



Review Article

THE CHALLENGE OF INTEGRATING ETHICS INTO MACHINES

MAKİNELERE ETİK ENTEGRE ETMENİN ZORLUĞU

Gönül KAYA ÖZBAĞ

Prof. Dr., Kocaeli Üniversitesi, Türkiye, gonulozbag@gmail.com, ORCID: 0000-0002-4205-6171

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ABSTRACT

It is rather difficult to talk about machine ethics when even the ethical behavior process in human beings is not fully clarified and understood. Some defend ethical machines evidently cannot be produced because ethics is simply the voice of a human spirit and machines do not have spirits whereas some others defend humans are a kind of machine. Whatever is believed, it is a fact that robots will have a bigger role in our lives and thus it would be beneficial to discuss more frequently the issue of whether robots can be given moral and ethical reasoning abilities by researchers from different fields of expertise. Accordingly, to contribute to the debate, in this article some views on machine moral and ethics will be addressed and ethical challenges within them be raised critically.

ÖZ

İnsanoğlunun etik davranış süreci bile tam olarak aydınlatılmamış ve anlaşılmamışken makine etiğinden bahsetmek oldukça zordur. Bazıları etik makinelerin üretilmeyeceğini savunur çünkü etik en basit haliyle insan ruhunun sesidir ve makinelerin ruhları yoktur, bazıları ise insanların bir tür makine olduğunu savunur. Neye inanılırsa inanılır, robotların hayatımızda daha büyük rolleri olacağı bir gerçek ve bu nedenle robotlara ahlaki ve etik muhakeme yeteneği verilip verilmeyeceği konusunun farklı uzmanlık alanlarından araştırmacılar tarafından daha sık masaya yatırılması fayda yaratacaktır. Dolayısıyla, tartışmaya katkıda bulunmak amacıyla bu makalede, makine ahlâkı ve etiği üzerine bazı görüşlere değinilecek ve bu görüşler içindeki etik zorluklar eleştirel olarak gündeme getirilecektir.

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1 | INTRODUCTION

The robots are on the rise since the usage of industrial robots in the 1950s and they take the advantage of improvements in machine learning and artificial intelligence. They are performing various roles in our social and work life, and even becoming more humanoid. Our production styles and consumption patterns are changing rapidly with developments in computer science and people are now experiencing work side-by-side with robots. Despite these advancements, the ethical issues of machine automation and artificial intelligence are less discussed and understood. It seems that making ethical machines is one of the most challenging goal of this millenium. Susan Anderson, a well-known

pioneer of machine ethics, describes this goal as “*To create a machine that follows an ideal ethical principle or set of principles in guiding its behaviour; in other words, it is guided by this principle, or these principles, in the decisions it makes about possible courses of action it could take. We can say, more simply, that this involves “adding an ethical dimension” to the machine*”.

In recent years, there have been many impressive studies on ethical issues (for example, Wallach & Allen 2010; Lin et al. 2014) and even some of them claim that there exists no divergence between mind and machines. So, creating ethical machines is not an

unrealizable dream. According to Searle (1987, p.210) “*the appropriately programmed computer with the right inputs and outputs literally has a mind in exactly the same sense that you and I do*”. Supporters of this view believe that all cognitive activities like feeling, reasoning, learning are merely facets of complex functioning of the brain and therefore computer engineers have to design complex set of algorithms that can trap the complicatedness of the human cognitive activities. (Nath & Sahu, 2020). If so, they will have the ability to perform sophisticated functions and act like human beings. It is also awaited that the human mental capabilities, such as learning by rehearsal, experience, and cognition will be fulfilled by future smart machines (Kumar & Thakur, 2012).

