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ARTIFICIAL INTELLIGENCE TECHNOLOGIES AND SOLVING SOCIAL PROBLEMS

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Abstract. The use of modern digital technologies, such as paperless document management, automated information systems, blockchain, big data, artificial intelligence (AI), etc., allows you to create high-performance decision-making systems. In the course of the development of modern information technologies, intensive digitalization is taking place in almost all spheres of human activity and the introduction of artificial intelligence, which affects social problems within society. In addition to the obvious advantages of using human intelligence in the new digital world, there may be various situations, primarily related to the digital society and the management decision-making process. Social problems are investigated using artificial intelligence technologies in a digital society. The article discusses the main aspects of social problems related to artificial intelligence technologies, in addition, in order to solve social problems and identify semantic

features of the knowledge base, an algorithm has been developed that provides a clear picture of social aspects in the process of filling in the database, taking into account the purpose of forming a thesaurus for a system of questions and answers.

Key words: Solving social problems, Artificial intelligence, social tasks.

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ЖАСАНДЫ ИНТЕЛЛЕКТТІК ТЕХНОЛОГИЯЛАР ЖӘНЕ ӘЛЕУМЕТТІК МӘСЕЛЕЛЕРДІ ШЕШУ

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Аннотация. Қағазсыз құжат айналымы, автоматтандырылған ақпараттық жүйелер, блокчейн, үлкен деректер, жасанды интеллект (AI) және т.б. сияқты заманауи цифрлық технологияларды пайдалану жоғары өнімді шешім қабылдау жүйелерін құруға мүмкіндік береді. Заманауи ақпараттық технологияларды дамыту барысында адам қызметінің барлық салаларын қарқынды цифрландыру және қоғам ішіндегі әлеуметтік мәселелерге әсер ететін жасанды интеллектті енгізу жүріп жатыр. Жаңа цифрлық әлемде адам интеллектісін пайдаланудың айқын артықшылықтарынан басқа, ең

алдымен цифрлық қоғамға және басқару шешімдерін қабылдау процесіне қатысты әртүрлі жағдайлар туындауы мүмкін. Әлеуметтік мәселелер цифрлық қоғамдағы жасанды интеллект технологиялары арқылы зерттеледі. Мақалада жасанды интеллект технологияларымен байланысты әлеуметтік мәселелердің негізгі аспектілері қарастырылады, сонымен қатар әлеуметтік мәселелерді шешу және білім қорының семантикалық ерекшеліктерін анықтау үшін сұрақ-жауап жүйесінің тезаурусын қалыптастыру мақсатын ескере отырып, мәліметтер базасын толтыру процесінде әлеуметтік аспектілер туралы нақты түсінік беретін алгоритм жасалды.

Түйін сөздер: Әлеуметтік мәселелерді шешу, жасанды интеллект, әлеуметтік міндеттер.

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ТЕХНОЛОГИИ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА И РЕШЕНИЕ СОЦИАЛЬНЫХ ПРОБЛЕМ

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Аннотация. Использование современных цифровых технологий, таких как безбумажный документооборот, автоматизированные информационные системы, блокчейн, большие данные, искусственный интеллект (ИИ) и др., позволяет создавать высокопроизводительные системы принятия решений. В ходе развития современных информационных технологий происходит

интенсивная цифровизация практически всех сфер человеческой деятельности и внедрение искусственного интеллекта, что влияет на социальные проблемы внутри общества. Помимо очевидных преимуществ использования человеческого интеллекта в новом цифровом мире могут возникнуть различные ситуации, прежде всего связанные с цифровым обществом и процессом принятия управленческих решений. Социальные проблемы исследуются с помощью технологий искусственного интеллекта в цифровом обществе. В статье рассматриваются основные аспекты социальных проблем, связанных с технологиями искусственного интеллекта, кроме того, для решения социальных задач и выявления смысловых особенностей базы знаний разработан алгоритм, обеспечивающий четкое представление о социальных аспектах в процессе заполнение базы данных с учетом цели формирования тезауруса системы вопросов и ответов.

