The Dilemma with Artificial Intelligence: A Review of Literature

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**Abstract**

The concept of creating beings with the same thinking as humans has come to be known as artificial intelligence, or AI for short. The research performed was in order to find out what artificial intelligence really is and what is it capable of, as well as how will it impact society. This study was performed in order to more deeply understand the field of artificial intelligence, since it is often wrongly portrayed by Hollywood, and seeing that it will most likely have a huge impact on society, it is important to start understanding what it really is. Countless articles and videos related to the topic of AI were analyzed and an interview with a graduate student studying in the field of engineering was taken in order to gain the different views of those related to the field. Overall, the results found throughout the research shows that different people of the same field have different views and concerns over the topic of AI, showing that the field of AI is still being developed and much more changes are likely to come.

**The Dilemma with Artificial Intelligence: A Review of Literature**

The idea of artificial intelligence first came to mind in the 1950’s by Alan Turning who, in his paper, asked the question, ‘Can machines think?’ (Warwick, 2012) This concept of machines being able to think was revolutionary and soon after various other engineers and computer scientist came to establish the field of artificial intelligence, which would deal with the idea of machine thinking. The rapid advancement of technology would also lead to the advancement of artificial intelligence but concerns over its capabilities would arise. The concern over super intelligent machines seemed like a far away scenario but the scientific community seems to agree that artificial intelligence could possibility reach the same level of thinking such as humans in this current century. It has already been shown that computers have greater capabilities than humans in certain areas such as recognizing patterns from large amount of data. The current accomplishments of AI may seem primitive compared to what a human brain can do but it is important for people to understand that once machines gain the capability to think like a human brain, they will be able to perform the same level of thinking at a faster rate. The fear that a machine could out perform a human in any given task has begun countless debates and it is for that purpose that this literary review will attempt to answer the following questions:

1. What is the definition of artificial intelligence?
2. When could artificial intelligence reach human level thinking?
3. How does the creation of artificial intelligence impact society?

These questions will be used in order to clearly define what can be considered an artificial intelligent machine and later on proceed to identify when these machine could reach human level thinking, as well as how they will affect societies’ every day life in the future.

**What is the definition of Artificial Intelligence?**

In order to understand what may lie ahead in the future of artificial intelligence, it is important to first define what artificial intelligence is. Rosemarie Velik, in her paper AI Reload (2012), attempts to define artificial intelligence as the science of making machines do things that would require intelligence if done by humans. This definition of artificial intelligence can be criticized as being too simplistic due to the fact that intelligence itself is not as easy to define. When taking into account that various animals and creatures are intelligent in their own manner it may be that artificial intelligence does not have to be intelligent in the same manner as humans (Warwick, 2012). Intelligence, as defined by Warwick (2012), is the variety of information-processing processes that collectively enable a being to autonomously pursue its survival. In other words, intelligence is the idea that a creature is able to use senses unique to it and process the information in its environment in order to survive without the help of any other creature. Warwick (2012) claims that the complicated definition of intelligence is necessary when trying to achieve an understanding of artificial intelligence due to the fact that the manner in which a machine may think will not necessarily be the same as a human. This idea contradicts to that of Velik (2012), who states, “The basic claim of AI is that the central property of (human) intelligence can be precisely described and thus simulated by a machine.” Velik seems to believe that AI does not need to take into account the various biological characteristics a human has that a machine may not and claims that human intelligence could be replicated nonetheless.

