HISTORY AND ADVANCES OF THE ARTIFICIAL INTELLIGENCE

Nikolay Petrov, Svetla Vasileva
TU-branch in Sofia, Bulgaria
nikipetrov_1953@abv.bg
**Institute of System Engineering and Robotics, BAS, Sofia, Bulgaria*
vasileva@iser.bas.bg

Abstract: By antiquity humanity seeks to discover likeness principles of human behavior, moving, sensing, thinking, evaluating and creating. In this connection our paper presents a short survey of history and advances of artificial intelligence. AI research is highly technical and specialized, and is strongly divided into subfields that often fail to communicate with each other. Some of the division is due to social and cultural factors: subfields have grown up around particular institutions and the work of individual researchers. AI research is also divided by several technical issues. Some subfields focus on the solution of specific problems. Others focus on one of several possible approaches or on the use of a particular tool or towards the accomplishment of particular applications. The paper observes a period from ancient centuries until recent advances of this interesting scientific field.

Key words: artificial intelligence

ИСТОРИЯ И РАЗВИТИЕ НА ИЗКУСТВЕНИЯ ИНТЕЛЕКТ

Резюме: От дълбока древност човечеството се стреми да открие принципите на човешкото поведение, двигателна активност, усещания, мислене, оценяване и творчество. В тази връзка нашата статия представлява кратък преглед на историята и постиженията на изкуствения интелект. Научните изследвания в областта на изкуствения интелект са високотехнологични и строго специализирани, поради което в тази област на науката са се обособили специфични подобласти, които често не успяват да общуват помежду си. Това се дължи на редица социални и културни фактори: подобластите са се развили около конкретни институции и/или работата на отделни изследователи. Изследванията в областта на изкуствения интелект също се разделят и поради възникващите технически въпроси. Някои подобласти са съсредоточени върху решаването на конкретни проблеми. Други са съсредоточени върху един от няколко възможни подходи или върху използването на конкретен инструментариум или към изпълнението на специални приложения. Обзорът обхваща

периода от древните векове до последните постижения в наше време на тази интересна научна област.

Ключови думи: изкуствен интелект

By antiquity humanity seeks to discover likeness principles of human behavior, moving, sensing, thinking, evaluating and creating. As Bruce Buchanan wrote "the history of artificial intelligence (AI) is a history of fantasies, possibilities, demonstrations, and promise" [1]. First findings appear in Early China, Egypt and the Greek myths, traditionally used to explain natural phenomena, cultural variations and frequent enmities. Most popular examples are mechanisms and the bronze robot of Hephaestus (corresponding to the Roman God Vulcan, the patron of the fire and the metal processing as black-smith) and Pygmalion's statue Galatea [2]. Pygmalion is an image, whose proto-type is associated with King of the Phoenician city of Tyre. Galatea is presented in Ovid's Metamorphoses, XIII 750—897.

In [2] the author McCorduck supposes the connection between sacred automatons and the Mosaic law developed around the same time, which expressly forbids the worship of robots. Also in [2] is considered statue of Amun in which "craftsman had reproduced the sensus and spiritus of gods" and author draw a conclusion that these were the first machines to be believed to have true intelligence and consciousness.

In the 3rd century BC a text of the Liezi [3,4] describes a curious account on automata involving a much earlier encounter between Mu of Zhou and a mechanical engineer known as Yan Shi, an "artificer". The latter depict the king with a life-size, human-shaped body of his mechanical "handiwork".

Another Chinese myth tells a story about Mu, who dreamed of being an immortal god. He was determined to visit the heavenly paradise and taste the peaches of immortality. A brave charioteer named Zaofu used his chariot to carry the king to his destination.

In a similar way the Mu Tianzi Zhuan, a fourth-century BC romance, fantasy version of the travels of King Mu of Zhou, historical fifth sovereign of the Chinese Zhou Dynasty, r.976-922 BC or 956-918 BC, describes amazing Mu's visit to Xi Wangmu[5,6].

It was also widely believed that artificial beings had been created by Jābir ibn Hayyān [7], Judah Loew (Golem of Prague - an animate being fashioned from clay) [1,2] and Paracelsus [2].

