**Basic questions of John McCarthy** ([http://www-formal.stanford.edu/jmc/whatisai/node1.html](http://www-formal.stanford.edu/jmc/whatisai/node1.html))

**What is artificial intelligence?**

It is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable.

Yes, but what is intelligence?

Intelligence is the computational part of the ability to achieve goals in the world. Varying kinds and degrees of intelligence occur in people, many animals, and some machines.

Is there not a solid definition of intelligence that does not depend on relating it to human intelligence?

Not yet. The problem is that we cannot yet characterize in general what kinds of computational procedures we want to call intelligent. We understand some of the mechanisms of intelligence and not others.

**Summary:** “Can a machine think?” This is a question that challenges science for a long time. The Turing Test is one of the methods known in Computer to answer that question. But is it relevant?”
Introduction

When flying to the site of Artificial Intelligence (AI), one can observe shaky ground, intersected by various disciplines (neuroscience, computer science, linguistics, psychology, philosophy, among others), which at the same time seeking a interdisciplinary contribution, clash in old paradigmatic certainties, characteristics of the communities they represent. From this scenario, one can immediately conclude the fertility of around seeded issues and the need for new and constant inputs that allow the ideas that flourish there follow the environmental changes in question.

But even the most casual observer ready realize that debates that there are waged are far from reaching any consensus. The products of the experimental designs high-tech barely enough to dazzle the eyes of general public, already provoke skepticism from critics of AI. And the evidence presented by advocates and critics of the real potential of Artificial Intelligence, add to rowdy passions that sometimes seem (in intensity and emotion) with discussions between fanatical fans for football rival teams.

And not infrequently, researchers from some popularity dangerously surrender to the easy breath that one should never doubt technology and even of his redemptive capacity. Pierre Lévy, in a large conference at PUC / RS in 2000, commented that the rapid progress of technology today is increasingly difficult to write science fiction. And, to try temporarily silence those who rose up against his exaggerated optimism, he added that a hundred years ago could not imagine the technological stage of this millennium turn, then one should not doubt what might happen technology in the coming centuries.

This is an argument (the no doubt the technology) for easy legitimize even the most whimsical of forecasts. But the truth is that behind robots that already rehearse steps (and can cost very little dodge shiny objects in its path) and robots that simulate speech, setbacks and difficulties faced by the Robotics and Artificial Intelligence are not easy solutions. It can be said that often such difficulties seem more massive barriers, which exceeded alternatives usually lead to new barriers or canyons.

In fact, ever greater attention to Artificial Intelligence by the Communication researchers is necessary. After great dedication to the study of mass communication, there is now a renewed demand for research interpersonal communication (which seemed to be like that "out of fashion"), in view that the branch of Artificial Intelligence devoted to the study of "natural language" it works primarily with dialogues simulation.
The concept of Artificial Intelligence

If you try to separate the terms "intelligence" and "Artificial" in order to simplify the understanding of the concept "Artificial Intelligence", we come across with the definition of intelligence presented by dictionaries of Portuguese (my official language), that define intelligence as "ability to learn, understand and adapt ". Not being the only definition given, it can be concluded that it is not easy and consensual definition. Thus the concept of Artificial Intelligence is also a concept with many definitions. According to Russell & Norvig (2009), the Artificial Intelligence definitions, which are in scientific literature, they may are grouped into four main categories: Systems that think like humans; Systems which act as human; Systems thinking logically; Systems logically acting.

Costa and Simões (2008) report that "In a simplified way we can define artificial intelligence as the discipline that aims to study and Construction of artificial entities with similar cognitive capacities of the human beings. The same authors also report that there are two different perspectives on Artificial Intelligence and on the way this discipline may have in the future: i) Strong Artificial Intelligence, which is considered that you can create a conscious and intelligent machine; ii) Weak Intelligence artificial, where it is considered that only you can build artifacts imitate man in his intelligent action. Artificial Intelligence as a science is recent and covers a wide variety of areas such as: Philosophy, Biology, Medicine, Robotics, Games, Neural Networks, Education, among others.

Related Areas with Artificial Intelligence

In 1995 Hélder Coelho stated that "(...) the AI has gained in recent years great importance and in very different areas (...) ", and the reason is because of knowledge, the key ingredient in AI, have" features very diverse, ranging from quantitative and certain aspects (trivial), the qualitative and uncertain".
Artificial Intelligence programming languages

Most artificial intelligence systems are characterized by non-following well-defined algorithms as in classical systems, so there are specific languages for AI that mainly use paradigms logic programming and functional programming.