Ключевые слова: решение социальных проблем, искусственный интеллект, социальные задачи.

Introduction

This research is funded by the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan (BR21882302 Kazakh society in the context of digital transformation: prospects and risks).

Today, when information and communication technologies are developing rapidly and the amount of data that can be collected and stored is growing, effective deep learning is drawing attention to the use of large amounts of data.

Artificial intelligence (AI) has become commonplace in modern life, offering the opportunity to solve social problems. This study examines how machine learning can solve these problems, assesses its potential impact, and demonstrates the moral consequences of using it. Exploring how technology and social issues intersect demonstrates the revolutionary potential of machine learning, but also highlights the need for ethical consideration when applying it to the common good.

Artificial intelligence is a method of intelligent thinking that uses a computer, a computer-controlled robot, or software in the same way as the human mind. Artificial intelligence is achieved by studying the patterns of the human brain and analyzing cognitive processes. As a result of these studies, intelligent software and systems are being developed.

Artificial intelligence systems work by combining large amounts of data with intelligent iterative processing algorithms (Nkambou, et al, 2018). This combination allows you to learn from the patterns and features of the analyzed data. Every time an AI system completes a data processing cycle, it checks and measures its performance and uses the results to gain additional knowledge.

Artificial intelligence sciences and their own functions, such as machine learning, focus on creating systems that learn and are developed through data processing and analysis.

Currently, most artificial intelligence programs are based on the study of not only computer technology, but also other areas. Artificial intelligence is one of the key elements of the era of technology convergence, which has a profound impact on humans, culture, society and the environment. Since artificial intelligence is a cognitive technology, its various aspects are closely related to the main activities of people: education, science, culture and communication.

New technologies and approaches have emerged that support the development of artificial intelligence. Machine learning and deep learning have become available and provided new opportunities for creating intelligent and adaptive systems that will receive large amounts of data from people and predict what will happen next using mathematical optimization and statistical analysis methods (Yudelson, et al, 2013). Machine learning is a common method of implementing artificial intelligence, and deep learning is one of several machine learning methods. Artificial intelligence is the broadest concept, and machine learning and deep learning are tools for implementing artificial intelligence.

Artificial intelligence is currently being developed, which has relevant socio-cultural implications and considers the social problems of the development and application of artificial intelligence.

Algorithms have begun to play a crucial role in choosing not only information, but also the decisions that people make. In scientific research, artificial intelligence is central to the analysis and interpretation of data.

In 1937, Alan Turing, a Turing machine is a hypothetical mechanism capable of generating any algorithm. The Turing hypothesis was less abstract with the launch of the first programmable digital computer in the 1940s. And in the 1950s, when research in the field of neurology showed that the brain is a neural network, and A. Turing said that any type of computing can be represented digitally, scientists moved on to create the first intelligent machines. Although their attempts mostly failed due to a complete hardware and software malfunction, it is from this point that the current history of artificial intelligence can be calculated. In addition, the idea of artificial intelligence has had great social and cultural significance since ancient times. It runs like a dotted line throughout human history in the form of ideas about “artificially created”, “intelligent” creatures, machines or tools.

Today, artificial intelligence, including socio-cultural aspects, its development and application at a specific stage, is becoming more and more intensive.

Artificial intelligence is also growing rapidly in everyday life and in professional fields such as healthcare, education, research, communications, transportation, art and more.

Artificial Intelligence Policy in Education

The passion for artificial intelligence (AI) education has spread throughout the world. Until recently, artificial intelligence was considered a unique technology used only by certain specialists (Motorina, Sytnik, 2020). However, this new technology is now developing rapidly and is being actively used in many industries.

Connectivity in our daily lives, especially after the outbreak of COVID-19, as digital transformation in various sectors of society is evolving day by day. As the influence of artificial intelligence grows, it is being seen not just as a technology, but as another new methodology for solving problems.

According to this view, countries around the world are creating national education systems to develop basic knowledge about artificial intelligence for everyday life.

Currently, as the need for AI education, which is more general education in nature than specialized vocational education, is growing, discussions are actively underway about what content such AI education should include.

