

Towards ethical aspects on artificial intelligence

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Abstract: This paper presents the role of ethics in developing artificial intelligence, and how the artificial intelligence could change our perspective, because artificial intelligence in fact is all around us. Artificial intelligence is an important part of our life, but we are sure that the possibility of acquiring the domination of AI over the humanity is only a myth. During the time, the progress helps society but also brings a number of ethical problems. In the academic society, like in real life, the process of using different kind of power are complex, and even if it is about the robots, the computer or other artificial intelligence tools, the ethical problems are not only theoretical but also practical, it is not only a concept, but it is also a practical support for our life.

Key Words: ethics, artificial intelligence, standards, dilemmas, health

1. Introduction

Ethics becomes more and more important in our life.

According to our development, a number of new dilemmas appear in ethical field, related to environment, e-communication, respecting human rights and, of course, artificial intelligence. [9]

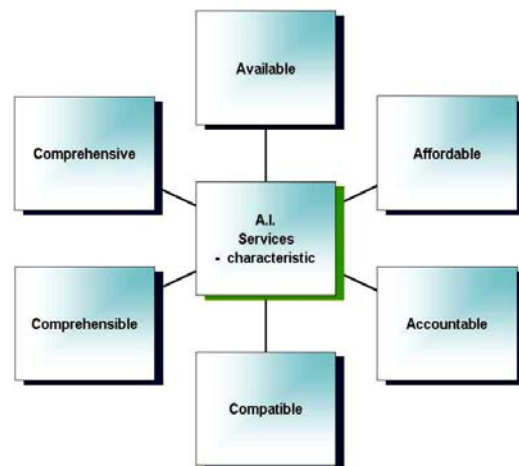
The society development and all knowledge and tools used for this purpose bring a number of ethics problems.

As human decision makers, we try to determine what the moral problems are and how we can use artificial intelligence to make good decision not only for one person, but also for the society.

It could be an interesting challenge to develop a software for helping us to take the best decisions, but we are sure that it could be inefficient and not enough powerful, because it can't appreciate all aspects and because a lot of mind properties cannot be, yet, reproduced by artificial intelligence. [3, 10]

Our conscious, our ethical judgment, could develop the trap that could be established in our world; it becomes more and more clear that not only the people must have ethical rights, but also the other creatures – natural or artificial who “live” on our planet.

The important issues which must be respected are: honesty, selflessness, serenity, the right to be use in a peaceful way, respect and a decent “death”. Also, it becomes more and more important to recognize the importance, the role and the place of this intelligence in our society, which is not a substitute for human intelligence. [10]



Even if the ethical issues have subjective and emotive components and it is obvious that is not possible to develop a pattern for all ethical dilemmas, we think that is possible to develop some standards not only for human behavior, but also for artificial intelligence tools used in our life, standards which could be part of human rights.

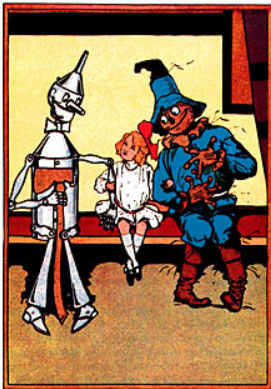
2. Artificial intelligence – a new concept?

The concept was developed by John McCarthy, a computer scientist, who receives the Turing Award in 1971 for this. He thinks that: "Whatever a person can do, he should able to make a computer do for him".

But, John McCarthy thinks that the concept is older. In his article Why Artificial Intelligence Needs Philosophy he affirms: "The idea of an intelligent machine is old, but serious work on the artificial intelligence problem or even serious understanding of what the problem is awaited the stored program computer. We may regard the subject of artificial intelligence as beginning with Turing's article *Computing Machinery and Intelligence* (Turing 1950) and with Shannon's (1950) discussion of how a machine might be programmed to play chess." [4, 13]

During the time the humanity was fascinated by robots and what they can do, a lot of inventors try to develop intelligent machines. From Pygmalion and Galatea myth, from Leonardo da Vinci machine to Tik-Tok, from *Ozma of Oz*, artificial machine describe in Frank Baum famous novel, artificial intelligence captive the intelligence and energy from the people.

Now, other people are connected with AI: Isaac Asimov in his series (Three Laws of Robotics, The Complete Robot) or George Lucas in Star Wars. [1]



Included in some of this novels and movies we found ethical preoccupation and a set of law which could supervise the development of AI.

3. Artificial intelligence – medical aspects

Homo sapiens is now the specie who try to change his environment, to make it easier to understand and used.

In medicine, the new preoccupation of the people involved in these fields is not only to reduce the suffering, to help the sick people using the local resources, but also to develop a way of using the human intelligence and the resource from other countries.

A reasonable course of action is to work together all over the world. One way for doing that is telemedicine, which is a modern way.

