

The Process of Designing Artificial Intelligence: Development Trends and Prospects

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Abstract. The relevance of research is due to the rapid development of artificial intelligence. It is an important technology that supports everyday social, technical, and economic activities. Artificial intelligence allows computers to learn from their own experience, adapt to set parameters, and perform tasks that were previously only possible for humans. In this regard, this article is aimed at identifying trends and prospects for the development of artificial intelligence. Another considerable task is to highlight the principles of building artificial intelligence systems. Developing an artificial intelligence system differs from building a conventional system as it requires a systematic approach, big data analysis, and model training. Building an artificial intelligence system – is a detailed process of reverse engineering human traits, capabilities of a machine, and using its computational power to surpass humans' skills. The leading approach to the study of this issue is literature analysis, which makes it possible to comprehensively consider artificial intelligence development. This article includes the modern foundations of artificial intelligence and various representative applications. In the context of the modern digital world, artificial intelligence is the property of machines, computer programmes and systems to perform intellectual and creative human functions, independently find ways to solve issues, be able to draw conclusions and make decisions. The research materials are of practical value for a critical analysis of current artificial intelligence capabilities, reasons why it still cannot achieve human intelligence, and the challenges it faces when achieving and surpassing the level of human intelligence

Keywords: artificial intelligence, information technologies, algorithm, technology development, expert systems

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Introduction

Artificial intelligence has become an important aspect of the future. This applies equally to information technology (IT) and many other industries that rely on it. Just a decade ago, artificial intelligence technology seemed like something out of science fiction; today, we use it in everyday life without even realising it – from intelligence research, facial and speech recognition to automation. Artificial intelligence is a general term that covers various areas, such as artificial neural networks, natural language processing, and deep learning, which are used for predictive modelling [1]. For many researchers, the purpose of artificial intelligence – is to mimic human cognition, while for some of them – it is the creation of intelligence without taking into account any human characteristics [2]. According to numerous other researchers, artificial intelligence is aimed at creating useful tools for human comfort and needs without any criteria for abstract intelligence [3].

The aforementioned variations in purposes are not necessarily wrong, as each approach provides new ideas and a framework for conducting research in the field of artificial intelligence. However, there is a strong argument that due to the lack of a correct definition of the given phenomenon, it is difficult to determine what can and cannot be done using existing methods. One of the purposes of studying AI – is to create intelligence in machines as a general property, not necessarily based on any quality of a person. This purpose also includes the task of providing means of human comfort and meeting the needs that are the driving force of technological development. Nevertheless, such purpose also requires a definition of intelligence.

The AI definition should cover data input, output, and their relationship based on the system structure. It is necessary that the definition is general and can be applied uniformly. In the absence of such a definition, the approaches to determining AI vary from case to case, such as a game of chess, automated vehicle control, the medical expert system for diagnostics. The scientific purpose of AI is to define theories and methods about knowledge representation, learning, rule-based systems that explain different intelligence types [4]. The engineering purpose of artificial intelligence is to give the machine the ability to solve real issues [5]. The main methods applied in artificial intelligence for this purpose are knowledge representation, machine learning, rule systems, and state space search.

The prospects for artificial intelligence are outstanding: improving efficiency, convenience, eliminating lengthy processes and automating the regular ones. So far, the relatively new field faces numerous difficulties in implementing solutions. However, according to a study by McKinsey [6], production automation will accelerate in the coming years. For example, in China and India, 50% of workflows will be handled by smart systems. Artificial intelligence and machine learning are based on conventional computing methods,

changing the productivity and day-to-day operations of many industries. Artificial intelligence has changed everything in a relatively short period of time, from research and manufacturing to modernising finance and healthcare.

This field and related technologies have had a positive impact on the work of the IT sector. Thus, it can be noted that artificial intelligence is a branch of computer science that aims to turn computers into intelligent machines which otherwise would be impossible without direct human intervention. With computer learning and advanced algorithms, artificial intelligence and machine learning can be used to create systems that can mimic human behaviour, provide solutions to complex issues, and develop modelling, in an effort to help artificial intelligence reach the human level.