According to Edelson, Drang and Levine (1988) for a program to be considered AI is necessary that all the elements necessary to process decision making, goals, facts, rules, inference mechanisms and pruning, they are included in the same program.

The same authors also note that there are several languages for AI construction programs. The first language for AI emerged in 1955, by Newell, Shaw and Simon, called IPL-11. Later came the language LISP (LISTS Processing), structured by John McCarthy (1958), which has become widely used simultaneously with the mathematical logic and recursive functions.

Another programming language, also considered Artificial Intelligence is the Prolog (Programming in Logic). Prolog appeared in 70s in order to solve problems through the use of logical instructions. "Was conceived in 1972 in Marseille by Alain Colmerauer and Philippe Roussel, exported to Edinburgh in 1974 by David Warren and Lisbon by Luis Moniz Pereira and Hélder Coelho ".

"To put it simply, logic programming is the use and formal logic notation to communicate computational processes to a computer" (Sebesta, 2003, p. 102).

Prolog is a declarative language, meaning that instead of the program stipulate the way to get to the solution, step by step (as in procedural or imperative languages), is limited to provide a description of the problem to be compute. It uses a base collection of facts and logical relationships data (rules) that express the relational domain of the problem to solve.
Prolog is a programming language for symbolic computation, non-numerical, specially designed to solve problems involving objects and relationships between objects (Bratko 2001).

The Prolog programming language is still widely used at the university level especially in undergraduate education in the field of Information Technology and particularly in the disciplines of Knowledge Based Systems and Artificial Intelligence.
What is Artificial Intelligence?

Robotics, fictional films, handling large machinery movements caused by human thought, these are some examples of Artificial Intelligence. So being involved, we can define as the Artificial Intelligence research branch that always seeks to build mechanisms or device capable of simulating the events of human beings, how to think, solve problems, in short, be smart.

In 1950, scientists Hebert Simon and Allen Newell began studies on Artificial Intelligence, they were pioneers in the field with the first laboratory at Carnegie Mellon. The desire to build intelligent machines comes from long and increasingly arise news. However, the AI gained strength only with the development of computers.

Initially, the main objective of Artificial Intelligence (AI) is to create machines that are able to develop both simple activities, routine, as well as those who develop an extremely complex task, therefore, they need to be adapted to the environment as well as to draw up the task for which was built in the most satisfactory way possible, in turn, they need to be able to learn to perform their tasks.

Fundamentals

The initial idea of a machine to be able to learn something turned out to be rethought as the human behavior is too complex to be passed on to a machine, since it was impossible. Given the difficulties encountered, the IA has in the 70 and 80 to be seen as a re-creation of human thinking to the development of machines capable of developing procedures impossible to a person. Thus, the human being is no longer a current model and the machines began to be developed from its technical capabilities.

The AI applications are not always seen and recognized by people, because it is not restricted in great inventions and trapped in sophisticated laboratories, but is found in everyday life. A good example of daily AI use is the brake system of a modern car, he is able to determine the time and intensity should be fired. In robotics there are many examples, scientists create robots capable of finding ways that a human being could not, for the purpose of collecting information. These robots are programmed to find your way around in difficult paths when there is any barrier they can identify the best route and avoid the obstacles.
What are the applications of Artificial Intelligence?

Thus, there are many examples of AI, we cannot forget some models of cameras that have been programmed to make the autofocus on people’s faces, and many of them take the picture when you meet a smile. Who never used a text editor and some phrase or word was underlined as well, spell checkers of computer word processors are produced with an intelligent system to detect any syntax problem in the sentence and thus offer a possible fix. Electronic games are also good examples of AI use, who was not super excited when the first plays in which players needed body movements just to run the game?

Medicine is full of machines with the application of AI, there are instruments for example, that in addition to detect the problem in the patient are able to determine the best treatment for it. The entertainment was also a great benefit from the AI, as a highlight, fighting games, where often the player cannot beat the machine because it is able to develop strategies from the user's movement.