Artificial intelligent is seen like a "the study and design of intelligent agents". **Poole**

Some of the authors prefer terms like: intelligence or computer intelligence.

Like other authors, we consider that artificial

intelligence is a concept that becomes more and more important in our life and it can become an interdisciplinary field that need a cooperation between computers scientist, engineering, psychologist, sociologist and medical doctors.

It is not very clear now the influence of the artificial intelligence on the people's life on the long term, but is our duty to understand and oversee this process.

Even in 1967, Marvin Minsky think that "Within a generation ... the problem of creating 'artificial intelligence' will substantially be solved." We know now that is only at the beginning. [1]

The most important field of AI in medicine is related with: Cybernetics and brain simulation, Cognitive simulation, simulate human thought.

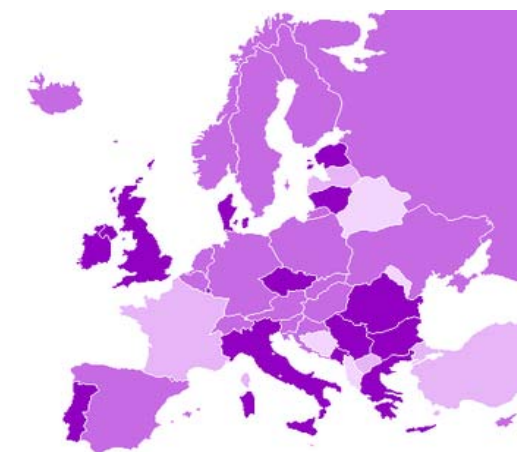
In medicine, artificial intelligence systems can be used to organize bed schedules, make a staff rotation, provide medical information or for medical diagnosis.

More and more AI is used for developing automatic systems from diagnostic (classification of some modifications, diagnostic lesions or cells with abnormalities) or treatment (intelligent decision support systems for mechanical ventilation, selected treatment strategy). Also, robots and telemedicine are other topics which must be analyze.

4. Infrastructure from medical artificial intelligence

More and more people use mobile phone, internet and computer, so it becomes obvious that these facilities are pervaded (penetrate) in medicine.

Because the aria covered by mobile company is large this could be used like a provider from AI in medicine. (http://commons.wikimedia.org/wiki/File:Europe_mobile_phone_penetration_map.png) fig.1



Mobile phone penetration in Europe
 120% > 100-120% 80-100%
 < 80% No data

Fig.1

Even if in the number of people connected to the internet is low in some European countries, though the internet becomes an important mean of communication. (<http://cordis.europa.eu/>) – fig.2.



Fig.2

We discover a different development of this 2 communications and infrastructures option, not only at the European level, but also in Romania, from different regions. [7, 12]

5. Ethics and artificial intelligence.

The researches in the field of artificial intelligence were developed in different direction, from philosophical questions to practical aspects.

Artificial intelligence has developed connections between informatics, mathematics, physics and biology, medicine or logic. It becomes more and more an interdisciplinary field and even if it is not very clear the links with medicine, grow up and become stronger.

Now, a lot of medical scientific associations are connected with AI from dermatology, radiology, traumatology, nuclear-resonance, magnetic resonance, oncology, gastroenterology, cancer, diabetes, endoscopy bio-engineering or public health. Including the hospital directors, doctors, administrators or managers are related with these fields, and of course medical informatics society is connected also. It was also established a European Society from Artificial Intelligence in Medicine which set up a conference organize every two year since 1985. [2, 6]

Artificial intelligence brings a number of ethical problems (like shown in the next graphic), a lot of them in relation with the everyday life of physicians and nurses. Fig.3.

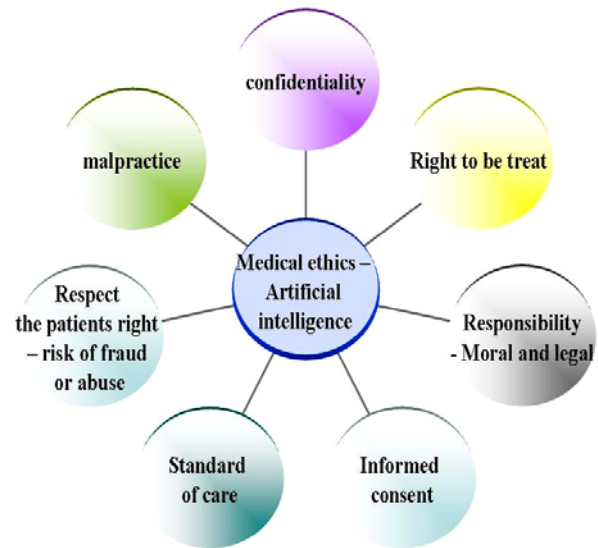


Fig. 3

When artificial intelligence was developing like a new trend, it looked like utopia to discuss about this, and of course we didn't have any ethical problems to solve.