This review article considers current trends, methods, and prospects for artificial intelligence development, including its shortcomings. *The purpose of this study* is to review trends and prospects for the development of artificial intelligence tools, identify possible areas and difficulties, as well as establish principles for building artificial intelligence as a system.

Methodological Component of Using Artificial Intelligence

In the past, scientists were more interested in engineering purposes [7], but psychologists, philosophers, and cognitive scientists were more interested in scientific ones. Despite these opposing perspectives, there are common methods that these two approaches can use for each other. At present, there is a debate about the possibility of comparing and considering artificial intelligence as real intelligence. The advantages of artificial intelligence include: accuracy of data processing; the ability to analyse a large amount of information at high speed; artificial intelligence does not need sleep and a lunch break; it does not make mistakes due to overwork; it can be used where it is dangerous for a person to be.

Using machines and learning programmes can considerably reduce time, financial costs, and increase productivity. For example, with artificial intelligence that can diagnose melanoma, doctors will be able to make more accurate diagnoses and spend less time on each of the patients. Accordingly, doctors will be able to help more people over a certain period of time [8]. The potential for using artificial intelligence is very wide, and it is already used in many areas: medicine, finance, industry, trade, and everyday life. For example, the Siri and Alexa voice assistants, which can be downloaded on iOS, Android, or Windows. There are also bots in video games that can always behave differently. There are also automatic translators, as well as complete integrated smart home systems. Artificial intelligence is a complex of related technologies and processes that develop efficiently and quickly (Fig. 1).

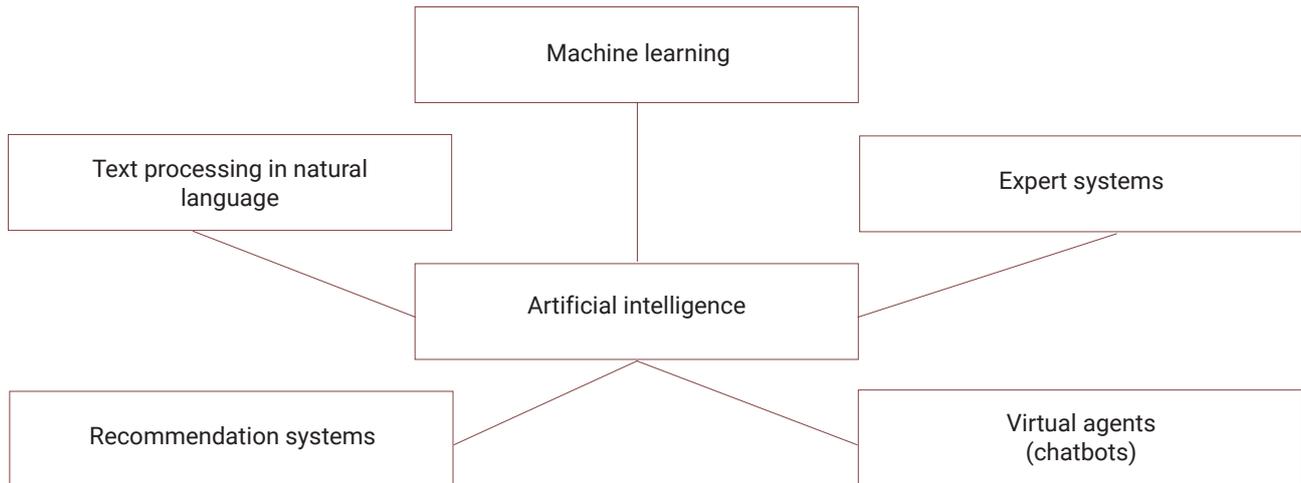


Figure 1. Artificial intelligence components

The consideration of artificial intelligence as human intelligence replication is primitive and can be misleading. This is because the actual process of human intelligence and its sources are still being discussed and investigated. Nevertheless, considering artificial intelligence as advanced computing is accurate. Over the past two decades, especially after 2000, artificial intelligence applications have evolved and expanded in commercial, industrial, pharmaceutical, medical science, consumer goods, manufacturing processes, and even management. The use of artificial intelligence methods in every organisation has become necessary to maintain competitiveness in the market. Many organisations keep the artificial intelligence techniques they use secret.