Below are some AI application examples:

Games: The IBM's Deep Blue became the first computer program to defeat the world champion in a game of chess, winning Garry Kasparov by a lacquering 3.5 to 2.5 in an exhibition match. Kasparov said he felt "a new kind of intelligence" across the board. The value of IBM's stock increased by $18 billion. Even today there is evidence that the game was armed because IBM refused to deliver the logs on the game, experts say that in fact the game was a sham because it was not the machine that was playing, but a team of experts in chess.
**Diagnosis**: Diagnostic medical programs based on probabilistic analysis have been able to perform tasks at the level of an expert physician in several areas of medicine. Heckerman (1991) describes a case in which an important pathology expert lymph nodes ridicule the diagnosis of a program in a case particularly difficult. The show's creators have suggested that he ask the computer an explanation of the diagnosis. The machine highlighted the main factors that influenced their decision and explained the subtle interaction of various symptoms in this case. Later, the expert agreed with the program.

**Robotics**: Many surgeons now use robots assistants in microsurgery. The HipNav is a system that uses computer vision techniques to create a three dimensional model of the internal anatomy of a patient, and then uses robotic control to guide the insertion of a hip replacement prosthesis.
Language recognition and problem solving: The PROVERB is a computer program that solves puzzles crossword puzzles better than most humans, using restrictions on possible fills words, a large bank of previous puzzles data and a variety source of information that include dictionaries and online databases, such as a list of films and actors who participate in them. For example, he finds that the track "Nice Story" can be solved by "ETAGE" because its database includes the pair runway / solution "Story in France / ETAGE" and because it recognizes that the patterns "Nice X" and " X in France "often has the same solution. The program does not know that Nice is a city in France but can solve the puzzle.

- Chinook was declared the Man-Machine Checkers champion in 1994.
- Deep Blue, a computer chess player defeated Garry Kasparov in a famous dispute in 1997.
- Logic uncertain, a technique for uncertainty within reason, has been widely used in industrial control systems.
- Expert systems have been used to a certain industrial scale.
- Translators systems such as SYSTRAN, have been widely used (however, the results are not comparable with human translators).
- Neural networks have been used in a wide variety of tasks, from intrusion detection to computer gaming systems.
- Optical recognition systems Character (OCR) can translate letter written arbitrarily text.
- Recognition of handwriting is used in millions of Personal Digital Assistants.
- Voice recognition is commercially available and widely used.

- Computer algebra systems such as Mathematica and Macsyma are good examples of AI applications in solving algebraic problems.
- Computer vision systems are used in many industrial applications.
Applications using Artificial Life are used in the entertainment industry and in the development of Computer Graphics.

Systems based on the idea of artificial agents, called Multiagent Systems, have become common for solving complex problems.

Chatterbots (software robots for conversation), virtual characters that talk in natural language as if they were real humans, are increasingly common on the Internet.

**Artificial Intelligence in real life**

Nowadays, there are several real-life applications of Artificial Intelligence: games, computer programs, security applications for information systems, robotics (auxiliary robots), devices for writing recognition hand and voice recognition, medical diagnostic programs and much more.

**And the future, what does us about AI technology?**

It is not hard to imagine, the proportion of technological developments, the major trend is the application of AI on a large scale. What already exists today will be improved, so cars will be safer, games and more and more real movies, improved security systems, finally, the path is leading us to it. Well, in my opinion, the only thing impossible to be done is to make a machine think like a human being, to why, if this happens, it may be that the invention itself runs revolting against the creator. Is it worth the risk?

**The Future - what is reserving for us?**

**Eight technologies that will be more present in their daily lives by 2020**

If we stop to think about how much you can accomplish today thanks to technology, we realize how much this means is changing our daily life. Internet shopping, smart devices, autonomous cars, homes connected with cell phones, chips implanted in the body ... all this for some time was only possible in science fiction movies, but now it has become reality. What the future holds?

Technology evolves every day and when we least expect we are surprised with a new product, able to understand and satisfy our needs or even create a need that did not exist. Given this, the question that remains is: how will be in a few years? Will the technology will be increasingly present in our everyday lives, shaping our behavior?

With this in mind, the Totvs Lab, Laboratory Research and Innovation Totvs, in Silicon Valley, announced 8 technologies that will bring significant changes to the routine of people and various sectors of the industry in the next four years. And how do they know this? Simple, the company noted where the technology
giants like Google, Microsoft, Samsung, Facebook and Sony are investing their thousands of dollars in recent years. Check them in the list below.