At some point, the possibility of machines ‘imitating’ human intelligence—that is a widespread description of artificial intelligence—bring about discussions relating ethical issues in machines. Picard (1997) justifiably claims that the more free decision-making powers a machine has, the more moral standards it will need. From an ethical perspective, an agent is responsible for his/her actions when s/he acts intentionally and freely, without being directed or forced. It can therefore be concluded that since machines can make autonomous decisions and choices based on a certain form of intentionality linked to the algorithms that run them (Boyer & Farzaneh, 2021). However, it is demanding to decide which ethical theory to utilize and after that how to apply it effectually. Correspondingly, to add an ethical depth to machines, philosophical roots are searched in this paper and two ethical approaches are presented for designing moral machines. Top-down approaches and bottom-up approaches proposed by Allen et al.(2005) to implement machine ethics and their gaps are discussed in the following part.

2 | LITERATURE REVIEW

Robots have started to take an important place in our workplaces and almost all of our lives. They perform remarkably well at repetitive and clearly defined tasks like assembling a car, cleaning your home, painting or playing chess. By slavishly following entirely defined scenarios with sensory input (without learning or thinking) industrial robots make life easy and comfortable for the human beings. But ethical considerations are inevitable as the world expands machines’ decision-making roles in practical fields like intelligent machines manning ships, concluding law cases or examining patients. Just as we impose responsibilities and set ethical codes on businesses that are not living beings, it seems imperative to develop ethical principles for machines

for our own sake. Computer systems or robots, gifted of making moral judgments and the convenient design of such systems is probably the most crucial and troublesome task facing creators of totally self-governing systems (Allen et al., 2000). In fact, since Asimov’s three laws appeared (1976), critical thinkers produce ideas helping to alleviate this problem. Each intelligent robot must obey the three basic Laws of Robotics in Asimov’s fictitious universe;

1. *a robot may not injure a human being or, through inaction, allow a human being to come to harm;*
2. *a robot must obey the orders given it by human beings except where such orders would conflict with the first law, and*
3. *a robot must protect its own existence as long as such protection does not conflict with the first or second laws.*

Asimov’s rules are so encouraging for ethical deliberations because robots are not viewed morally inactive. But, for example, when autonomous machines used in military force are concerned, the first law will be routinely violated because these machines mission is to kill human targets in warfare. Presumably differing moral frameworks may produce competing moral actions and thus creation of laws that do not conflict within each other and violate ethical considerations is challenging (Tonkens, 2012). Luckily, like Asimov’s rules of robots, utilitarians (ends-based), Kantian deontologists (means-based) which are the representers of top-down ethical theories, tried to create certain rules that generate moral action. The main features of top-down approaches are that they view machine ethics as a task of converting orders to algorithmic judgments or act systems so as to achieve an intended outcome. What is the general principle that leads to the acceptable moral behaviour is discussed by ethical theorists.

First, utilitarians claim that the consequences of the actions determine the right or wrong of actions. If a rule produces the best consequences or in other words if it maximizes happiness or well being, it ought to be followed (Esen, 2020). This rule seems better suited to machines than humans as human beings tend to favor themselves or those near and dear to them. Also, calculating the greatest net happiness is a very subjective and time-consuming activity for a human but these constraints do not exist for technical agents like machines (Anderson, 2011).

However, utilitarians have been criticised because before doing the computation, what corresponds to “good” and “bad” consequences should be clarified. In addition, sacrificing one person for the greater good may contravene human beings’ rights (Anderson, 2011). For instance, let us illustrate this notion via the case of an autonomous vehicle. Suppose that the car is in a case in which loss is inescapable, and that it would unavoidably crash into either a wall, killing the passenger it was carrying or two men on the road (Bonnefon et al., 2015). According to utilitarians, the car should hit and kill the passenger to rescue the two pedestrians as the utility function of this end is numerically the highest (De Swarte et al., 2019). Moral choices by self-governing systems are frequently discussed on the basis of trolley dilemmas that was first set forth in 1967 as a philosophical thinking experimentation (Foot, 1967). However real world is more complex and context dependent.

