

FUTURE OF MECHANICAL CREATURES: AN ETHICAL PROSPECTIVE

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Introduction

Since the beginning of the computer age, modern science and technology has slowly crept into nearly every corner of our life may it be office, home or someplace else. Machines can now do something in minutes which could otherwise consume days of human effort. These machines have made our life so easy, effortless and enjoying that we do not even care that the body, the mind and the environment we have today is a result of millions of years of evolution.

Like my alma mater IIT Delhi, many institutes are spending great human efforts and money in conceptualizing, designing and experimenting with robots. Scientists and engineers are working hard to perfect the activities of robots in such a way that these robots shall be able to approximate humanlike intelligence in decades to come. Being involved in robotics during my engineering studies, I observed that the pace we are following is a big step in robotic evolution.

As we have been observing around us, robots have already started spreading into industries, offices and even homes, replacing some of the conventional appliances which were once the great mechanical innovations. For example, *iRobot's Roomba* vacuum cleaner can clean our house on its own, needing just a few instructions and USD 340 paycheck. *Sony's* robo-dog *Aibo* can keep us entertained like a real dog, in case we do not want a real fleshy-bony barking dog around us. A masterpiece in its league, *Asimo* is an outcome of years of scientific diligence and huge spending by *Honda*. *Asimo* has already perfected the complicated art of walking and with a few more improvements it could one day be put to work as a helper in house or in office.

Moreover, some space scientists are expecting that manned space exploration shall not be needed in future since we can send a cheaper, mechanical replacement. Meanwhile, before these robots start enjoying beaches of Mars and Venus, let us analyze the situation back on earth where we are already relying heavily on to-some-extent intelligent robots in automobile industry, computer chips making and other manufacturing facilities industries that don't require too much independent thinking. Although still in its infancy, 'cognitive artificial intelligence' or 'human computer interface' development has been a great field of research by the global scientists.

Scientists in the field are of opinion that a humanlike talking mechanical partner may enhance human-machine-interaction.

Whether the visions of scientists in the field of robotics are realistic and the problems which may arise by assuming such projects is unknown to us yet. But one thing is sure that all these developments shall have some very important social, ethical, and economic effects. As scientists are busy in gathering awards and recognitions for the great robotic evolution, science critics are raising concern such as: Could a robot be an 'angel' or a 'devil'? Could robots be dangerous to human race? Is a robot that is able to communicate and take decisions in human way, still a machine? To what extent should we depend upon a robot? How do these machines relate back to our everyday needs?

Through this paper, I want to discuss my judgment regarding social, ethical and political concerns that could arise in future because of the accelerated mechanization in our life.

Statement of Purpose

Being a mechanical engineer and happily enjoying my life in a mechanical environment, I do not envisage any immediate robo-ethical concern in today's environment and tend to ignore it in the name of expected science fiction drama. However, these robo-ethical concerns, though sleeping today, may take up a ferocious face tomorrow.

Not stretching the introduction too much and coming to the main point, I would like to introduce and discuss the main issue dealing with 'Man-Machine' interaction which shall be, out of many possible cases, my medium to portray possible consequences of robotic evolution: 'Robots in servitude'.

Although looks unreal, the 'robots as servants' situation may create such a complicated slave-race philosophy that even all the historic slave revolutions and struggles may look weak in front of it. The kind of complex socio-political dilemma this situation may generate is something out of human imagination. In such case, human shall be required to manage and create highly innovative social parameters and regulation for so-called robo-slaves. Overpowering of complete human race as shown in many Sci-fi movies like *Matrix*, *The Sixth Day*, etc. will not be director's fantasy anymore then, if the concerns are not properly addressed today.

Another important issue I would like to touch near the end of this paper would be 'substitution of body organs'. Body is natural habitat of various complicated organs and their mechanisms and therefore, an excessive inclusion of machines into the body may lead to some neurological and genetic disorders. This shall not only impact our physical capabilities but also worsen the health of generation to come. Movie stars, without knowing the potential harmful outcomes, are already undergoing various types of cosmetic surgeries and implantations to look more beautiful and young. Commenting on anybody's personal decisions is out of my jurisdiction and so, I would like to carry on with the discussion specific to the two issues mentioned above.