Artificial intelligence (AI) in its formative years was influenced by ideas from many disciplines as well as neurosciences in medicine, biology, mathematic and statistics, logic and philosophy, communications, system research and control, etc. Theory in early neuroscience (Balloonist theory) was attempted to explain muscle movement by asserting that muscles contract by inflating with air or fluid. **René Descartes** (1596–1650), who was interested in hydraulics and used fluid pressure to explain various aspects of physiology such as the reflex arc, proposed that "animal spirits" flowed into muscle and were responsible for their contraction [8]. In the model, which Descartes used to explain reflexes, the spirits would flow from the ventricles of the brain, through the nerves, and to the muscles to animate the latter.

In 1791, **Luigi Galvani** (1737-1798) learned that frogs' muscles could be made to move by the application of electricity. This finding provided a basis for the current understanding that electrical energy (carried by ions), and not air or fluid, is the impetus behind muscle movement.

In 1642 **Blaise Pascal** (1623 –1662) invented the mechanical calculator. He built 20 machines, called Pascal's calculators and later Pascalines in the following ten years, but he never made the claim that the devices could think. [9].

Leibniz (1646–1716) developed the infinitesimal calculus and Leibniz's mathematical notation has been widely used ever since it was published. It was only in the 20th century that his Law of Continuity and Transcendental Law of Homogeneity found mathematical implementation. He became one of the most prolific inventors in the field of mechanical calculators. While working on adding automatic multiplication and division to Pascal's calculator, he was the first to describe a pinwheel calculator in 1685 and invented the Leibniz wheel, used in the arithmometer, the first mass-produced mechanical calculator. He also refined the binary number system, which is at the foundation of virtually all digital computers.

"Mendelian inheritance" was initially derived from the work of father of modern genetics **Gregor Johann Mendel** (1822–1884), published in 1865 and 1866 which was re-discovered in 1900. It was initially very controversial. When Mendel's theories were integrated with the chromosome theory of inheritance by **Thomas Hunt Morgan** (1866–1945) in 1915, they became the core of classical genetics. Thomas Hunt Morgan was an American evolutionary biologist, geneticist and embryologist and science author who won the Nobel Prize in Physiology or Medicine in 1933 for discoveries elucidating the role the chromosome plays in heredity.

The scientific results of Mendel appear in the computer science field of artificial intelligence as genetic algorithms (GA) - a search heuristic that mimics the process of natural selection. This heuristic (also sometimes called a metaheuristic) is routinely used to generate useful solutions to optimization and search problems. Genetic algorithms belong to the larger class of evolutionary algorithms (EA), which generate solutions to optimization problems using techniques inspired by natural evolution, such as inheritance, mutation, selection, and crossover. Genetic algorithms find application in bioinformatics, phylogenetics, computational science, engineering, economics, chemistry, manufacturing, mathematics, physics, pharmacometrics and other fields.

John von Neumann (1903-1957) is remembered as a pioneer of the modern digital computer, and the application of operator theory to quantum mechanics, as a member of the team of Manhattan project and creator of game theory and the concept of cellular automata. For future computer his ideas were “not simply as a powerful calculating device and as a universal tool for research, with practically unlimited possibilities for solving tasks with an algorithmic nature” [10].

In the scientific literature is popular a term known as Von Neumann machine - a term created in honor of John von Neumann, suggest getting this concept, as it can mean: Von Neumann architecture, a concept for a computer architecture of IBM. In the general case, when it comes to computer, John von Neumann architecture refers to the physical separation of the multi-processing module of storage devices, programs and data. Also refers to a class machines, capable of self-replication; universal constructor of von Neumann, self-reproducing cellular automaton; probe of von Neumann, a self-replicating space probe and finally self-replicating nano-robots.

The classic model for decision-making in sciences of management and business administration is founded on the principles of von Neumann and Oskar Morgenstern.

Oskar Morgenstern (1902 –1977) was a German-born economist. In collaboration with mathematician John von Neumann, he founded the mathematical field of game theory and its application to decision making in economics (see von Neumann–Morgenstern utility theorem).

Mechanical or "formal" reasoning has been developed by philosophers and mathematicians since antiquity. The study of logic led directly to the invention of the programmable digital electronic computer, based on the work of the English mathematician **Alan Mathison Turing (1912–1954)** and others.

Alan Turing, was highly influential in the development of computer science, giving a formalization of the concepts of "algorithm" and "computation" with the Turing machine, which can be considered a model of a general purpose computer. Turing is widely considered to be the **father of computer science and artificial intelligence**. He first proposed possibility of artificial intelligence in 1950.