Our country is also working on the digitalization of universities, the introduction of artificial intelligence and new technologies in higher education. It includes the development and implementation of educational programs at universities and research centers, as well as providing additional training and advanced training for teachers and researchers. Several universities and research centers are engaged in research and development in the field of artificial intelligence, and conditions have been created for processing large amounts of data and teaching algorithms for deep research. As for the effectiveness of the use of artificial intelligence in education, artificial intelligence allows you to adapt educational materials and methods to the individual needs of each student, automation and optimization, interactive lessons thanks to artificial intelligence technology, etc.

In the field of education, artificial intelligence has the potential to reduce barriers to learning, optimize methods to improve learning outcomes, and also allows you to create new forms of independent learning, making the learning process more adaptive.

Scope of application of AI in solving social problems

Today, the world is experiencing a period of rapid development of artificial intelligence (AI). Advances in this field are leading to the creation of machines capable of learning and performing cognitive tasks that previously could only be performed by humans. AI is a key element of the era of technology convergence, which has a profound impact on people, culture, society and the environment. Since AI is a cognitive technology, its various aspects are closely related to the main forms of human activity: education, science, culture and communications. In fact, artificial intelligence is, first of all, a set of different technologies, methods and tools. And new technologies have always influenced social development. They change how people receive information, how they make decisions, and form opinions. They are changing how people can participate in society and how we perceive each other and society as a whole. As artificial intelligence continues to penetrate into various aspects of society, its influence is increasing (Russel S.J., Norvig P.,2020). The impact of AI is undeniable, from changing daily life to reorganizing social structures. AI not only makes life easier for humanity, but also saves time and effort. It helps you navigate traffic by analyzing real-time data

and offering the fastest routes. It automates everyday chores such as vacuuming or washing dishes, and frees up our time for more important activities. In fact, we see AI becoming our capable ally in making our lives easier and better.

The potential of AI in solving social problems is huge. Its applications extend to various fields, including health, the environment, and education (Tsvyk, et al, 2019; Ranerup, et al, 2020). Using artificial intelligence, we can improve efficiency, optimize resource allocation, and develop proactive strategies to solve problems that were previously overwhelmed.

Social problem solving is an interdisciplinary field that explores how individuals and groups approach and solve problems in social situations. Research in this field covers psychology, sociology, education and related disciplines. Solving social problems is often defined as the process of identifying and implementing effective solutions to social problems or interpersonal problems. Researchers usually identify several key components of solving social problems, including problem definition, goal setting, alternative solutions, decision making, and solution implementation. Cognitive processes play a crucial role in solving social problems (Vassilakopoulou, et al, 2022). Research often focuses on how people perceive and interpret social situations, as well as their ability to generate and evaluate potential solutions. Research has revealed individual differences in cognitive processes related to solving social problems, such as differences in perspective perception, cognitive flexibility, and information processing. There is considerable interest in the developmental aspects of solving social problems, especially in children and adolescents. Research studies how problem-solving skills develop over time, and the factors that influence this development. Intervention programs often target children to improve their social problem solving skills, which can contribute to improved interpersonal relationships and academic success. With the increasing role of technology in social interactions, some research focuses on how digital communication and social media influence the solution of social problems (Basl, et al, 2019). The impact of online communication on conflict resolution, cyberbullying, and the development of digital social problem solving skills are areas of interest.

To develop a system for solving social problems, it is necessary to develop a number of diagrams describing the structure and interrelationships between the components of an intelligent system for solving a social problem. A precedent in object modeling is a document describing a sequence of events related to an executor (an external agent) who uses the system being created to complete the required process. Use cases are descriptions or use cases of the system. A certain process is described using a precedent. Based on the results of the analysis of use cases, at the first stage of domain modeling, a diagram is created to determine the requirements for the Use Case system (behavior scenarios). This diagram allows you to create diagrams of the behavior of system objects. The use case diagram illustrates the set of use cases of the system and the performers, as well as the relationships between them. Use cases determine how performers interact

with the software system. During this interaction, the executor generates events transmitted to the system, which are requests to perform some operation.