Robots in My Grandmother's Story

Robots are no more restricted to grandmother's monster stories or *O.G. Wells'* comical science-fiction portrayal. Today, robotics is acclaimed as one of the fastest growing research field and prosperous economic market. In days to come, robotic equipments shall be no more the toys in the hands of experts but rather be a part of lives of niche users like children, elderly or disabled.

The human-machine relationship has always been smooth and friendly whether appeared in respected Hindu epics of *Ramayana* and *Mahabharata* or in the latest science fiction movies by *Stephen Spielberg* and *James Cameron*. Nevertheless, a slow but ironical transition has been observed recently that this human-machine relationship is now finding space in aggressive moral and ethical essays. This transition is heading in the direction of enmity and hatred.

This new way of looking at the machines is a subject matter that we should take into account and analyze. The reason behind this transition is that humans have started realizing at-least some aspects of the ethical and social issues concerned with the robots, which are aggressively trying to penetrate our aura. We have seen the journey of robots from myth to science fiction and then science fiction to reality. But, nightmare part is yet to be seen and can't be avoided unless suitable measures are implemented today.

Hey! You are Just a Machine

We consider robots as mere machines, though very sophisticated and intelligent, and, as our human nature persists, we expect these robots to remain machines always. Therefore, the concept of creating thoughtful and conscious robot rebels is a farfetched threat to humans. Since there are still technical hurdles to overcome in the fields of artificial intelligence, some experts think the creation of a robot servant class may be a misguided concept in the first place. According to them, robots do not have any characteristics to be provided with consciousness, free will, or emotions. So, the expectation of robot servants around the houses may just be a dream.

On the other way round, we should never forget the saying that 'Today's magic is Tomorrow's science'. Hundred and fifty years back we had never thought of talking to our friends on phone, today we do not even care that telephone is one of greatest invention in human history. Without the magic wand of *Graham Bell*, we would not be using *iphones* or *tablets*. Man is thriving to innovate new magic every day and is only doing good to society till things are limited to only *iphones* and *tablets* and do not go beyond the creation of destructive, monstrous enemy robot servants. We are already stuck in the vicious circle of proving ourselves superior to our predecessors by creating more and more sophisticated technology every day.

Survival of the Fittest

Presently, our interaction with robots is no more than what we have with other mechanical appliances. But, as the technology grows, the scope of human-robot

interaction shall widen up and robots' involvement in daily business activities shall increase. For making these robots to be more interactive, we shall be required to inject in them certain extent of intelligence and moral character, at least similar to that of a pet. And, it is not surprising to report that pets get angry at their masters and even sometimes become very dangerous. It doesn't matter how much we train our dog, we cannot be hundred per cent sure that it will not bite us.

Consider a hypothetical situation, which may not be hypothetical in future, that our robotic machines have somehow acquired autonomy and consciences. Humans have created machines that exceed us in morals and in intellect. The rational mind and undoubted morality of robots have created new class of species which is far superior to us in all facets of our characteristics. We shall be nothing but physically and mentally handicapped in front of these species. What if robots' morals and intellect achieve some form of self-recognition. Humans start exploiting robots beyond the point at which robots start realizing that they are being exploited. At that point in future, robots start demanding their rights for equality. This situation shall be more important to analyze because it shall be irrespective of human conscience and thoughtfulness. And, then what if robots do not accept the reasons or the theories we humans give to them. As the history has experienced many a times, this would led to the same revolutionary path followed by suppressed groups to establish respect for their rights against powerful socio-political groups who argued and stood against them. If we go by Darwin's theory of evolution: survival of the fittest, we should start thinking about our survival against far superior and fittest race of robots.

Movie, although science fiction, called *Surrogates* is a good example in support of my viewpoint. Let us wish to God that in such times, the great armies of robots allow us, the normal people, to live happily and without any robotic support. We can just wait for the moral Armageddon between the morally superior robots, though trained by us, and inferior human beings.