Early AI programs, developed in the 1960s, attempted simulations of human intelligence, were aimed at general problem-solving techniques. Turing's theory of computation suggested that a machine, by shuffling symbols as simple as "0" and "1", could simulate any conceivable act of mathematical deduction. This, along with concurrent discoveries in neurology, information theory and cybernetics, inspired a small group of researchers to begin to seriously consider the possibility of building an electronic brain.

In computability theory, the Church–Turing thesis is a combined hypothesis about the nature of functions whose values are effectively calculable; or, in more modern terms, functions whose values are algorithmically computable. In simple terms, the Church–Turing thesis states that a function is algorithmically computable if and only if it is computable by a Turing machine.

Early attempts in neurosciences are significantly influenced by scientists as **Norbert Wiener** (with his fundamental work on cybernetics and by introducing feedback in control), **W.Ross Ashby**, **Waren Mc Culloh**, **Walter Pitts**, **Newell**, **Simon** and many others.

W. Ross Ashby (1903 –1972) was an English psychiatrist and a pioneer in cybernetics, the study of complex systems. His two books, “Design for a Brain” and “An Introduction to Cybernetics”, were landmark works. They introduced exact and logical thinking into the nascent discipline and were highly influential. In 1946, Alan Turing suggests Ashby to use Turing's Automatic Computing Engine (ACE) for his experiments instead of building a special machine. In 1948, Ashby made the Homeostat - one of the first devices capable of adapting itself to the environment; it exhibited behaviors such as habituation, reinforcement and learning through its ability to maintain homeostasis in a changing environment. In “An Introduction to Cybernetics” Ashby formulated his Law of requisite variety stating that "variety absorbs variety, defines the minimum number of states necessary for a controller to control a system of a given number of states." This law can be applied for example to the number of bits necessary in a digital computer to produce a required description or model.
Despite being widely influential within cybernetics, systems theory and, more recently, complex systems, Ashby is not as well known as many of the notable scientists his work influenced, including Herbert A. Simon, Norbert Wiener, Ludwig von Bertalanffy, Stafford Beer and Stuart Kauffman.

In response to Ashby’s Homeostat, Roger C. Conant and Ashby produced in 1970 so-called "Good regulator theorem" stating that "every good regulator of a system must be a model of that system". Any regulator that is maximally successful and simple must be isomorphic with the system being regulated. With regard to the brain, considered as a complex dynamic system, insofar as it is successful and efficient as a regulator for survival, it must proceed, in learning, by the formation of a model of its environment. The theorem is general enough to apply to all regulating and self-regulating or homeostatic systems.

Also in response to Ashby’s Variety, Stafford Beer (1926 –2002) applied Variety to found management cybernetics and the Viable System Model (VSM) which presents the organizational structure of any viable or autonomous system. A viable system is any system organized to meet the demands of surviving in the changing environment. One of the prime features of systems that survive is that they are adaptable.

Working independently, **Gregory Chaitin** (born 1947) followed this with algorithmic information theory and meta-mathematics, in particular a new incompleteness theorem in reaction to Gödel's incompleteness theorem. Chaitin has defined Chaitin's constant Ω, a real number, whose digits are equidistributed and which is sometimes informally described as an expression of the probability that a random program will halt. Ω has the mathematical property that it is definable but not computable. Chaitin's early work on algorithmic information theory paralleled the earlier work of **Andrey Nikolaevich Kolmogorov** (1903 – 1987). Chaitin is also the originator of using graph coloring to do register allocation in compiling, a process known as Chaitin's algorithm.

Warren Sturgis McCulloch (1898–1969) was an American neuro-physiologist and cybernetician, known for his work on the foundation for certain brain theories and his contribution to the cybernetics movement. In 1943 Mc Culloch and Walter Pitts published a paper in which they attempted to demonstrate that a Turing machine program could be implemented in a finite network of formal neurons, that the neuron was the base logic unit of the brain. In the 1947 paper they offered approaches to designing "nervous nets" to recognize visual inputs despite changes in orientation or size [16]. McCulloch also posited the concept of "poker chip" reticular formations as to how the brain deals with contradictory information in a democratic, somatotopical neural network. His principle of "Redundancy of Potential Command" was developed by Heinz von Forster and Gordon Pask in their study of Self-organization [14] and by Pask in his Conversation Theory and Interactions of Actors Theory.[15].