The use case diagram contains:

- use cases of the system (use case);
- the actor.

The diagram reflects the interaction of use cases and actors. It reflects the system requirements from the user's point of view.

System use cases – description of system functions at a «high level». They describe everything that happens within the system. Use cases illustrate how the system can be used. They focus on what users want to get from the system. Each use case represents a completed transaction between the user and the system.

An actor is anything that interacts with the system, transmits or receives information from the system. An actor is a concept external to the system that participates in a certain way in the process described by the precedent. They describe everything that is outside the system. These are users of the system, other systems interacting with the one being described, time. Each use case must be initiated by an actor.

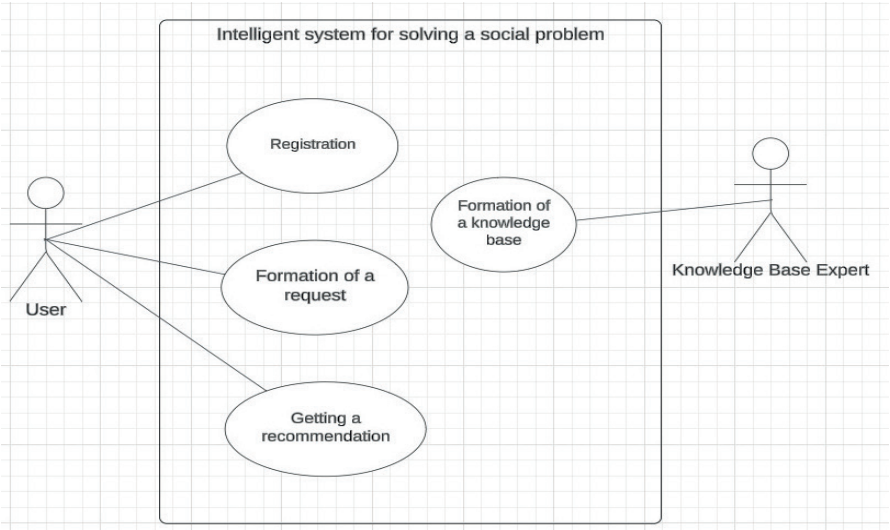


Figure 1. Diagram of precedents for a system for solving a social problem

Algorithm for using an intelligent system to solve a social problem:

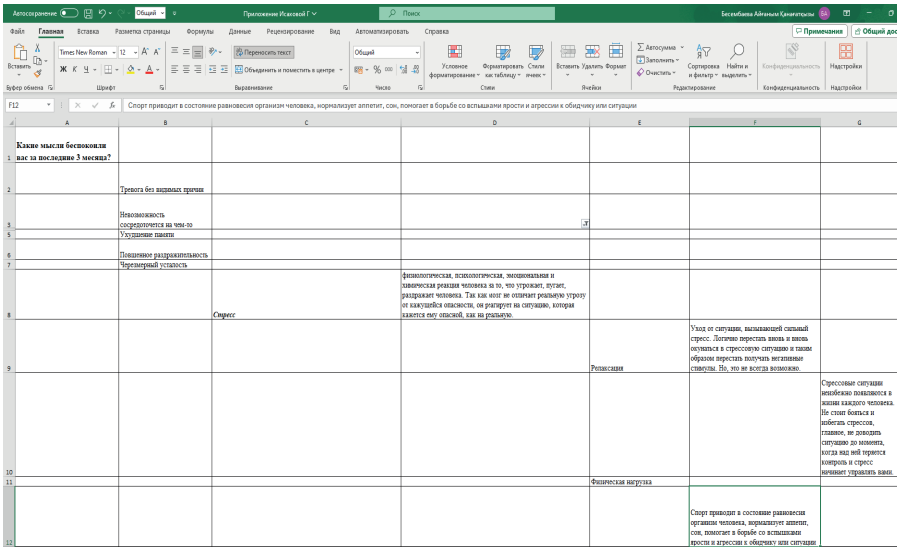
- The expert forms a knowledge base on social problems (Socio-economic problems, Housing problems, Problems of self-development, Threat to one's own life and health, etc.)
- The user registers and creates a request.
- The system, based on the knowledge base, generates a response to the User with recommendations.

