The advantages and disadvantages of using robots in society

by

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Abstract
Advances in technology will mean robots are going to perform an increasing role in society, doing many things better than humans, and many things which we are unable to do. Along with the many benefits of robots, there are many potential negative implications for society, such as, will the benefits of robots be available to all, and will robots conduct their tasks and decisions robots make will be ethical. The positive and negatives of robots were considered with particular concentration on how robots replace jobs previously occupied by humans, and also the potential threat to humans from machines without a moral and ethical framework. While it is a challenge, there is a need for regulation and ethics to ensure that the benefits of robots are available to all, mitigate against the possible negatives and ensure robots developed, and designers instil in robots a value system which is people-centric, with human ethics and morals.

Introduction

Technology has revolutionised the modern world and is going to continue to do so at an increasing pace. The development of sophisticated, "intelligent", robots has the potential to change our lives in ways which up to a few years ago would only be in the realm of science fiction. Robots will be utilised in many domains, from medicine, military, manufacturing, domestic duties, virtually all occupations will be affected either by robots replacing the human role [1], or by augmenting it [2].

In the past robots were passive, limited by their mechanics and circuitry to perform tasks, dependent on its operator. Now fused with artificial intelligence (AI), robots have the power to be dynamic and autonomous, increasing their potential applications.

With this increasing sophistication and utility, robots can contribute many things to our lives, however there is also the potential for them to impact society and individuals lives in negative ways.

Societies and our ethical foundations, have evolved over hundreds if not thousands of years, the robotics revolution is occurring in a generation, and we need to accommodate this with an ethical framework, how they fit into society, how they operate and crucial for this is how they are designed and developed [3].

Advantages

Robots have the ability to do many tasks faster, more efficiently, more accurately, with virtually endless capacity, compared to humans. They can do tasks which are physically

dangerous or physically impossible for humans. Robots could do the everyday time-consuming tasks, freeing humans for more enjoyable and productive tasks.

With the benefits of robots and automation, new discoveries will be made, Medicine will increasingly benefit from technology, in surgery, testing and diagnostics [4].

Robots have the potential to do care tasks for the young and elderly [5], robotics can assist those with physical disabilities, technology like exoskeletons can provide mobility to many people with life-limiting disabilities.

As with many technological advances, military applications have been the spur to many developments in robotics, from robotic drones, vehicles and smart missiles, even the possibility of some future robotic soldier. Arkin argues in [6, p. 32] how robots can be used in warfare to limit civilian casualties, deal with the stress of conflict scenarios, more effectively than traditional soldiers.

It would be disastrous, if terrorists or a rogue regime without concern for international or domestic public opinion, get hold of such technological advances [7], and utilise it without the ethical and moral priorities of the civilised world [8].

Risks and Disadvantages

Robots have the power to do bad as well as good, sadly due to its nature, it can do bad with similar levels of efficiency and accuracy as they can when doing benevolent tasks.

Surrogating power and control to machines is a potentially catastrophic risk [9] many futurists predict a future point of *technological singularity*, where machines achieve a super-human level of intelligence and with this and the capacity for machines to cyclically replicate and self-improve, can we control it? [10] would it be feasible to instil innate ethics and morality into these robots and their progeny [11]. While some like Kurzweil [12] hold a utopian view that humans and machines merge enhancing life, others futurists, Vinge [13], Good [14] and Bostrom [15], view it as an existential threat to humanity.

With developments in robots would have the capacity to mine the earth's resources to exhaustion, natural resources which are beyond the scope of existing human mining methods, or uneconomical, could become physically and financially viable. Would governments be able to resist the potential financial windfall by exploiting natural resources enabled by robots, with the environment being the casualty?

The threat to social cohesion, where peoples jobs are taken by robots or the value of their labour is diminished since they are competing with robots, as Smith [16] states there would be a necessity for society to be accommodate people and avoid unemployment [17].

Some advocates for technology, describe these concerns as the same as Luddites during the industrial revolution. In the industrial revolution, while much manual intensive labour was preplaced by mechanisation, new jobs came on steam to replace them, the case with the

robotics revolution has far greater potential to render many occupations obsolete [16] [18]. What are the legal implications of having sophisticated Robots [19]?

It is crucial that control and ownership of robots and new technology is not confined to some section of society such as a robot owning, or technology controlling upper class. All countries and all of society must be seen to benefit [20] [21].

How can we avail of the benefits and mitigate against their disadvantages of robots

For Robots to be human-focused, and knowing what is right or wrong, good and bad, and how it makes decisions depends on its developers [22]. Developers must develop ethically and insure what they produce functions ethically [17]. Traditional development methodologies focus on the technical issue, more modern developments which are client and stakeholder focused like CATWOE [23, p. 360] and Agile would prove more ethical [24]. There is also opportunities and commercial benefit in producing software which is ethical [25].

National and International information industry organisation like the IFIP [26], ACM [27], ICS, BCS and IEEE, have devised codes of ethics, while beneficial, with limited power, their punitive measures are ineffective. GDPR from the EU [28], is a far more powerful tool at insuring ethical handling of peoples data by companies and organisations since it has real punitive powers. The European strategy of regulation on artificial intelligence is an endeavour to reap the benefits of AI and Robots while protecting people's rights [29] [25].

The *three rules of robotics* aimed at protecting humans from robots, suggested by Asimov [30] are perhaps somewhat naïve and requires a more nuanced ethical guidelines, to deal with moral and ethical grey areas, where decisions with negative implications need to be made [31]. For example the moral dilemma where an autonomous vehicle could avoid a traffic collision killing a pedestrian or a allow the accident to happen killing its passenger.

Regulations, would be needed to ensure that no person or company, can abuse their superior robotic technology, to monopolise a market, take over a new market, obliterating any competition unfairly. This would require certain limits on what is patentable, anti-trust cases possible breaking up of monopolies, ensuring competition and innovation.

Conclusion

Technology and robots are going to revolutionise our world, with wonderful benefits to our lives. To ensure that robots will be utilised and function in an ethical manner we need developers and engineers develop with ethics in mind [32, p. 32] [24].
There is also the imperative on national and super national governments and organisations, to regulate and have rules to ensure technology is not misused, in warfare [8], business etc.

Developments with robots also have the capacity to destroy the social equilibrium as we have it, measures will need to be taken [16], protecting people's rights and roles, so as all of society can adjust to the new reality the increasing role robots will play in our lives.

Responsible and ethical development of robots, and regulation of how this technology is utilised can protect people from negative consequences, while maximising the benefits we can reap from robots in society where humans and robots coalesce in harmony.

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