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Discussion on how humanoid robots could possibly replace humans at works

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Abstract. In this paper, it has been briefly discussed that the present situation of humanoid robots utilizations from several aspects and according to the information collected the possibility of "robots replacing humans" has been analyzed independently. Humanoid robots are considered as invulnerable and durable and these benefits have been utilized in several different areas such as military and space and they are expected to conquer those objective problems that are difficult for a human. Other areas like industry and medicine have included humanoid robots to accomplish mechanical and repetitive work because of their characteristics of precision and energy-saving. Additionally, robots with flexible outlooks give them the ability to take part in advanced medical innovations such as micro-robots for tumor cell killing, and they are expected to make a breakthrough in difficult miscellaneous disease treatment. On the other hand, the shortage of humanoid robots that they cannot generate human emotions has been discussed and the representation of robots in the art field - the AI artwork generators cannot completely replace human artists.

Keywords: Humanoid robots, Human; replace at works, Robots.

1. Introduction

With the rapid development of science and technology, artificial intelligence is gradually integrating into human life. As an important part of artificial intelligence, humanoid robots have also begun to be applied and appeared in some enterprises. Humanoid robots are professional service robots built to mimic human motion and interaction. Like all service robots, they provide value by automating tasks in a way that leads to cost-savings and productivity. It involves a lot of areas, can cook, do housework, complete some daily tasks and so on [1]. They are now starting to become commercially viable in a wide range of applications. So the question that needs to be answered is will humanoid robots eventually replace humans in the workplace in the future. Because many people are worried about losing their jobs. The answer is that humanoid robots will indeed replace some people at work in the future, but not all. Some jobs will never be replaced by humanoid robots. In other words, humans have a lot of functions that they can't have. It is illustrated in more detail in the following paragraphs. There are abundant studies on humanoid robots and relative news reported about the latest research progress on the innovation of humanoid robots. The relative representative studies have been collected and summarized in this discussion. The aim of this article is to discuss the current conditions of the employment of humanoid robots and the consequence of this in regard to the demand for human resources.

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2. The concept of humanoid robots

The concept of humanoid robots has been around for a long time. Due to progress of times, people are gradually accepting these kinds of high-tech products. A study indicates that the humanoid robot market was valued at $1.5 billion in 2022 and is expected to reach $17.3 billion by 2027, growing at a CAGR of 63.5% from 2022 to 2027[2]. It is clear that today, humanoid robots are in constant demand with the advancement of technology, whether in the home or in all walks of life. Many high-tech companies are also competing to build intelligent humanoid robots. For example, the Tesla Bot named "Optimus", which has been making a lot of noise recently, will debut on AI Day on September 30. Elon Musk thinks Optimus could eventually become cheaper than cars and become a mainstay of family life [3]. Elon Musk says his robots are designed to help humans with manual tasks such as driving, doing housework, cooking and other daily activities. He also proposed that "Optimus" robots will replace most of the workforce in society, such as workers, security guards, waiters, couriers and even some office workers.

3. The advantages of humanoid robots

3.1. Safety

So will humanoid robots eventually replace humans at work? The answer is yes, according to current study results, it has a great possibility to replace people in certain jobs, but not all. First of all, the author will give the advantages of humanoid robots. Firstly, humanoid robots are safe. Safety is the most obvious advantage of humanoid robots. Heavy machinery, machinery operating at high temperatures, and sharp objects can easily injure people. Humanoid robots can perform any task and have body autonomous cognition. You can perform many simple and very dangerous tasks. This characteristic of humanoid robots is being accepted in the world range. As the US has an input budget of over $18 billion on autonomous robot weapons innovation before 2020 and such weapons have already served during the Libiyan civil war. Independence in selecting attacking targets endowed humanoid robots with the ability to participate in wars like human soldiers [4]. However, robots are cheap and produced in batches which makes them their own advantages compared to soldiers. As further technique innovations on autonomous robots would focus on their flexibility with biological and nuclear weapons the war mode will be changed completely in the future. And military could be the most thoroughly rewritten field by robots. Another field that has well utilized the advantage of humanoid robots in space exploration. NASA sent its robot called Robonaut into space early in 2011. Unlike human astronauts it can be designed into ideal shapes, such as Robonaut which has a column shape of "feet" that allows it to engage into the ground stably that makes it can work with dexterity and stability that human spacers cannot reach. This type of robot that used in space can only make a difference in assistance but not in leading positions. They can imitate human activities and behaviours by absorbing and analyzing what developers have tough of them, also they can speak human languages and process simple communications under various environments and mimic corresponding emotions [5].