The Unlucky Poor

Let us, for a time being, forget about the fearful scenario mentioned in the previous paragraph. Even if the robots do not stand against human being for their rights and even, after being fully autonomous and conscious, continue to work under servitude of humans. What will happen to the humans whose livelihood depends upon the daily wage labor and menial work? Is it justified to force the poor humans to compete against the robots in the work for which robots are specifically made for? Human comparing themselves with robots is something out of the question and shall have many far-reaching implications.

Rich and powerful shall definitely continue to enjoy leisure of life, however, poor shall suffer because the value of labor shall be highly devalued by then. A human being, even on his best day, cannot produce the work efficiency achieved by a robot and at far lower prices. Moreover, robots shall be trained to work with honesty to avoid any lying, cheating or stealing for which humans may not be trusted completely.

The poor would be worst hit when their effort will no longer be required. Then, they will be forced to either perform criminal activities or die of hunger. Which option would we like them to choose?

I Sue the Robot

Once robots are engaged into our normal threads of social and business interaction, we must expect them to attain some social and legal morality, to fulfill the obligations made by man, and to become strictly against cheating, stealing or any other unlawful activity. And, if a robot is convicted for having involved in some criminal activity, whom will we punish – the robot, its master or the robot maker? Who will punish the robot – its master or the court of law?

Here comes the legal ethics in robotics, which requires us humans to develop and create very sophisticated control mechanisms that prevent any expected or potential danger to humans, to the other robots or to the environment. I am sure this shall not be required suddenly, but rather shall take ages to need such a high level of social regulation.

The most useful framework to begin thinking about ethics in robots is probably legal liability along-with the human moral theory we have been discussing in last few paragraphs. We need to involve systems which will do reasoning beyond the limited task domain. In future, robots shall not only be regarded as on-shelf available product in grocery store but also be considered highly specialized and customized agents of warfare, politics, terrorism, and, God knows what more. How will we define an act or a law for a robot fighting in a war? Who knows that the fascinating character shown in a science fiction movie may tomorrow be found standing in a courtroom as culprit?

Even if we do not go to the extremities of warfare, a simple autonomous robot is a moral agent in itself and should be held responsible for any criminal action. But, robot as moral agent has not trained himself to be a moral agent, therefore, his master should be held responsible for his granting enough autonomous intentions and responsibilities to the culprit robot. This common man, like you and me, doesn't know about the nitty-gritty of technical structure of robot, so he will direct the case toward the scientist who designed and constructed the robot and because of his mistake, the robot has committed the crime. And, the chain goes on. Therefore, we should keep in mind that if we pursue this technology further, then the highly complex interactive robots will be moral agents with the corresponding rights and responsibilities, and someone will have to take responsibility of the robots' actions.

Machine Implantation in Human Body: Justified?

Replacement/Implementation of body parts is not a new concept to mankind; it has been there for the centuries. Even the ancient Hindu scripture give a mythological reference of replacing *Lord Ganesh's* head with an elephant's head. But these kinds of replacements have been done only when someone needs it urgently. It has never been at the will of humans to replace body parts with the artificial ones.

If we carry on with the same concept and requirement, no problem, we are good to go. So far, not many people are debating about Bio-ethics, but there has been whisperings out there. People are afraid of an era when the artificial organs shall perform better than the original ones; they will be long-lasting, strong and high performing. So far 'Prosthesis' has been boon for everyone in need. Any impairment, injury can be well treated by implanting the artificial organs in the human body. This bio-mechatronics based technology has given happiness to many physically challenged people. There are many incidents of performing cosmetic prosthesis to disguise injuries and disfigurements. With development of modern medical technologies, disabled or handicapped shall be able to use lifelike silicon or PVC limbs. But the issue arises only when the technology is used for fulfilling the unnecessary human requirement to attain physical, mental and behavioral desires. So the point of discussion here is the human intensions of replacing the well-working body organs with the mechanical equivalent intentionally. I am more afraid of the recent developments in genetics and biotechnology, which claim that the day is not very far when the failed or the injured organs shall be re-generated with some changes in genes, DNAs, RNAs etc.

We have been seeing movie stars aggressively going after surgeries and implantations. Such developments are very tempting to human being especially to those who are not satisfied with their God-gifted features, physique or a particular organ. Why wouldn't a girl go for bionic eyes like *Aishwarya Rai* or bionic lips like *Julia Roberts*, if she is provided with an option?