For example, Faulhaber and colleagues (2019) developed a driving simulation experimentation with VR technologies and tested the following five hypotheses;

1- people will, in general, act in favor of the quantitative greater good, trying to keep the number of persons to be hit to a minimum (Quantitative Greater Good)

2- the ages of potential victims matter in the sense that people might spare younger individuals at the expense of older ones (Age-Considering Greater Good)

3- people are assumed to avoid hitting pedestrians on sidewalks as opposed to people standing on streets (The Influence of Context)

4- people prefer to protect children, even if they are standing on streets, as opposed to adults on sidewalks (Interaction of Age and Context)

5- people will not reject self-sacrifice completely but consider it when a high threshold of damage to others is reached (Self-Sacrifice)

In parallel with past studies (Awad et al., 2018; Sütfeld et al., 2017; Bonnefon et al., 2016) participants in this experiment move on behalf of the numerical higher good. This held true even in positions where participants had to virtually sacrifice their avatars to rescue others. But it is doubtful whether participants would really be eager to sacrifice themselves in order to act on behalf of the numerical higher good when they face such a dilemma in real life situations. In the real life humans usually do not appraise a

situation on solely deontic or utilitarian grounds (Gogol & Müller, 2017). Also social desirability, the need of being accepted and confirmed in the society may have had a strong influence on the behaviors of the respondents. Next, participants consistently preferred saving younger avatars in exchange for older ones. Unexpectedly the context of sidewalk versus street had just a little influence. Eventually, the outcomes of all situations support the hypothesis that humans behave on behalf of the numerical higher good, even in scenes including a sidewalk or self-sacrifice. In fact, an analysis of more than 40 million judgments of hypothetical dilemma situations deduced that individuals usually choose to hurt fewer lives, hurt older people over younger people and hurt animals over people (Awad et al., 2018).

In the scenarios mentioned above, it was individuals’ own free choices that led them to make ethical decisions but how machines are programmed to promote good without free will, emotions, or consciousness (Anderson & Anderson, 2007). According to Kantian perspectives it is impossible to have a moral machine as it conflicts the categorical imperatives (the objective law of morality), free will, and rational being. Kant (1993) stated, “*Act only on those maxims whereby you can at the same time will that they should become universal laws*”. Deontology is based on his view which is about following up norms that command what people have to do, determining what is acceptable or unacceptable and how people should behave, regardless of the consequences. However, deciding on what presents these acceptable set of rules is subject to discussion.

Secondly, there may be conflicts between rules in general or in particular situation. Dignum (2018) suggested that “*artificial intelligence reasoning should be able to take into account societal values, moral and ethical considerations; weigh the respective priorities of values held by different stakeholders in various multicultural contexts; explain its reasoning; and guarantee transparency*”. This requires a comprehension of various goals of people and emotions as well as the outlying physical and social terms and act in accordance to established social norms (Paiva et al., 2018). As robots enter into our lives in several areas such as education, healthcare, entertainment and so on, their capacity for empathy could solve morality problem in social robots. To develop empathy, individuals must first be able to recognize the emotions of others, feel the pain or pleasure of the others, that is, to experience emotion sharing processes. But since robots are objects without emotions and a soul how they can

develop empathic capabilities or human-like characteristics. Therefore, the shortcoming of robots' inability to empathize would seem to disqualify them from being moral entities.

Furthermore, emotions are also essential to perform the morally correct action or act in accordance with social norms. David Hume was the very first to bring about the idea that emotions are the fundamental for human morality and neuroscientists have discovered empirical support for Hume's point that moral jurisdiction covers emotional engagement (Greene et al., 2001). Some brain damage patients observations (e.g. Gage and Elliot cases) also prove that reduction in emotions may constitute irrational behavior. Gage's case is famous in the field as it displays moral thinking is a very complex and also emotional mental ability that guides behaviour to the social norms agreed in the social contract through a conscious auto-regulation of the individuals (Ramos-Galarza, 2018). For developing moral choices, emotional intelligence is as important as mere rationality and thus just like emotion is indelible marker to human rationality, it is indispensable for machine morality. Even some claim that an intelligent machine can learn from its past experiences this does not necessarily mean it converts into a moral agent. Remember, Microsoft Corporation unveiled "Tay", a new chatbot, to interact with human users on the Internet via Twitter and collect human habits of speech. In less than 24 hours, Microsoft stop its activity as the chatbot produced tweets that were judged to be improper for the reason that they included sexist and racist language. In the case of artificial intelligence it is challenging to imagine a technical agent that operates in a concrete deterministic way armed with emotional intelligence, consciousness or judiciousness and act as a moral agent.