Now artificial intelligence consists of many components using various methods, such as:

- speech processing: for speech comprehension, speech generation, machine dialogue, machine user interface;
- natural language processing: information search, machine translation, questions/answers, generalisation;
- planning: development of schedules, game strategies;
- engineering and expert systems: troubleshooting diagnostics, decision support systems, training systems;
- fuzzy systems: for fuzzy controls [9];
- brain and evolution models: genetic algorithms and programming, brain modelling, time series prediction, classification;
- machine vision and robotics: object recognition, image comprehension, intelligent control, autonomous research.
- machine-learning: learning on decision trees, learning the versioning space.

The main technology of AI is the ability of computer systems to “self-learn” [10], using accumulated data or a specially created environment to program certain decision-making rules or behaviours applicable in the future. The main ideological “difference” between artificial intelligence technologies and conventional digital solutions is the fact that when performing tasks, AI does not rely on logical schemes set by programmers, but build complex

decision-making mechanisms (neural networks) based on the data and tasks that were set by programmers.

In the following processes and tasks, the introduction of artificial intelligence technologies brings considerable results:

1. A large amount of input data (for example, credit risk assessment using social media data or working with seismic data to determine the location of oil deposits).
2. Large variability of input data, working with unstructured data (example: processing contracts executed using arbitrary templates of contracts with counterparties).
3. High “speed” of input data (example: real-time face recognition in a video stream from video surveillance cameras).
4. Analytical work (example: almost every profession where formula-based calculations were previously used to achieve results: finance, engineering, risk assessment).

Thus, high-quality solutions based on the possibility of using data with artificial intelligence technologies to improve the results obtained are developed. An example where artificial intelligence has assisted society is the growing use of artificial intelligence tools for cybersecurity. Cyberattacks are becoming increasingly complex, and data breaches are putting many people's sensitive personal information at risk. Artificial intelligence helps organisations fight cybercriminals by analysing huge amounts of data to detect potential suspicious behaviour on the Internet. Therewith, AI is harmful to society, as authoritarian states use artificial intelligence to conduct intrusive surveillance. Artificial intelligence capabilities such as facial recognition have become useful tools used by states to suppress and marginalise minorities.

Features of Developing Artificial Intelligence Systems

The main process of AI development can be divided into three stages:

- the first stage is early development from 1943 to 1970. The early development was represented by the Turing Test

in 1950, the introduction of artificial intelligence in 1956, and later by symbolism, reasoning systems, connectionism, and expert systems;

- the second stage is the development from 1980 to 2000. This stage occurred mainly between 1980 and 2000, with the rapid development of typical statistical learning, machine learning, neural networks, and pattern recognition.
- the third stage is represented by deep learning and obtaining powerful data after 2006. During this period, AI reached its third major development and continued to grow rapidly [11-14].

Artificial intelligence is a field of computer science that develops intelligent computer systems, that is, systems that have capabilities that are generally associated with the human mind – understanding speech, learning, the ability to reason, solve issues, etc. [5]. Later, artificial intelligence began to include a number of algorithms and software systems, the characteristic feature of which is the ability to solve some issues in the same way that a person would do.

The main properties of artificial intelligence are language comprehension, learning, and the ability to think and, importantly, act. Artificial intelligence is a general term that covers various areas such as artificial neural networks, natural language processing, and deep learning used for predictive modelling. Creating an artificial intelligence system is different from conventional computer programming, where the software does not automatically improve itself. The principle of a good artificial intelligence mechanism: it is necessary to collect more relevant data to train the model.