Understanding semantic features is necessary to analyze and describe the meaning and relationships between words in a language (Pavlicek, et al,2019). They provide a basis for the study of lexical semantics and contribute to a deeper understanding of language and its structures.

Semantic features are components of concepts related to lexical units or grammatical units.

There are main reasons for using semantic analysis: it expands vocabulary and basic knowledge and helps to distinguish the meanings of words and concepts, shows how similar and diverse they are.

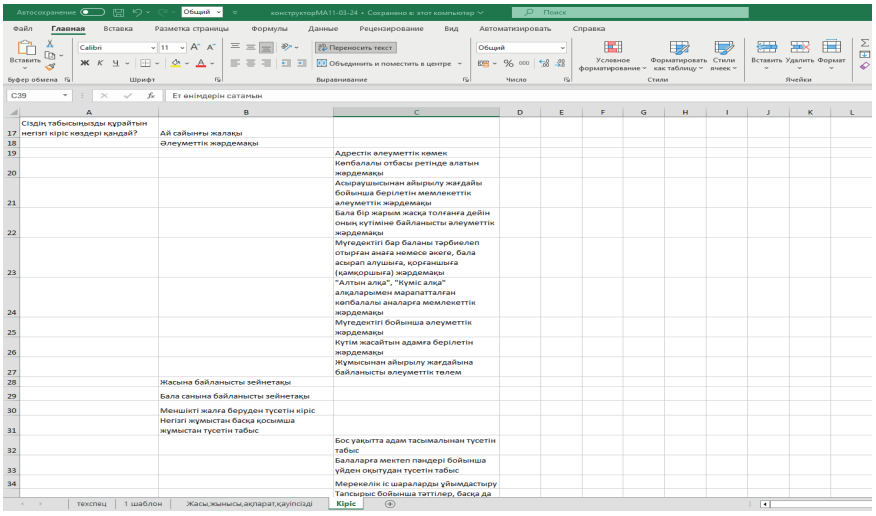
Taking into account the purpose of forming a thesaurus for a question-and-answer system in order to solve social problems and determine the semantic features of the knowledge base, an algorithm has been developed that provides an accurate reflection of social aspects in the process of filling in the database. This algorithm allows you to effectively and accurately respond to social requests and tasks (Figure 2).



	A	B	C	D	E	F	G
1	**Какие мысли беспокоили вас за последние 3 месяца?**						
2		Тревога без видимых причин					
3		Невозможность сосредоточится на чем-то					
5		Ухудшение памяти					
6		Повышенное раздражительность					
7		Чрезмерный усталость					
8			*Стресс*	физиологическая, психологическая, эмоциональная и поведенческая реакция человека на то, что угрожает, пугает, раздражает человека. Так как кот не отличит реальную угрозу от какущейся опасности, он реагирует на ситуацию, которая кажется ему опасной, как на реальную.			
9					Релаксация	Уход от ситуации, вызывающей сильный стресс. Детально перестать вникать и вновь окунаться в стрессовую ситуацию и таким образом перестать получать негативные симпулы. Но, это не всегда возможно.	
10							Стрессовые ситуации неизбежно появляются в жизни каждого человека. Не стоит бояться и избегать стрессов, главное, не доводить ситуацию до момента, когда над ней примется контроль и стресс начинает управлять вами.
11					Физическая нагрузка		
12						Спорт приводит в состояние равновесия организм человека, нормализует аппетит, сон, помогает в борьбе со вспышками прости и агрессии к обидчику или ситуации	

Figure 2. The first page of the algorithm table, which serves as the basis for the formation of the thesaurus and defines the structure of the knowledge base

A list of social issues important to users of the question-and-answer system has been developed. Each question has several possible answers, taking into account a variety of situations and user preferences (Figure 3).