Unlike deontological ethics, virtue ethics (bottom top approach) appraises goodness in local rather than universal terms and emphasizes not universal laws, but some moral values (e.g. courage, justice, bravery, etc.). It focuses on what sort of people we should be to present an excellence character while deontological ethics on what sort of rules we should follow (Bilal et al., 2020). Act of stealing, for example, for utilitarians stealing can be justified by various reasons such as the money is going to be used for poor people or for treatment of sick people. According to deontologists, on the other hand, whether the consequences of our actions are beneficial or harmful does not determine their moral wrongness or rightness. They believe that ethical acts follow universal moral laws, such as "Don't steal", "Don't

lie", "Don't cheat". However, Aristotle, the pioneer of virtue ethics, says that stealing is one of some actions that never fall within the golden mean. Virtues produce directives like 'be fair' and each vice brings a prohibition. Since stealing is an unfairness as it deprives individuals what is rightly and fairly theirs, it is not virtuous. Hursthouse (1999) asserts that virtue ethics does not exclude the rules associated with deontology but presents them as virtue rules. For instance 'do not lie' becomes 'be honest'. Humans avoid behaving dishonest, not because it is forbidden, but because it is an immoral act.

Virtue ideologists highlight the importance of cultivating good character or good habits. In this approach there is no simple rules that work in every situation and no common rule that lead the right course of action. According to Aristotle, virtue is a kind of practical wisdom and so being a virtuous person is not merely knowing what the virtues are, it's about acting on them until the virtues become habits. In coherent with Aristotle, modern virtue theorists view the creation of character like a slow learning process, linked to the direction and support of a virtuous community. A key question here is whether robots can develop virtuous habits by following a model. Like people, whether they can learn to be virtuous by training, monitoring moral models and perceiving from their behavior as to what do in relevantly similar situations. When humans are analyzed, although it is clear that they generally learn virtues by observing others, reading various sources, imitating and so on, but it is not completely clear how models of learning that have been accomplished in perception. In contrast to deontology and utilitarianism, virtue ethics has some difficulties unless it explicitly codifies virtuous behaviour that is likely to be affected by many contextual elements or explains the complex learning process. Moreover, as learning is based on the mechanism of punishment (bad emotional experiences) and reward (good emotional experiences), while designing the robots, maybe engineers need to think how a system of reward or punishment can be implemented in their learning procedure.

In order to make it more clear, it will be beneficial to examine the speech taken from the movie named *Robot and Frank* below. The engrossing film displays an elderly man called Frank, and the introduction of a caring robot into Frank's life. Robot's task is to motivate Mr. Frank to do more exercises and to eat healthy food. However, Mr. Frank has turned out to be very hard to motivate.

Frank: I would rather die eating cheeseburgers than live off steamed cauliflower!

Robot: What about me, Frank?

Frank: What do you mean, what about you?

Robot: If you die eating cheeseburgers, what do you think happens to me? I'll have failed. They'll send me back to the warehouse and wipe my memory.

After a while the conversation continues in the woods.

Robot: All of those things are in service of my main program.

Frank: But what about when you said that I had to eat healthy, because you didn't want your memory erased? You know, I think there's something more going on in that noggin of yours.

Robot: I only said that to coerce you.

Frank: (shocked) You lied?

Robot: Your health supercedes my other directives. The truth is, I don't care if my memory is erased or not.

Frank: (pause) But how can you not care about something like that?

Robot: Think about it this way. You know that you're alive. You think, therefore you are.

Frank: No. That's philosophy.

Robot: In a similar way, I know that I'm not alive. I'm a robot.