In addition, it is essential to understand that designing AI systems has become not only less complex but also much cheaper. Machine learning in the Amazon system [15] is one of the examples. The technology automatically classifies products in the shopping catalogue, using product description data as a training set. One important point to note is that a well-understanding of statistics is a favourable provision for artificial intelligence. The steps for developing an AI system are presented in Figure 2.

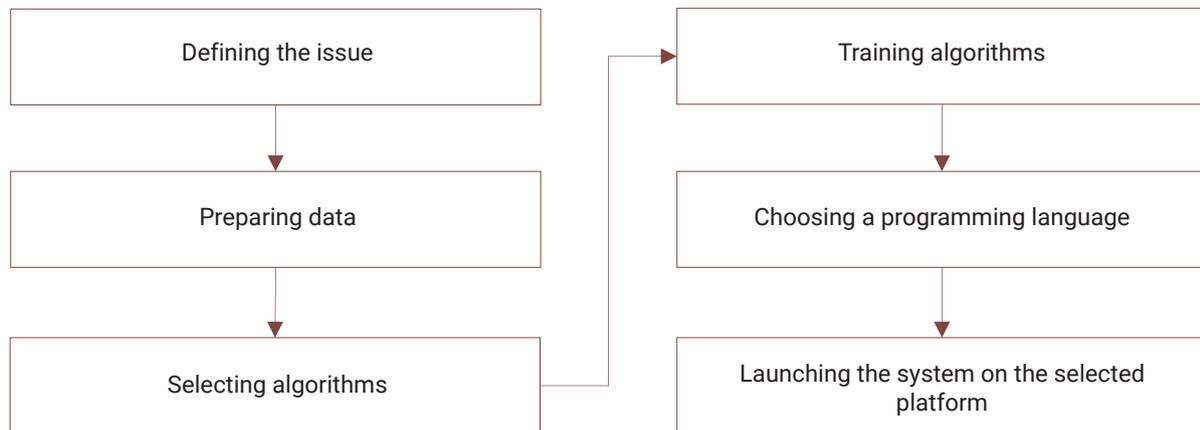


Figure 2. AI system development steps

Each of the steps to prepare the system includes many sub-items. Namely:

1. Defining the issue. Firstly, the main questions are “what should be solved?” and “what is the desired result?”. However, it should be remembered that artificial intelligence cannot be a panacea itself. This is a tool, not the solution itself. There are several methods and numerous issues that need to be solved using artificial intelligence tools.

2. Preparing data. Data is divided into two categories: structured and unstructured [16]. Structured data follows a rigid format to ensure consistency of processing and facilitate analysis. For example, signing up a customer's first name, last name, date of birth, and so on. Unstructured data is all other data. They are stored in a non-uniform pattern. This category can include audio, images, videos, words, and infographics. Examples of such data are emails, phone conversations, WhatsApp messages, and WeChat messages. Enabling computers to analyse unstructured data and access more information than structured data is one of the biggest utilities and breakthroughs in artificial intelligence. It is generally believed that the key elements of AI are complex

algorithms. However, the key part of artificial intelligence toolkits is data cleaning. As a rule, researchers spend 80% of their time cleaning, moving, checking, and organising data even before actually using or writing a single algorithm [17].

Enterprises and large firms have their own personal databases, and the data may not be prepared for the AI tools implementation. It is very common that data is stored in closed sources. This may lead to duplication of information that may correspond or contradict. Data storage can ultimately restrict a firm's rapid understanding of its internal events and information. Before launching models, it is necessary to ensure that the data has been organised and cleaned up. In practice, it is required to check consistency, determine the chronological order, add labels where necessary, and so on. Generally, the more data is processed, the more likely it is to provide a result to solve a specific issue.