3.2. Efficiency and accuracy

Humanoid robots work very efficiently. Humanoid robots don't get distracted or need breaks. The robot never gets stressed out and starts running slowly. Robots can work all the time, which speeds up production. Additionally, humanoid robots can accomplish tasks perfectly. Humanoid robots will always provide quality. Because they are programmed for precise, repetitive movements, they are less likely to make mistakes. Eliminating the possibility of human error creates a predictable, perfect product every time. Current techniques on medical used robots such as CorPath's angioplasty robot have been used in cardiological surgeries. This type of medical robot have been created in human shape so that they can do repeated work with their mechanical arms like doctors. There is no doubt that machines have the characteristic of keeping precise as long as there is correct order input by operators that are human doctors. By being included in such medical robots the possible misoperations raised by physicological factors of humans could be almost completely avoided [6]. Therefore, humanoid robots are considered to be good choices for assisting surgeries and simple diagnoses in medical institutions.

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Since current techniques on medical usage robots still require human operators to manipulate such machines, medical robots can only finish low-level works that used to be charged by nurses but they cannot replace doctors who making decisions for patients. Due to these advantages, humanoid robots are being used in power plant inspections, maintenance, and disaster response to alleviate heavy and dangerous tasks for human workers. Other diverse applications include providing companionship for the elderly and sick, acting as guides and interacting with customers as receptionists. Humanoid robots can automatically perform a variety of tasks, from dangerous rescues to compassionate care. The ways in which these robots can be deployed are expanding, and as the underlying technology improves, so will the market. There is no doubt that Humanoid robots can replace a large part of human beings in the job, but most of these workers only need to work according to the process, such as assembly line workers, cashiers and so on. In addition, humanoid robots have been considered in the advance medical field and reach unprecedented areas where a human cannot. A company in California has developed tiny miniature robots as a possible brain cancer treatment. The idea has been taken into reality, and hopefully resolve the ultimate medical problem that has been torturing human for decades. Such micro robots can carry anti-tumor drugs and after being injected into the human body they can precisely reach tumor cells and kill them without mistakes [7]. If the technique of using micro robots in cancer treatments can be put into clinical trials, those traditional cancer treatments like chemical therapy will be abandoned completely and we cannot deny that we could obtain unbelievable benefits from humanoid robots.

4. Disadvantage of humanoid robots

For all their virtues, humanoid robots have a fatal drawback: they can't feel emotions like humans. Some professions, such as artists and musicians, cannot be replaced by emotionless humanoid robots, because every artist and musician creates some excellent work through their own emotions and experiences. Their works can touch people. Even a simple object can be created by every artist into different works and different expressions. Artificial intelligence will never be as creative and imaginative as humans, and even though it can perform high-intensity work, it has no insight into human emotions. Robots of the future can do a lot of physical work, but they are not expected to accomplish human works that demand emotional input. However, the situation seems going to be reformed gradually by the advent of AI drawing techniques in recent years. AI generated art tools like Disco diffusion is widely used open-source programm which is open to the public. Other systems like DELL-E 2 and Midjourney have been available for artists that received invitation codes from their development groups [8]. These kinds of AI programms have gotten attention worldwide, especially in the art field they are the headlines that are being frequently discussed. It must be admitted that the working mode of text-to-image software can indeed create realistic and subtle high-quality artworks that do not inferior to those artificial. However, currently, AI generated images are somehow limited as they collect existing visual elements according to the prompts from the online storage that makes AI a collection tool but not a real artist. It can not be accurately predicted if the machine would replace humans completely with the breakthrough of technological innovation in the future that it could eventually beyond its extreme limitation and reach the level of a real human. This question remains unsolved, but it could come into reality someday.

5. Conclusion

In conclusion, humanoid robots have their performance is being gradually improved along with the innovation in techniques in the past years and are expected to be put into use in various areas. Now humanoid robots rely on orders input by human operators in most cases and rarely work with independent consciousness. Several advantages of machines compared to humans drive its development. Initially, humanoid robots have stiff stature and flexible shapes which can be produced in mass at cheap prices that make them competent in dangerous situations such as battlefields and nuclear plants that usually confuse humans with safety and moral worries; secondly, humanoid robots can reduce manpower costs as they are electric energy driven and do not need holidays that makes them willing to work continuously; thirdly, it effectively improved the precision on manipulation for complex and repetitive works that enables it to avoid possible misoperation in certain fields such as prolonged surgery.

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On the contrary, humanoid robots have their limitations which impede them to replace humans in upscale positions. In some special circumstances like cancer treatment robots can surprise humans with innovative techniques. One example has been discussed that tiny humanoid robots can work as porters in the human fluid system and preciously target tumor cells so that to treat cancer. Such techniques on humanoid robots in the medical field combined various advantages and brought unparalleled reformation as they can reach what humans cannot. It's undoubtedly that such reformations on difficult illness trials once success will force medical workers to change their working patterns. The most obvious limitation is that robots cannot generate natural emotions, since their behaviour is confined to mimicking humans with their programm but not creating. Even if further development of humanoid robots' autonomy will not stop and they are expected to replace humans with low-end jobs, in upscale fields such as the art field humanoid robots cannot alter humans in situations where independent consciousness and creativity are essential.

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