Several independent attempts were made in the first half of the 20th century to formalize the notion of computability: American mathematician **Alonzo Church** (1903 –1995) created a method for defining functions called the λ-calculus, **Kurt Gödel** (1906 –1978) with **Jacques Herbrand** (1908 –1931), created a formal definition of a class of functions whose values could be calculated by recursion. All three computational processes (recursion, the λ-calculus, and the Turing machine) were shown to be equivalent—all three approaches define the same class of functions. This has led mathematicians and computer scientists to believe that the concept of computability is accurately characterized by these three equivalent processes. Informally, the Church–Turing thesis states that if some method (algorithm) exists to carry out a calculation, then the same calculation can also be carried out by a Turing machine (as well as by a recursively definable function, and by a λ-function). Even though the three processes mentioned above proved to be equivalent, the fundamental premise behind the thesis — the notion of what it means for a function to be effectively calculable — is "a somewhat vague intuitive one". Thus, the thesis, although it has near-universal acceptance, cannot be formally proven.

Kurt Gödel published his two incompleteness theorems in 1931. The first incompleteness theorem states that for any self-consistent recursive axiomatic system powerful enough to describe the arithmetic of the natural numbers (for example Peano arithmetic), there are true propositions about the naturals that cannot be proved from the axioms. To prove this theorem, Gödel developed a technique now known as Gödel numbering, which codes formal expressions as natural numbers. most significant logicians in human history, Gödel made an immense impact upon scientific and philosophical thinking in the 20th century, a time when others such as **Bertrand Russell** (1872 –1970), **Alfred North Whitehead,** (1861 –1947), and **David Hilbert** (1862 –1943) were pioneering the use of logic and set theory to understand the foundations of mathematics. Human beings solve most of their problems using fast, intuitive judgments rather than the conscious, step-by-step deduction that early AI research was able to model. **Wason and Shapiro** (1966) showed that on examples of selection tasks (to test for one aspect of propositional logic while ignoring general-purpose reasoning based on syllogistic logic, predicate logic, modal logic and inductive logic) that people do poorly on completely abstract problems, but if the problem is restated to allow the use of intuitive social intelligence, performance dramatically improves.

In fact, the Dartmouth Summer Research Project on Artificial Intelligence was the name of a 1956 undertaking now considered the seminal event for artificial intelligence. The proposal goes on to discuss computers, natural language processing, neural networks, theory of computation, abstraction and creativity - areas within the field of artificial intelligence are considered still relevant to the work of the field.

The field of AI research was founded at a conference on the campus of Dartmouth College in the summer of 1956. The attendees, including **John McCarthy** (1927-2011), **Marvin Minsky** (born 1927), **Allen Newell** (1927-1992) and **Herbert Simon**(1916–2001), became the leaders of AI research.

McCarthy served on the committee that designed ALGOL, which became a very influential programming language by introducing many new constructs now in common use. In 1958, he proposed the advice taker, which inspired later work on question-answering and logic programming. Around 1959, he invented so-called "garbage collection" methods to solve problems in Lisp. Based on the lambda calculus, Lisp soon became the programming language of choice for AI applications after its publication in 1960. In 1961, he was the first to suggest publicly that computer time-sharing technology might result in a future in which computing power and even specific applications could be sold through the utility business model (like water or electricity). This idea of a computer or information utility was very popular during the late 1960s, but faded by the mid-1990s. However, since 2000, the idea has resurfaced in new forms (see application service provider, grid computing, and cloud computing). In 1966, McCarthy and his team at Stanford wrote a computer program used to play a series of chess games with counterparts in the Soviet Union. From 1978 to 1986, McCarthy developed the circumscription method of non-monotonic reasoning.

Minsky's inventions include the first head-mounted graphical display (1963) and the confocal microscope (1957, a predecessor to today's widely used confocal laser scanning microscope). Minsky also built, in 1951, the first randomly wired neural network learning machine, SNARC. Minsky wrote the book Perceptrons (with Seymour Papert), which became the foundational work in the analysis of artificial neural networks. This book is the center of a controversy in the history of AI, as some claim it to have had great importance in driving research away from neural networks in the 1970s. His book "A framework for representing knowledge" created a new paradigm in programming. While his "Perceptrons" is now more a historical than practical book, the theory of frames is in wide use. Minsky has also written on the possibility that extraterrestrial life may think like humans, permitting communication.

Allen Newell work in computer science and cognitive psychology. He contributed to the Information Processing Language (1956) and two of the earliest AI programs, the Logic Theory Machine (1956) and the General Problem Solver (1957) with Herbert A. Simon.

Symbolic manipulation languages such as Lisp, IPL, POP and time sharing systems gave programmers new power in the 1950s and 1960s.