In time it becomes obvious that ethical problems are really important and a lot of organizations try to mark out the principal direction where we must interfere.

Using artificial intelligence could help medical system or sick people but also brings a number of ethical problems like: responsibilities, informed consent, respect the patient right.

Few ethical issues are specific to AI (fig.4.):

- Intelligence machine and their role in the human life
- Could the machine have conscience?
- Who has the power: the man or the machine
- Is AI modifying the relation between medical doctor / nurse and patients?
- How long and sure is the way to link the AI and medicine?
- Could be – in time – the AI a solution for economic problems?
- Could be the AI a possibility to reduce the discrepancy between accessibility from different citizens from different country to discover in medicine?

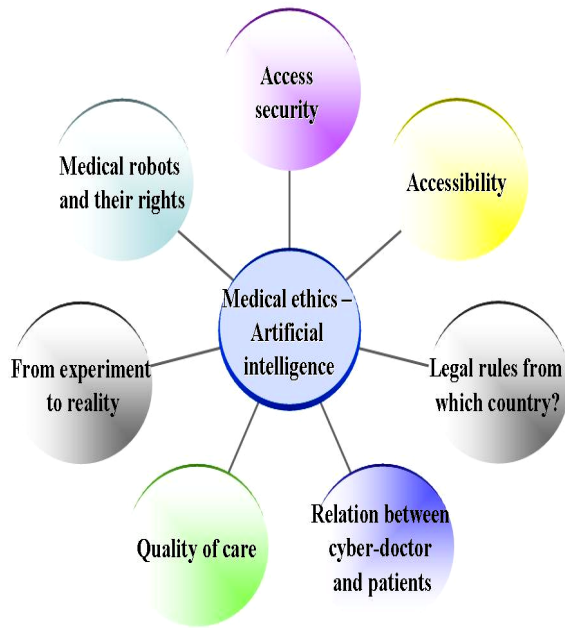


Fig. 4

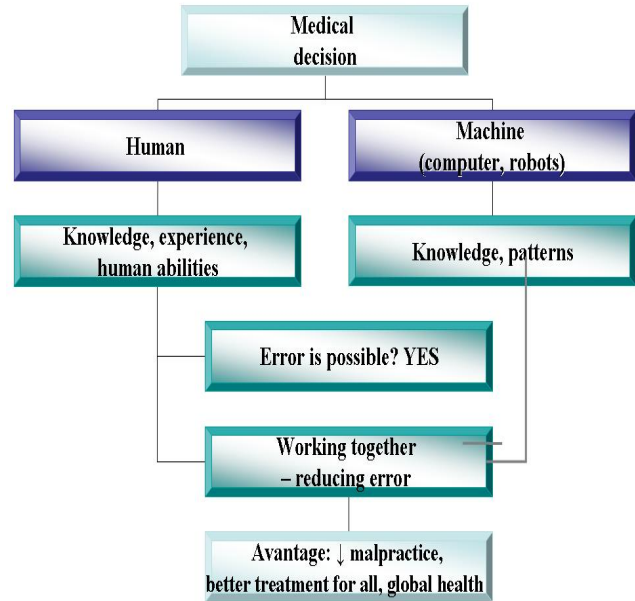


Fig.5.

Of course the artificial intelligence is based on human development, but, of course, is not so easy to put the machine to learn from its experience; the robots don't have the historical experience of development and the intelligence to learn from the past. [8]

The way the people develop their intelligence during the time is difficult to reproduce by computer.

The human brain has a limit about the possibility to accumulate the knowledge, but is brilliant by the way how he combine the piece of information. The computer could accumulate in a short time a lot of information, but is not capable to use the error for the past to accumulate knowledge.

So, in that context, one of the most important ethical questions is: could we let the machine to decide for us?

Of course the security and the privacy must be important objectives of our activities. [11]

Even if it is about miniaturization, molecularisation or nanomedicine, about putting a diagnostic or decides for a treatment in a classic way or using new technologies like cell or gene therapy, it is very important how we make the medical decision and how we connect the human and machine decisions. (fig.5)

7. Ethics and artificial intelligence an students' point of view- a case study

Ethics is a practical science and not a theoretical one. Ethics must help people to develop their wisdom and skills, to take competent decisions. Developing an ethical attitude must be an aim for all students, and the teachers must know their perception and to entailed in developing the good ethical wont. [5]

The study group comprises of 174 students which have a minimum of 18 and a maximum of 47 years. The study was realised in December-January 2009, in Transilvania University of Brasov and University of Iuliu Hațieganu Cluj.