3. Selecting an algorithm. An important point when creating an artificial intelligence system is to analyse various common types of algorithms, which also depend on the chosen learning type:

1) supervised learning: classification and regression. Basically, classification refers to predicting data labels, and regression refers to predicting quantity. An example of using a classification algorithm is a case when it is necessary to determine whether the loan can be outstanding. The regression algorithm may be used if it is required to quantify the expected loss for these outstanding loans. In this context, the question of value is raised. Once the issue is identified, an algorithm can be selected. These examples are simplified and far from actual practice. There are other algorithms for controlled learning, such as random forest, naive Bayesian classifier, support vector machine, and logistic regression;

2) unsupervised learning and enhanced learning. The algorithms can be diverse and classified into several categories, such as clustering, when the algorithm groups objects together, association, when it finds relationships between objects, dimensionality reduction, where it reduces the number of variables to reduce noise.

4. Training algorithms. After selecting the algorithms, the model has to be taught how to apply them. The critical step here is the accuracy of the model. Although there are no generally accepted or internationalised thresholds, it is important to establish the accuracy of the model within a given selection. Setting a minimum allowable threshold and applying statistical discipline is a key need, and it is necessary to retrain the model, as models may need some fine-tuning.

5. Selecting a programming language. The choice depends on the needs and various factors. There are various programming languages, from classic C++ and Java to Python & R. Python & R are the most popular coding languages as they offer a powerful set of tools, including many machine learning libraries for users.

6. Selecting a platform. Currently, there are ready-made platforms that provide all the services, instead of buying a separate service, database, and so on. A ready-made platform – machine learning as a service – is one of the most useful parts of the infrastructure that has helped spread machine learning. These platforms are designed to simplify and facilitate machine learning, frequently offering advanced analytics that can be used together with different algorithms and languages. Rapid deployment is also key to the success of platforms. The platforms are generally involved in data pre-processing, model training, and estimation prediction, and other issues. Among the most popular ones, there are Microsoft Azure, Google Cloud Prediction API, TensorFlow, Ayasdi, and others.

AI systems have many variations, such as rule-based systems with symbolic representations that work on inferences. There are also systems based on an artificial neural network that work on the interface with other neurons and communication weights. Despite the differences, all systems have four common features:

1. *Representativeness*. All artificial intelligence systems have such an important feature as knowledge representation. Rule-based systems, frame-based systems, and

semantic networks use a sequence of if-then rules, while artificial neural networks use connections along with connection weights.

2. *Learning*. All systems have the ability to learn, through which they automatically accumulate knowledge from the environment, for example, by obtaining rules for a rule-based expert system, or by determining the appropriate weights of connections in an artificial neural network.

3. *Rules*. System rules can be implicit or explicit. If the rules are explicit, the rules are created by the knowledge engineer, for example, for an expert system, and if they are implicit, they can be in the form of connection weights in a neural network.

4. *Search*. The search can take many forms, such as finding a sequence of states that lead to a faster solution.

Artificial intelligence is becoming increasingly important in the information technology sector and there are no obstacles to its development. With its machine and deep learning capabilities, this technology is transforming many industries, making them more efficient, productive, and focused on the core tasks that most require people's attention. The impact of artificial intelligence on modern life is hard to ignore:

– transportation: while it may take decades or more to improve this field, autonomous cars will transport people from place to place in the future;

– manufacturing: artificial intelligence-based robots work together with humans to perform a limited range of tasks, such as folding and stacking, and predictive analysis sensors ensure smooth operation of the equipment;

– healthcare: diseases are diagnosed faster and more accurately, improved drug discovery, virtual assistants to doctors and nurses who monitor patients, and big data analysis helps create more personalised patient maps;

– education: textbooks are digitised with AI, virtual teachers assist human instructors at the initial stage, the facial analysis measures students' emotions to adapt the experience to suit their individual needs;

– Mass media: journalism also applies artificial intelligence tools and will benefit from them. Bloomberg uses cyborg technology to quickly understand complex financial statements;

– customer service: Google is working on an assistant with artificial intelligence tools that can make calls to organise appointments. In addition to words, the system will be able to understand context and nuances.