**Artificial intelligence**

Favorite subject in science fiction movies, the AIs, which are already a present reality, should become even closer to our daily lives. It is true that there is no robots still behaving as if they were humans among us, but there are various smart devices, such as the chatbot, the lawyer DoNotPay, who has won more than 160,000 responses. To Totvs, the future will be formed by combining software, data and artificial intelligence. This will cause significant changes in several market segments, simplifying decision making. Industries such as healthcare, financial services, manufacturing and retail will be transformed by this combination.

**Bitcoins and Blockchain**

Bitcon is a virtual currency used in transactions made online. Unlike pay per ticket, where the buyer needs to go to a bank to make the payment and the seller takes a few days to receive, the bitcon is a fast, inexpensive process (it has no taxes or fees) and without the need for an intermediary (bank).

Although this type of currency is not so common to the great mass, the expectation is that in the future it becomes popular. Already Blockchain is a transaction database created in order to ensure extra safety to use Bitcoin. Their technology prevents the use of the same coin more than once, thus ensuring more transparency in transactions. This feature can also be used by financial institutions to register assets, keep them up to date and make them available to regulators.
3D printer

The tool is already being used highly in recent years, is for printing personal items such as household goods and toys, and in medicine, with the body members used in printing prostheses and transplants. The trend is that this technology is improved and even food can be printed by the apparatus. Is it true that a printer can print food?

Curiosity: The Cornucopia design, created by Brazilian designer Marcelo Coelho and Amit Zoran Israeli engineer, consists of a 3D printer of food, a robotic arm to prepare them and a mixer. The machine uses capsules placed ingredients in the machine compartments to shape and prepare the food. It has been possible to print pralines, pecans and hazelnuts, but in the future Coelho believes that you can print even a bean stew.

Autonomous cars

You may have heard of the company Tesla Motors, which develops and sells high-performance electric vehicles. The company has won wide attention for their cars with autopilot. Although research related to cars that do not need drivers are advanced for now these vehicles are not available for general use, but some people are already testing autonomous cars from Tesla. Google has also been investing in this technology.

The trend is that from 2020 autonomous cars are launched by different manufacturers and, until 2025, to happen to mass adoption of these vehicles, when their prices are becoming more affordable. IHS Automotive, consulting in the automotive market, still risk that by 2050 no one will need to put your hands on the steering wheel of a car.

Robotics

Robotics encompasses different forms of automation, including physical tasks, intellectuals and customer care services. According to Forrester, by 2019, 25% of will undergo changes due And who is concerned in be replaced by machines, changes will contribute to the emergence of new professional categories, increasingly strategic.
Virtual Reality and Augmented Reality

Unsurprisingly companies like Facebook are determined to invest in Virtual Reality. The technology allows users to interact in real time with computer-generated three-dimensional environments through multisensory devices. Currently, the use of virtual reality is being very used in games. With the Oculus Rift, for example, the player has the feeling of being inside the game. In the case of augmented reality, a well-known example is the *Pokemon Go* game, which uses this technology to bring the pocket monsters to the real environment. Soon these technologies are expected to reach several other markets, such as tourism and education.

Biotechnology

It is a body of knowledge that allows the use of biological agents (organisms, cells, organelles and molecules) to obtain goods or provide services. Thanks to this study area that the pharmaceutical industry can cultivate microorganisms to produce antibiotics that are marketed in. The technology is a promise to address global challenges, offering new potential to meet the global demand for food, fuel, materials, among others, while reducing the impact on the environment. We can see the advances provided by the Biotechnology in sectors such as textiles, which enables the creation of intelligent fabrics such as felt, which cannot catch fire. Another example are the carpets that eliminate dust.

Computer, Networking, Internet of Things

The Internet of Things is a very current theme that is increasingly present in our lives. It has as main purpose to connect all the items that are used on a daily basis to the World Wide Web. An example of this are the household appliances that connect to smartphones or tablets, through the internet, already available in the market such as smart refrigerators, where the owner can view the market, the mobile phone, which foods have and which are missing in refrigerator. The expectation is that in the future homes may be connected with all the utensils, providing more convenience to people.

As the director of Totvs Lab, Vicente Goetten, the revolution which we will experience in the coming years will have a greater impact than even the industrial revolution. It is estimated that in the United States, 47% of current jobs do not exist in the next 10 years. But he also points out that new jobs should arise. The most important as it is to be prepared for the changes to come.
Bibliography


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