Artificial intelligence can be sometimes divided into two categories known as weak AI and strong AI (Warwick, 2012). Weak AI is defined as a machine that gives the illusion of being as intelligent as humans and strong AI is defined as actually being as intelligent as humans in every aspect (Warwick, 2012). These two ideas simplify the meaning of artificial intelligence, managing to categorize different machines as human-like thinking or actual human thinking. Velik (2012) similarly categorizes AI but instead of creating only two categories she expands the idea of AI into various sub-disciplines known as Applied AI, General AI, Embodied AI, Bio-Inspired AI, and Brain-Like AI. Theses countless sub-disciplines are a bit more complex to understand but overall define artificial intelligence as actual human thinking. Warwick may disagree with most of these disciplines, which he mainly categories as strong AI, because actual human thinking machines may not be possible as the processing of information from a given environment might differ between humans and machines since human anatomy would most likely differ from machine hardware. There are other factors that could also make strong AI not possible such as that of life’s experience (Warwick, 2012). A machine will not be able to go through the path a human would go through by growing up in a certain environment, experiencing different senses, learning values, or being faced with moral dilemmas (Warwick, 2012). These various factors make it hard to view a future of machines with the exact same thinking such as human beings but as mentioned by Velik (2012), “the functioning of the human brain, its structural organization, and information processing principles could be used as an archetype for designing artificial intelligent systems instead of just emulating its behavior in a black box manner.” Overall, artificial intelligence is a concept that attempts to achieve autonomous thinking from a machine, and the thinking a machine has may be used to perform minor task or, at some moment in the near future, achieve human-like reasoning.

**When could Artificial Intelligence reach Human level thinking?**

Artificial Intelligence is a complicated subject to give a solid definition but there is no doubt of how much artificial intelligence has progressed over the years and what it has accomplished. One of the first major accomplishments of AI came from IBM’s Deep Blue, a chess-playing machine, which was able to defeat world chess champion Gary Kasparov in the year 1997 (Warwick, 2012). Soon after, AI would reach various other milestones such as that of a Stanford University robot that had driven autonomously for 131 miles along an unrehearsed desert trail in 2005, or the announcement that the Blue Brain Project had successfully simulated parts of a rat’s cortex in 2009 (Warwick, 2012). These examples show how fast technology has advanced therefore allowing artificial intelligence to progress at an equal pace. These are task that are achieved by highly intelligent robots and as stated by Bostrom (2012), it would be easier to create an AI with simple tasks like these, than to build one that has a human-like set of values and dispositions. Bostrom means to say that an AI machine will not be able to achieve human-like behavior and accomplish human-like thinking as others believe could be possible. He also mentions that artificial intelligence’s sole fundamental goal could simply be to count the grains of sand on Boracay, or to calculate decimal places of pi indefinitely, or to maximize the total number of paperclips in its future light cone (Bostrom, 2012). Yet, the idea of social robots contradicts with Bostrom’s thinking.

Social robots, often known as service robots, are socially intelligent in a human-like way and they are able to communicate and interact with humans, understanding them, and even relate to them in a personal way (Abney, 2012). In 2006, the number of service robots worldwide outnumbered industrial robots by a factor of four, and this gap is expected to widen as South Korea and Japan seek ambitious goals relating to the field of social robots (Abney, 2012). This new generation of robots is expected to coexist with humans in homes, workplaces, and communities, by providing support in services, entertainment, education, health- care, manufacturing, and assistance (Kernaghan, 2014). The advancement of artificial intelligence has led to the creation of these service robots, which have been used to care for the elder. CareBot is one of the many robots which is used to take care of the elder and it is able to monitor elderly persons, give them automatic reminders of when to take medication, notify emergency contacts, and provide companionship (Kernaghan, 2014). These particular robots can also be used to help impaired or ill persons in their homes or hospitals (Kernaghan, 2014). These service robots can be highly useful to anyone looking for companionship or assistants in their every day activities showing that artificial intelligence could be used to do more than simply tasks.

As stated by Nick Bostrom(2015), in a presentation given at TED, the current state of AI is machine learning, which is a machine that contains algorithms that learn, often from raw perceptual data. This type of artificial intelligence is at the level of an infant child but as mentioned by Bostrom(2015), a survey was made in which the leading experts in AI were asked, by which year did they believe there would be a 50 percent probability we achieve human-level machine intelligence, defining human-level as the ability to perform almost any job at least as well as an adult human, the results are shown below. 

The median answer from the above data was approximately the year 2040 (Bostrom, 2015). So there seems to be an agreement between the leading experts that AI will reach human-level intelligence within this century, and that will most likely cause a drastic change in the way people live.