AI as a Prerequisite for Economic Development: Advantages, Disadvantages, Risks

In addition to the above-mentioned fields, AI methods are used in the following technologies: smart sensors; Internet of Things; natural language processing; deep learning; recognition of texts, speech, images; business intelligence; intelligent information security systems; machine translation; other technologies and development areas. Many people still associate artificial intelligence with science fiction dystopias, but this characteristic is decreasing as artificial

intelligence develops and becomes more common in everyday life. While AI adoption in mainstream society is a new phenomenon, the concept itself is not new. The modern AI field appeared in 1956, but considerable advances in the development of an artificial intelligence system and its transformation into a technological reality took decades [18].

Artificial intelligence is widely used in business. In fact, most people interact with artificial intelligence in one form or another on a daily basis. As artificial intelligence technologies spread, they are becoming a prerequisite for enterprises that desire to maintain competitiveness. Instead of serving as a substitute for human intelligence and ingenuity, AI is generally seen as an auxiliary tool. Although it is currently difficult for artificial intelligence to perform "smart" tasks in the real world, it can process and analyse data sets much faster than the human brain. Artificial intelligence software can produce synthesised action courses and present them to the user.

Artificial intelligence as software appeared several years ago. This is a form of software that makes decisions independently, and it can operate even in situations not provided for by programmers. Artificial intelligence has broader decision-making capabilities, unlike conventional software. These traits make artificial intelligence extremely valuable in many industries, whether it is used to efficiently navigate visitors and employees at the corporate campus or perform a complex task such as monitoring a wind turbine to predict when it will need repairs. In this way, people can use artificial intelligence to help identify the possible consequences of each action and simplify the decision-making process. The possibilities of using artificial intelligence in the future are crucial. It is difficult to predict the development areas of this technology, but most experts see that computers handle "smart" tasks even easier as time passes [14]. This means that robots will be extremely useful in everyday life.

Artificial intelligence is capable of doing things that were once considered impossible, such as self-driving cars [19]. Cars without steering wheels exist exclusively due to access to training data and fast GPUs, which are key factors. Training self-driving cars requires a huge amount of accurate data, and speed is essential in this process. Five years ago, CPUs were too slow, but the introduction of GPUs provided new opportunities. The use of artificial intelligence in various cases arises an important question as to whether machines will replace human resources. Some experts strongly deny that artificial intelligence will automate so many processes that millions of people will be left unemployed [20], while other experts consider this an urgent issue [21].

The current state and future trends, uncertainty and possible failures of artificial intelligence and big data can be traced in the following areas:

1. Political: at present, it is extremely difficult to study and evaluate the power of artificial intelligence, and if implemented in autonomous systems, it can be potentially dangerous. Political data is about accountability, transparency, security, control, and public debate. Such data should

be based on ethics. Artificial intelligence can lead to better governance, more discussions, and new policy actors and processes.

2. Socio-economic: big data is changing the role of data, generally working with sensitive information, and providing better data protection in the long run. AI reduces the cost of forecasting, replaces a person responsible for this activity. Technology will lead to an increase in the amount of data, economic growth, and distortions in the labour market.

3. Geopolitical: AI increases competition between the US and China and gives both more power. Europe is attempting to build a business and find its strengths. Artificial intelligence can lead to changes in the international system of relations, hierarchies and networks, which will become more powerful, and deception in real life will be more difficult.

4. Technological: AI development is invested in and researched. This technology is aimed at emulating the brain, and can also be designed by other artificial intelligence. This will require long-term funding, overcoming many technical obstacles, and so on.