One of the problem discuss with the student was: *Which are the most significant ethical issue connected with development of artificial intelligence and its application in medicine?* (fig.6)

- using the financial resources from health sector to develop application on medicine of artificial intelligence
- respected the patients right
- establishing the independences of robots used in medicine
- undiscriminating patients access to advance technique.

As it could be so in the next graphic 47% from the students consider that the respect of the patients' right and establishing the independence of robots used in medicine are the most important ethical problems.

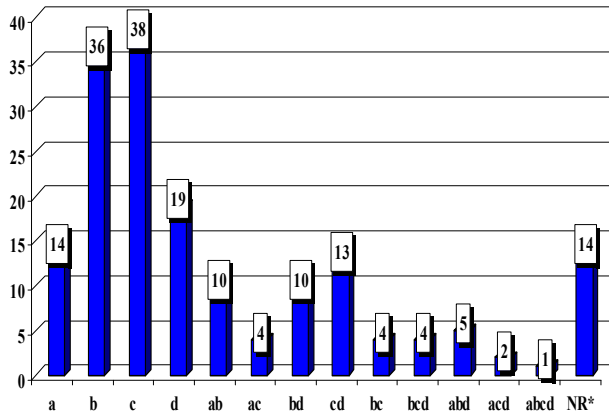


Fig.6.

Another problem to resolve was: *Which do you think is the role of the robots in the medicine of the future?* (fig.7)

- a. to substitute the surgeons
- b. to realize the surgical intervention at distance
- c. to reduce the risk of malpractice
- d. to assure a good position during the surgical intervention for reducing the risk of spine diseases

The 22% of the students think that the robots could reduce the risk of malpractice and 17% of them think that the robots could assure a good position during the surgical intervention. Also, 13% of them think that they could have the role to realize the surgical intervention at distance and 44% of them think that robots could have 2 or 3 of role.

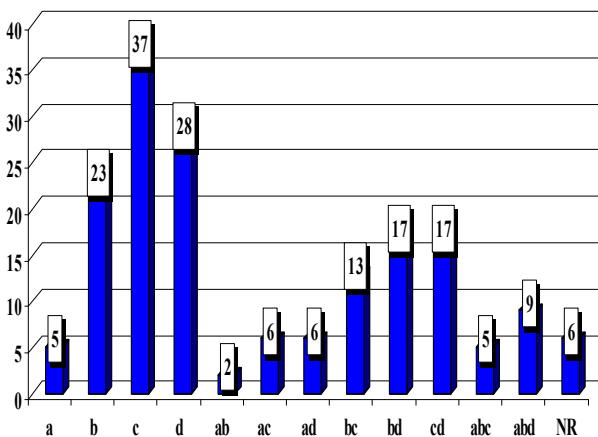


Fig. 7.

Education and artificial intelligence is one of the attractive ways to help students to develop their skills. At the questions: *Do you think that medical decision assisted by computer must be an objective of medical education?* the majority 62% of students say yes (fig 8.)

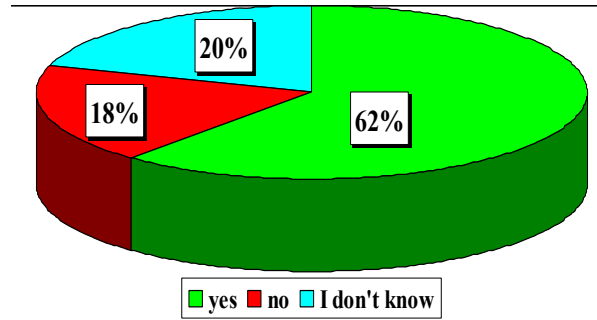


Fig.8.

The robots and the mannequins in the medical training are seen very useful by 74% of the students. (fig.9)

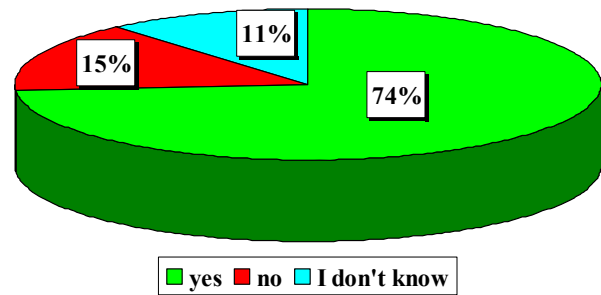


Fig.9.

8. Conclusion

The domain of Artificial Intelligence helps human experts to offer solutions for some problems.

Technology won't replace human experts. AI could help the medical experts to extract information from other solved cases and take into consideration the results of the last researches.

But the human judgment can't be replaced.

The final decision has to be made by a human expert.

In medicine AI can build intelligent tools that have some features usually associated with human intelligence, to develop medical experts system.

In an ethical way, it is very important to be a critical user of artificial intelligence.

Artificial intelligence is a challenge for all of us. From science fiction to reality is a step, but we must be prepare for that.

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