**How does the creation of Artificial Intelligence Impact Society?**

Artificial Intelligence seems to be an inevitable development for the future and as many other devices have come to cause a difference in the way people live, artificial intelligence is sure to make an impact on society. In an attempt to gain the perspective from someone within the field of engineering a call was made to graduate student Eduardo Mora requesting for an interview. Eduardo Mora, who is studying Electrical Engineering at New Mexico State University, agreed to an interview and plans were made to meet up and talk about how the creation of AI would impact society. During the in person interview Eduardo Mora stated, “Artificial Intelligence has the capability to affect every aspect of our lives, from how we transport ourselves from place to place, to how doctors diagnose a patience.” He also stated, “People should not fear the future of artificial intelligence since it will be used to assist humans and not to take over the world.” His views over AI are very optimistic which highly differ with those of Nick Bostrom(2015), who stated, “Once there is super intelligence, the fate of humanity may depend on what the super intelligence does. Think about it: Machine intelligence is the last invention that humanity will ever need to make. Machines will then be better at inventing than we are, and they'll be doing so on digital timescales.” These two views seem to agree that AI will impact society in some manner but Bostrom gives the idea that once AI reaches a certain level, humanities’ existence could be in the metaphoric hands of AI, which often concerns people, making them question if it is in the best interest to pursue the goal of achieving artificial super intelligence.

The concern over whether people should continue their goal of reaching high level artificial intelligence is often due to the constant issues and questions that this new technology is bringing. Some of the concern dealing with autonomous machines is often related to who takes responsibility when something goes wrong. AI machines are being incorporated into hospitals and in the future they are likely to be more autonomous in performing surgery, or other tasks in a hospital which gives rise to question of who is to take responsibility for their actions, the robot’s designer, its manufacturer, the hospital, or individual surgeons? (Kernaghan, 2012) This type of question over who takes responsibility for an autonomous robot’s actions also transcends into the military, which gives rise to more ethical questions. As mentioned by Kernagham(2012), there is pressure for more unmanned robots to be taken into the battlefield as it will drastically decreases human casualties but certain military specialist acknowledge that in order for a robot to reach its full potential and accomplish its missions to perfection, some type of autonomy must be in placed within the robot. This leads to the previous question of responsibility as well as other type of ethical questions such as, will robots know the difference between military and civilian personnel or, will they recognize a wounded soldier and refrain from shooting (Kernagham, 2012).

As more and more types of artificial intelligence begin to take part in society various people being to ask questions about the ethical implications that this new technology will bring. Stephen Peterson, in his paper, The Ethics of Robot Servitude (2006), introduces the question, “suppose that we could build creatures with intelligence comparable to our own, who by design want to do tasks we find unpleasant. May we build such creatures?” This is an interesting statement that relates with some of the ethical thinking that may arise as more AI machines are built. In this paper, Peterson(2012) mentions that AI built to solely serve humans in whatever tasks could be seen as a new form of slavery. Peterson(2012) states that some object to creating such machines by pointing out that if engineered robot servitude would be possible and acceptable then engineered human servitude should also be possible and acceptable. In this idea it is mentioned that if we were to consider robots to have a high level of intelligences such as that of humans then constructing robots to do tasks without compensation would mean that we could do the same to humans. This type of reasoning, as well as various other types of ethical questions being asked may challenge people to view AI machines in a different manner. It may be that at a future point in time our ethical reasoning could drastically change to the point that humans begin to treat AI machines as equals, creating a system in which both coexist.

**Conclusion**

To conclude, in this literary review the topic of artificial intelligence has been thoroughly analyzed in attempt to bring to light the constant questions arising from the topic. An attempt was made to define artificial intelligence, and provide some answers on when artificial intelligence could reach human level thinking, as well as how it might influence society in the years to come but as technology advances, various parts within this paper may at one point become obsolete. Artificial Intelligence is still a growing field in which more research is needed to completely comprehend whether the current form of this technology is its limit or if, as some experts believe, this technology has no limits.

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