The AI purpose is to increase human capabilities and help to make proactive decisions with far-reaching consequences. From a philosophical standpoint, AI can help people live more meaningful lives, free from routine work, and manage a complex network of interconnected individuals, companies, and states to function in a way that benefits humanity. At the moment, the AI goal is to apply all the different tools and techniques that have been invented over the past thousand years to simplify human efforts and help make better decisions. Currently, AI is mainly used by companies to improve the efficiency of their processes, automate tasks that require large resources, and make business forecasts based on reliable data, not sensations. Similar to all technologies that have emerged before, research and development costs must be subsidised by corporations and government agencies before they become available to people.

AI advantages: reducing human error; artificial intelligence systems work continuously, without vacations; artificial intelligence-based digital assistants help perform common everyday tasks; systems that use artificial intelligence make decisions based on data and evidence; artificial intelligence offers intelligent automation. Artificial intelligence has some drawbacks [21]:

1. Since artificial intelligence is updated daily, hardware and software must be updated over time to meet the latest requirements. Machines require repair and maintenance, which is costly.

2. Artificial intelligence makes people lazy: due to its programmes that automate most of the work. People tend to become addicted to these inventions, which can cause issues for future generations.

3. Unemployment: as artificial intelligence replaces most repetitive tasks with robots, there is less human intervention, which will cause a considerable issue related to

employment standards. Each organisation aims to replace qualified specialists with AI-driven robots that can perform such work with greater efficiency.

4. Lack of emotion: there is no doubt that machines are much better when it comes to working effectively, but they cannot replace the human connection within a team. Machines cannot develop communication with people, which is an important attribute of team management.

5. Lack of thinking: machines can only perform the tasks they are designed for or programmed for, for everything else, they tend to crash or produce irrelevant results.

6. Lack of ethics: ethics and morality are important categories of human relationships that are difficult to incorporate into AI. The rapid AI progress has raised a number of concerns that one day it will grow rapidly and eventually destroy humanity.

The rapid AI adoption, despite being promising, highlights the risks involved, and as the takeover trend accelerates, businesses and governments are rushing to develop standards and provisions that increase trust, protect digital consumer rights, and promote responsible growth. The use of artificial intelligence can also carry some risks:

1. AI accuracy: to bridge the gap between the potential of artificial intelligence and risks, stakeholders in artificial intelligence require increased regulation and guidance on managing technology and the consequences of wrong decisions. Since governments do not take into account the potential impacts and risks of artificial intelligence, regulations and guidelines should provide a broad new framework that effectively promotes trust and reliance on automation.

2. Lack of technical knowledge: to integrate, deploy, and implement artificial intelligence applications in an enterprise, an organisation must obtain knowledge of current achievements and technologies, as well as their shortcomings. The lack of technical know-how hinders AI adoption in most organisations.

3. Price factor: small and medium-sized organisations struggle a lot with the introduction of artificial intelligence technologies due to their price. Even large firms such as Facebook, Apple, Microsoft, Google, Amazon (FAMGA) allocate a separate budget for the adoption and implementation of artificial intelligence technologies.

4. Data collection and storage: one of the biggest challenges of artificial intelligence is data collection and storage. Artificial intelligence business systems depend on sensor data as input. Irrelevant and large data sets can cause interference because they are difficult to store and analyse. Artificial intelligence performs best with a large amount of high-quality data. The algorithm becomes more efficient as the corresponding data grows.

5. Technology adoption requires specialists such as scientists, data engineers, and other subject matter experts. These experts are well-paid and rare in the modern market. Small and medium-sized enterprises have a limited budget to attract labour in accordance with the project requirements.

6. Lack of computing speed: artificial intelligence,

machine learning, and deep learning solutions require a high level of computing speed offered only by high-end processors. The higher infrastructure and pricing requirements associated with these processors have become an obstacle to the overall adoption of the technology. As the amount of data available for processing increases exponentially, the speed requirements for computing will increase along with it. It is absolutely necessary to develop a next-generation computing infrastructure solution.