In this period of time appeared the term "fuzzy logic", introduced with the 1965 proposal of fuzzy set theory by **Lotfi A. Zadeh** (born 1921) [17,18]. Fuzzy logic has been applied to many fields, from control theory to artificial intelligence. Fuzzy logics however had been studied since the 1920s as infinite-valued logics notably by **Jan Łukasiewicz** (1878 –1956) and **Alfred Tarski** (1901 – 1983). Fuzzy logic is a form of many-valued logic; it deals with reasoning that is approximate rather than fixed and exact. Compared to traditional binary sets (where variables may take on true or false values) fuzzy logic variables may have a truth value that ranges in degree between 0 and 1. Fuzzy logic has been extended to handle the concept of partial truth, where the truth value may range between completely true and completely false. Furthermore, when linguistic variables are used, these degrees may be managed by specific functions. Irrationality can be described in terms of what is known as the fuzzjective.

In the field of artificial intelligence, hybrid intelligent approaches as well as neuro-fuzzy, proposed by **J. S. R. Jang**, refers to combinations of artificial neural networks and fuzzy logic [19]. Neuro-fuzzy hybridization results in a hybrid intelligent system that synergizes these two techniques by combining the human-like reasoning style of fuzzy systems with the learning and connectionist structure of neural networks. Neuro-fuzzy hybridization is widely termed as Fuzzy Neural Network (FNN) or Neuro-Fuzzy System (NFS) in the literature. Neuro-fuzzy system (the more popular term is used henceforth) incorporates the human-like reasoning style of fuzzy systems through the use of fuzzy sets and a linguistic model consisting of a set of IF-THEN fuzzy rules. The main strength of neuro-fuzzy systems is that they are universal approximators with the ability to solicit interpretable IF-THEN rules [11,12].

The strength of neuro-fuzzy systems involves two contradictory requirements in fuzzy modeling: interpretability versus accuracy. In practice, one of the two properties prevails. The neuro-fuzzy in fuzzy modeling research field is divided into two areas: linguistic fuzzy modeling that is focused on interpretability, mainly the Mamdani model; and precise fuzzy modeling that is focused on accuracy, mainly the **Takagi-Sugeno-Kang** (TSK) model [11,12,19].

Hybrid intelligent system denotes a software system which employs a combination of methods and techniques from artificial intelligence subfields as: hybrid connectionist-symbolic models, connectionist expert systems, fuzzy expert systems, neuro-fuzzy systems, genetic fuzzy systems, rough fuzzy hybridization, evolutionary neural networks, reinforcement learning with fuzzy, neural, or evolutionary methods as well as symbolic reasoning methods

From the cognitive science perspective, every natural intelligent system is hybrid because it performs mental operations on both - the symbolic and sub-symbolic levels.

For the past few years there has been an increasing discussion of the importance of AI systems integration. Based on notions that there have been created specific AI systems (such as systems for computer vision, speech synthesis, etc., or software that employs some of the models mentioned above) and now is the time for integration to create broad AI systems. Proponents of this approach are researchers such as Marvin Minsky, Ron Sun, Aaron Sloman, and Michael A. Arbib.

An example hybrid is a hierarchical control system in which the lowest, reactive layers are sub-symbolic. The higher layers, having relaxed time constraints, are capable of reasoning from an abstract world model and performing planning. Intelligent systems usually rely on hybrid reasoning systems, which include induction, deduction, abduction and reasoning by analogy

AI research is highly technical and specialized, and is strongly divided into subfields that often fail to communicate with each other. Some of the division is due to social and cultural factors: subfields have grown up around particular institutions and the work of individual researchers. AI research is also divided by several technical issues. Some subfields focus on the solution of specific problems. Others focus on one of several possible approaches or on the use of a particular tool or towards the accomplishment of particular applications. The central problems (or goals) of AI research include reasoning, knowledge, planning, learning, communication, perception and the ability to move and manipulate objects. General intelligence (or "strong AI") is still among the field's long term goals. Currently popular approaches include statistical methods, computational intelligence and traditional symbolic AI. There are an enormous number of tools used in AI, including versions of search and mathematical optimization, logic, methods based on probability and economics, and many others.

In the early 1980s, AI research was revived by the commercial success of expert systems, a form of AI program that simulated the knowledge and analytical skills of one or more human experts. By 1985 the market for AI had reached over a billion dollars. At the same time, Japan's fifth generation computer project inspired the U.S and British governments to restore funding for academic research in the field. However, beginning with the collapse of the Lisp Machine market in 1987, AI once again fell into disrepute, and a second, longer lasting AI winter began.