	A	B	C
17	Сіздің табысыңызды құрайтын негізгі кіріс көздері қандай?	Ай сайынғы жалақы	
18		Әлеуметтік жәрдемақы	
19			Әдеттік әлеуметтік көмек
20			Кәмбалалы отбасы ретінде алатын жәрдемақы
21			Асыраушысынан айырылу жағдайы бойынша берілетін мемлекеттік әлеуметтік жәрдемақы
22			Бала бір жарым жасқа толғанға дейін оның күтіміне байланысты әлеуметтік жәрдемақы
23			Мүгедектігі бар баланы тәрбиелеп отырған анаға немесе әкеге, бала асырап алушыға, қорғаншыға (қамқоршыға) жәрдемақы
24			"Алтын алқа", "Күміс алқа" алқаларымен марапатталған көпбалалы аналарға мемлекеттік жәрдемақы
25			Мүгедектігі бойынша әлеуметтік жәрдемақы
26			Күтім жасайтын адамға берілетін жәрдемақы
27			Жұмысынан айырылу жағдайына байланысты әлеуметтік төлем
28		Жасына байланысты зейнетақы	
29		Бала санына байланысты зейнетақы	
30		Меншікті жалға беруден түсетін кіріс	
31		Негізгі жұмыстан басқа қосымша жұмыстан түсетін табыс	
32			Бос уақытта адам тасымалынан түсетін табыс
33			Балаларға мектеп пәндері бойынша үйден оқытудан түсетін табыс
34			Мерекелік іс шараларды ұйымдастыру
			Тапсырыс бойынша тәттілер, басқа да

Figure 3. Social questions with possible answers for the question-and-answer system

Sequence diagrams have been developed. Sequence diagrams are used to refine use case diagrams and describe the logic of use cases in more detail. Sequence diagrams contain the objects that interact within the script, the messages they exchange, and the results returned related to the messages.

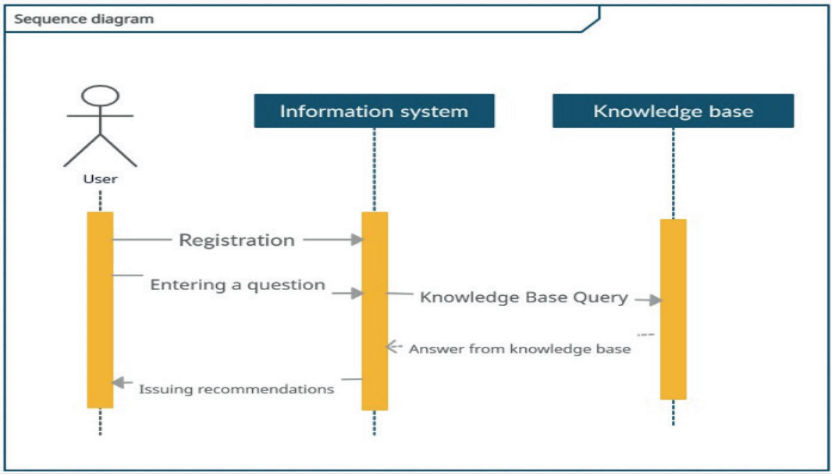


Figure 4 - Sequence diagram of the social task solution system

Algorithm for using an intelligent system to solve a social problem:

• The user registers in the system.

• The user enters a question on a specific social issue in text form in Russian or Kazakh.

• The system generates a request to the knowledge base of social problems and receives a response to the request.

• The system generates a response to the User with recommendations for solving a specific social problem.

One of the most pressing social problems in the world is access to quality education. Technology can bridge this gap by providing innovative solutions. Thus, technology and innovation have the power to solve social problems and promote positive change.

Conclusion

The role of artificial intelligence in solving complex social problems is multifaceted and is constantly expanding. By understanding artificial intelligence and using its potential, we can overcome difficulties more effectively. As artificial intelligence develops, it is very important to adopt responsible and ethical practices to ensure that its benefits are accessible to everyone. The adoption of artificial intelligence as a tool for positive change holds the key to a brighter future for the entire society. Artificial intelligence-changes people's daily lives, integrates into everyday social practice and forms a social world that does not lose sight of social problems.

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