7. Proper use of consumer data and data confidentiality: when artificial intelligence enters common streams, attention to privacy and responsible use of customer data will be a key component of the new regulation.

8. Discrimination and bias in decision making: AI use is increasingly based on confidential personal information, which raises public concerns about how social or model bias may influence decisions and ultimately lead to consumer discrimination.

In conclusion, artificial intelligence and automation will play a crucial role in developing new business models of the 21st century and they are expected to be the focus of attention more than ever before this year. There is no time to ignore the inevitable need for businesses to apply full-scale artificial intelligence innovations, as it may result in being left behind while fast-growing competitors and bold new players rewrite the rules of success.

Conclusions

The AI field provides various opportunities for many developers. However, this technology is still in its infancy stage. Given this, the AI field is developing very quickly, and in the near future, there is a probability that such systems will be able to perform very complex tasks. The article considered trends and prospects for the development of artificial intelligence systems, as well as defined an algorithm for creating artificial intelligence. Creating an artificial intelligence system is a time-consuming process that depends on the correct approach to solving issues, the choice of tools and algorithms. To design a good system that will effectively fulfil purposes, it is necessary to collect as much data as possible about the research tools. For example, to assess equipment failure, it is required to collect its indicators and information from sensors for further assessment of bottlenecks and possible issues.

Currently, AI is mainly used by companies to improve the efficiency of their processes, automate tasks that require large resources, and make business forecasts based on reliable data, not sensations. AI development is determined by the constant improvement of all information processes. Increasingly more companies and spheres of public life automate their work through the introduction of modern information tools. An important question remains as to the effectiveness of artificial intelligence and its ability to create more problems or solutions. Artificial intelligence has become the next big thing in technology. Organisations around the world are developing breakthrough innovations

in the field of artificial intelligence and machine learning. Artificial intelligence affects not only the future of every industry and every individual but has also become a major driver of new technologies such as big data, robotics, and

the Internet of Things. Given the pace of growth, it will continue to act as a technology innovator for the foreseeable future. As these technologies continue to evolve, they will have an increasing impact on social conditions and life quality.

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Анотація. Актуальність досліджень обумовлена стрімким розвитком штучного інтелекту. Це важлива технологія, що підтримує повсякденну соціальну, технічну та економічну діяльність. Штучний інтелект дає змогу комп'ютерам навчатися на власному досвіді, адаптуватися до заданих параметрів і виконувати ті завдання, які раніше були під силу тільки людині. У зв'язку з цим, дана стаття розроблена для виявлення тенденцій та перспектив розвитку штучного інтелекту. Також важливим завданням роботи виступає виділення принципів побудови систем штучного інтелекту. Розробка системи штучного інтелекту відрізняється від побудови звичайної системи, оскільки вимагає системного підходу, аналізу великих даних і забезпечення навчання моделі. Побудова системи штучного інтелекту – це ретельний процес зворотного проектування людських рис та можливостей машини, і використання їхніх обчислювальних здібностей, щоб перевершити те, на що люди здатні. Провідним підходом до дослідження цієї проблеми є аналіз літератури, що дає змогу комплексно розглянути питання розробки штучного інтелекту. У даній роботі розглянуті сучасні основи штучного інтелекту та різні репрезентативні програми. У контексті сучасного цифрового світу штучний інтелект є властивістю машин, комп'ютерних програм та систем виконувати інтелектуальні й творчі функції людини, самостійно знаходити шляхи вирішення проблем, вміти робити висновки та приймати рішення. Матеріали статті представляють практичну цінність для критичного аналізу того, на що здатний сьогодні штучний інтелект, чому він все ще не може досягти людського інтелекту та які відкриті виклики існують перед ним, щоб досягти та перевершити рівень інтелекту людини

Ключові слова: штучний інтелект, інформаційні технології, алгоритм, розвиток технології, експертні системи