In computer science, particularly artificial intelligence, a number of representations have been devised to structure information.

Knowledge representation is most commonly used to refer to representations intended for processing by modern computers, and in particular, for representations consisting of explicit objects and of assertions or claims about them. Representing knowledge in explicit form enables computers to draw conclusions from knowledge already stored.

Various knowledge representation methods were tried in the 1970s and early 1980s, such as heuristic question-answering, neural networks, theorem proving, and expert systems, with varying success. Medical diagnosis (e.g., Mycin) was a major application area, as were games such as chess.

In the 1980s formal computer knowledge representation languages and systems arose. Major projects attempted to encode wide bodies of general knowledge; for example the "Cyc" project went through a large encyclopedia, encoding not the information itself, but the information a reader would need in order to understand the encyclopedia: naive physics; notions of time, causality, motivation; commonplace objects and classes of objects. Through such work, the difficulty of knowledge representation came to be better appreciated. In computational linguistics, meanwhile, much larger databases of language information were being built, and these, along with great increases in computer speed and capacity, made deeper knowledge representation more feasible.

Several programming languages have been developed that are oriented to knowledge representation. Prolog developed in 1972, but popularized much later, represents propositions and basic logic, and can derive conclusions from known premises. KL-ONE (1980s) is more specifically aimed at knowledge representation itself. In 1995, the Dublin Core standard of metadata was conceived.

In the electronic document world, languages were being developed to represent the structure of documents, such as SGML (from which HTML descended) and later XML. These facilitated information retrieval and data mining efforts, which have in recent years begun to relate to knowledge representation.

Development of the Semantic Web, has included development of XML-based knowledge representation languages and standards, including RDF, RDF Schema, Topic Maps, DARPA Agent Markup Language (DAML), Ontology Inference Layer (OIL), and Web Ontology Language (OWL).

By the mid-1990s, scientists were concluding that AI was more difficult to create than they had imagined. It is now thought that intelligent behaviour depends as much on the knowledge a system possesses as on its reasoning power. Present emphasis is on knowledge-based systems, such as expert systems, while research projects focus on neural networks, which attempt to mimic the structure of the human brain.

In the 1990s and early 21st century, AI achieved its greatest successes, albeit somewhat behind the scenes. Artificial intelligence is used for logistics, data mining, medical diagnosis and many other areas throughout the technology industry. The success was due to several factors: the increasing computational power of computers, a greater emphasis on solving specific subproblems, the creation of new ties between AI and other fields working on similar problems, and a new commitment by researchers to solid mathematical methods and rigorous scientific standards.

In 2005, a Stanford robot won the DARPA Grand Challenge by driving autonomously for 131 miles along an unrehearsed desert trail. Two years later, a team from CMU won the DARPA Urban Challenge when their vehicle autonomously navigated 55 miles in an urban environment while adhering to traffic hazards and all traffic laws. In 2011, in a “Jeopardy quiz show” exhibition match, IBM's question answering system, The Kinect, which provides a 3D body–motion interface for the Xbox 360, uses algorithms that emerged from lengthy AI research as does the iPhone's Siri.

Bulgarian scientists have also contributions in the field of artificial intelligence, starting with the works of academicians Ivan Popchev [21] and Vassil Sgurev [23], Lyudmil Dakovski [22]. Original results in filed of the intuicionistic fuzzy sets and generalized nets published corresponding member of Bulgarian Academy of sciences Krassimir Atanassov [24,25]. New Bulgarian generation in AI is presented by the works of Dimiter Dimitrov, Daniel Nikovski [20], Todorov G. and M.Todorova [13]. In the world AI-teams are highly evaluated contributions of Dimiter Dryankov [26], N.Kasabov [27], A.Gegov [28] and many others.

CONCLUSION

Artificial intelligence is the science of the views, principles or concepts, methods and means for the creation of intelligent computer systems. The main purpose of creating workers of artificial intelligence is the ultimate knowledge and in-depth study of natural intelligence by means of modern computer systems and knowledge from the fields of medicine, biology, mathematics and other basic and engineering sciences. From this point, the term gets different formulations, all created for a more precise definition of the objectives and guidelines of the scientific and applied research. It is customary to argue that artificial intelligence is developed in three directions – information, biophysical and evolutionary.

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