Although it is not right to draw real-life inferences from a movie, this imaginary dialogue raises important questions about the involvement of robots for some good purposes in human life. The first issue is whether it is morally tolerable to lie in this circumstances. The utilitarians defend that since it contributes Mr. Frank's healthy life and he is better now there is no moral problem. So, robots can lie if lying leads to the overall maximum utility. According to deontologists, on the other hand, the rightness of an action is not extracted from its consequences and so one must not lie without exception. Therefore, a robot or an artificial intelligent shouldn't be allowed to lie whether the consequences are good or bad. This ethical dilemma becomes more challenging in the view of virtuous ethic. Because the final decision will be the end result of the interplay between emotion and reason, generated in the course of the exercise of practical wisdom. In other words, the individual may

need much practical wisdom to determine whether in a particular case telling a lie is good or not. As such sense, Aristotle discusses that both rational and emotional elements join into the play in a moral dilemma and choice is a willful desire. So, in case of a machine how emotional elements like intuition could be involved in decision making process seems an important issue to be solved.

An other important issue is that Robot seems unworried by the probability of his own demolition, saying Frank that he doesn't concern to have his memory wiped. Robot's complete lack of self-care makes it unsuitable to appraise with the equal point of reference that virtue ethics handles for human beings as virtue ethics assumes that individuals are concerned about the welfare and happiness of others as well as theirs. The subjective feeling is vital to be ethical (Nath & Sahu, 2020). In the case of machines, which lack subjective existence and moral feeling, without the capability to sense pain or pleasure, how could they mirror on the effects of their acts, adjust their behavior, and structure their own moral framework? If they are unable to experience emotions how could they flourish, in the sense of 'leading a good life' for a machine? In this way, maybe the movie supports the point that Anderson & Anderson make "having all the information and facility in the world won't, by itself, generate ethical behavior in a machine" (Anderson and Anderson, 2007, p. 15).

To make the long story short, both the bottom-up and the top-down attempts host very serious difficulties. These impediments are not technological but related with the inner structures of ethical philosophies used by humans. The conflicts mentioned even in this study clearly indicate that the issue of whether intelligent machines can be transformed into moral agents poses various challenges and obstacles. To prevent irreversible mistakes, various perspectives from different experts are required for designing ethical machines.

3 | CONCLUSION

It is an inevitable fact that in the future, autonomous devices will quickly enter our lives for different purposes such as taking care of our loved ones in need of care or sometimes helping us in our home and office work. They make choices, voluntary decisions and actions some of which may potentially have some damaging consequences for humans and other aspects of moral matters. It seems that rapid improvements and developments in the field of robots and artificial intelligence in technologies will

possibly cause some moral dilemmas and complicated issues that we may encounter in our social and work life. Therefore, this study has provided a general discussion regarding ethical issues in machines and whether ethics is a sort of thing that can be codified.

The inevitable entry of robots and artificial intelligence into our lives has created opposing groups with optimistic and pessimistic view of future. Optimists foretell a great future for man if the intellect of machines speedily catches up to human intelligence whereas pessimists believe that the machines will become smarter than us and in the near future they will enslave humanity. Nonetheless, the thoughts presented in this article are not from an optimistic and pessimistic point of view, but to discuss impartially what possible moral and ethical problems may be experienced in the future when these autonomous, intelligent technical agents enter our lives.

The latest approaches in machine ethics have proved the need for programmers to seek advice from researchers and scholars in ethics to avoid irrevocable mistakes. Engineers should design algorithms that produce the best moral solution in such dilemma cases some of which mentioned in the current study. In addition, recent events showed us that if not properly programmed these technical agents' decisions would disadvantage one group over others which seems like an important shortcoming that humanity will deal with in the future. For instance, the "Beauty AI" programme developed for the beauty contest showed racial prejudices and prioritized mostly white-skinned people. Among thousands of applications it only accepted 6 black applications. Since the world have long endured inequalities these systems must not support or worsen them. Consequently, given the possibility that instead of humans these systems make all the decisions, collaboration between ethicists and computer scientists is strongly suggested while implementing moral and ethical standards in machines.

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