

# THE EVOLUTION OF AI CONCEPT

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The humanity has always dreamed of a technology-enabled future. One of the most courageous ideas was to create a thinking machine, and this dream materialized in the concept of Artificial Intelligence. Today AI is not something mythical or distanced. We can feel its influence practically at every turn. AI has taken shape of a game counterpart (famous Deep Blue versus Garry Kasparov), a personal virtual assistant (Cortana, Siri etc.), an accurate diagnostic device like IBM Watson and so on.

The purpose of this paper is to clear up, how the concept of AI has been changing through the history of its development. The relevance of a subject is proved by the dynamics of the AI concept caused by the development of the Industry 4.0.

The term *Artificial Intelligence* was coined in 1956 on the Dartmouth workshop. In the early 1950s, there existed various names for the field of "thinking machines": cybernetics, automata theory, and complex information processing. In Vannevar Bush's seminal work "As We May Think", John McCarthy proposed a system which amplifies people's knowledge and understanding. Five years later Alan Turing wrote a paper on the notion of machines being able to simulate human beings and the ability to do intelligent things, such as play Chess. As one can see, the ideas of what these intellectual machines should be like differed greatly. So, the common vector of scientific researches aimed at creating intelligent machines needed to be figured out. The main problems AI was to deal with in 50s-70s years were mathematic and logic operations like proving geometric theorems and learning natural languages. The humanity was optimistic, predicting birth of an intelligent computer in 20 years.

Nevertheless, in two decades too many difficulties were still to be overcome, such as lack of computer power and wrong conception of making AI to develop. This a period got a name of the first AI winter (1974-1980). AI researches had to camouflage themselves under different names in order to continue receiving funding. So, "Machine Learning", "Knowledge-based system" and "Pattern recognition" take their roots from this period in the history of the AI concept development.

Starting from 1980 a new cycle of AI development has started. Both program of "experts systems" and Japanese fifth generation computer system project were launched. Knowledge and logic programming became the focus of mainstream researches.

Unfortunately, Lisp machine market, expert systems and fifth-generation computer program have failed. Strategic Computing Initiative was canceled. Machine learning was not yet mature enough, and the business community fascination felt like a usual economic bubble. The second AI winter (1987-1993) occupied the scientific arena.

In the late 80s, the interest in robotics increased. The reason is in appeared at those times idea, that a really intelligent machine should have a body to action physically. Nowadays this theory is famous as an embodied cognition: its adherents suppose that many features of cognition are shaped by aspects of the entire body. So, the concept of AI started being associated with it.

Moreover, AI began to be successfully used in different branches of industry. Researches call this phenomenon the *4<sup>th</sup> industrial revolution* or *Industry 4.0*. According to Klaus Schwab, Founder and Executive Chairman of the World Economic Forum, "The First Industrial Revolution used water and steam power to mechanize production. The Second used electric power to create mass production. The Third used electronics and information technology to automate production. Now a Fourth Industrial Revolution is building on the Third, the digital revolution that has been occurring since the middle of the last century. It is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres." AI plays an important role in this process. Nowadays it is being successfully used not only for design, data collection and analysis. Thanks to cyber-physical systems, a mechanism controlled by computer-based algorithms and tightly integrated with the Internet, the functions of AI are more extended.

Artificial Intelligence acts as a tool connecting peoples' requests with machine performers. Therefore, as Pieter Boon, partner at the data science company Xomnia, says: "Today AI has become a loaded term, often misused for a variety of technical utilities to create intelligent system." In the engineering world, "data scientists still prefer to use the term machine learning."

Even a short digest of the AI history which illustrates also the evolution of the AI concept undoubtedly shows that AI has gone a long path to become an essence we see today, and it is to go much further in its evolution. The question of what is AI is actual even now, and there exist many points of view what the AI should be.

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