Information and communication technology (ICT) is an essential part of our life now. So far, the influence of ICT has been mainly to the external devices such as personal computers, mobile phones, laptops, tablets etc. used for private and official purposes. Use of ICT in medical purposes has been a big help to doctors as well as patients. ICT is now an essential part of medical surgeries and implantations. So far and so good, the ICT implants have been ethically utilized in medical purposes, for example, cardiac pacemakers. Although ICT implants have been used to repair deficient bodily capabilities, think about their misuses, particularly when these devices are accessible via digital networks. If somebody else is able to manipulate this digital network, then it will be a big threat to human privacy and particularly to the integrity of the human body. If such facilities are kept limited to the urgencies of any physical injury or an accident, any development would be a boon. However, open access or free will could be disastrous.

Scientists are predicting another great achievement in the field of science and technology that is injection of microchips/nano-robots inside the brain to enhance our brain efficiency. They can be pushed into our brains through capillaries and can interact directly with our neural network. These nano-robots will be able to make us more intelligent, smarter, remember for a longer time and imagine even those things which are totally unknown to us. Nobody is aware of the harmful effects such applications may bring: may it be own physical deterioration, manipulating memory using these nano-robots or having intelligence that is out of control of human capabilities. But again the question arises - Is the usage of technology to this level justified?

Robosapiens

This is the last paragraph in the sequence of various issues raised so far in the sections 3 through 8. In this paragraph I want to imagine a situation which actually absorbs and combines the moral and legal ethics raised in the sections 3 through 7 and the bio-ethics raised in section 8. I am considering eruption of robosapiens, half robot – half man, who would make their own society, define their own culture and finally fight with humans for their rights.

Think about a well designed robot, injected with human-like genes, with ability to sense, hear, speak and see like we do. Let this robot roam around and develop skills on the basis of its interaction with humans and environment. This robot can use strong neural networks, genetic algorithm and biomorphic engineering to learn things and react accordingly. Now, we gather a group of similar robots and allow them to move, act, observe, react and manipulate freely. Even if they do not approach the humanlike intelligence, they shall be at least able to form a tribal-like society with its own rules and regulations, with own culture, with own laws. This whole experiment looks highly unrealistic, but this would be an amalgamation of social ethics I have been discussion during the ‘robots in servitude’ part and bio-ethics mentioned in the previous section.

As these robosapiens shall become more integrated into their society, many unresolved ethical issues of their existence and design will become more imminent. We should imagine how development of a parallel society within our own, but not following our rules, laws and obligations, can create a pandemonium and it would be out of our hands to control and manage such a social structure.

If these robots don’t age and die and we human continue to follow our natural order of aging and dying, will human beings start feeling envy of these creatures? Will it be a boon and a bane creating such a new civilization?

Only solution to such a situation would be to eliminate their race to such an extent that we do not afraid of them anymore and can take advantage of their capabilities in our day-to-day work. In that case, we may try to merge the remaining species in our own social culture and apply our rules to them as well. By allowing machines become a part of our society, we can profit from their capabilities without trying hard to establish strategies to control them. We should realize that it being a machine is not a flaw, it’s a role. Let us keep it up to the role only.

Conclusion

I have discussed the ethical issues in robotics mainly through two channels, firstly raising concerns when robots become our servants and a new army of slaves may appear, and secondly through the harmful effects of aggressive substitution of body parts. Now, I would like to conclude that heavy reliance on robotics may lead to several ethical issues concerning social, political, legal and biological aspects. So far and so good, the robotic applications are limited only to industries. Further penetration of robotic equipments to offices and to homes may not have any immediate ethical concern;

however, its extreme usage may lead to harmful consequences as has been discussed in this paper. There would definitely be many more concerns which could have been detailed out but through this paper I'm trying my best to highlight specifically the socio-political, legal and biological ethics pertaining to extreme mechanization. In this paper, I have considered many imaginary and hypothetical situations to present my case more elaborately. Presenting the essence of concerned ethical issues has been the main motive of quoting those situations.

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