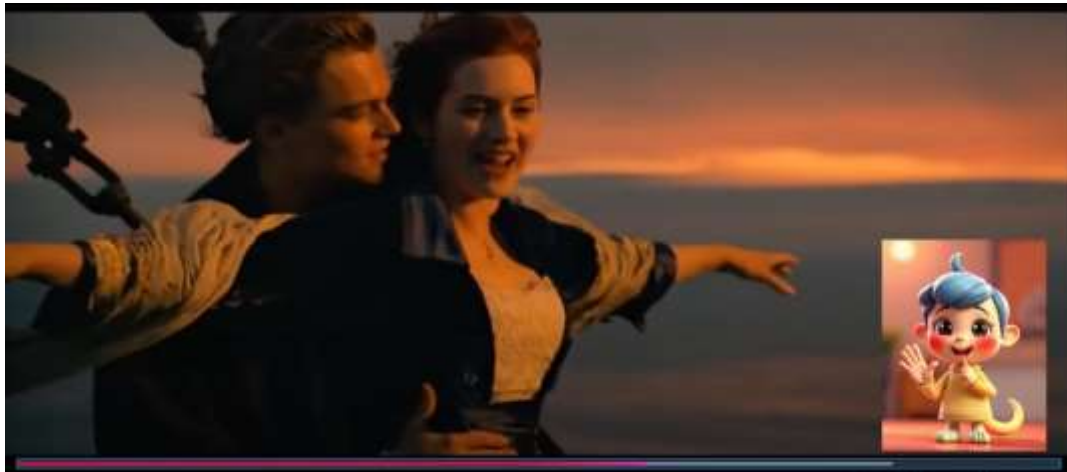
Sometimes I think we make so much software for commerce, and what about those who cannot hear, who lost the ability to hear? So, how we can fix this situation? I concur my project **ASLify EchoVision** is a great solution. I decided to make a real-time, smart device by integrating a software translator that can translate our speech into ASL language. I want to explain in several stages. Initially, I want to break this process into pieces such as the device, and software that will integrated into the device. While using this device a user must feel comfortable and stable. I want to imply that this project will be improved and expanded which I will describe very detailed in this article. Moreover, while working on it I want to implement the research and share it free for observation very carefully, as we know Science is unpredictable.

Device and evolution.

To start and achieve I want to use AR glasses and Arduino because I have positive knowledge of Arduino. Additionally, I do not plan to switch the human ear to a Biocomponent (robot component) now, rather now. Initially, the module ESP32 is more comfortable to integrate Bluetooth and Wi-Fi to connect to software. This module is very wonderful just like the bicycle. However, depending on observation it will be changed with other modules. The device wasting time with showing the beneficial ranks I plan to upgrade it to lenses. AR glasses will be used to integrate special software that should translate anything



into ASL language. So, users through glasses see at the bottom the animated translator, wherever, where you will look, on a smartphone, TV, Notebook, or even while speaking with humans. What if someone wants to talk with you and screams out of the glasses-view zone? I concur with you it is a crucial aspect. The device must be briefly sensitive to voices and when the software is upgraded to AI, the error must be solved.



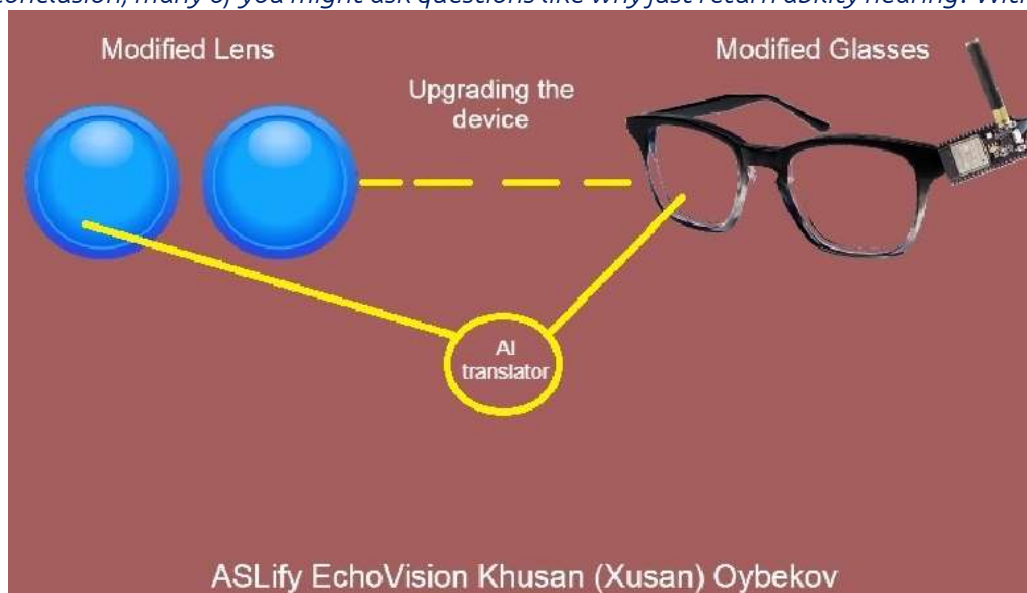
Software

The software must be created in several principles such as, readably, secure, and also dynamically. I cannot explain it with depth exploration because for it I will need more pages. If we use Arduino, why



must we make other software and waste time? Hmm, it is a good question. As I mentioned this project is based on evolution, we will not be limited to using Arduino. The concept is it should be the beginning of the new technological epoch. Depending on the evolution is preferable for me rather than on basic. When you can dream and imagine it very correctly you will plan it very softly. Upgrading to AI is more significant just like keeping progression. In the first stage, everything will be translated into ASL language by using Adobe After Effects then we will have the hub. Every word that would be transferred by the device will translated into ASL language and shown by using our hub.

In conclusion, many of you might ask questions like why just return ability hearing? With some little



devices or something else. Yes, your opinion is correct, but in the first stage I want to achieve the point with the skills that I have now, it doesn't mean that it will not be. I need to use modules on what I just have not got any knowledge and here we go. It will be a big experience. No, I am not crazy, I am just a researcher that overcome with no opportunities, so it is my own way that inspired me. In other words, I will make them and not only them, remember this project will be based on evolution. Actually, there are several ways to fix it with benefits. Here I decided to share what I preferred. Well, about the production of this device, I plan to make it free. To realize it we can imply substitution or sponsoring by



*the government. Believe me, when the device is used it brings us to the incredible, I suppose many of you will not think about earning money on this device. Of course, the real-time smart device **ASLify EchoVision** will upgraded to a lens, which makes use of the device more comfortable.*

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