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A Critical Review of the Challenges, Threats, and Drawbacks of Humanoid and Autonomous Robots

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ABSTRACT

Humanoid and autonomous robots are well-known around the world, not only for their intelligence, but also for their great automation and advanced capabilities. Man has been on the receiving end of their limitations, flaws, and/or destructiveness since they were first invented and used. In some ways, they have done more harm than good, leading to increased calls for their prohibition. This study aims to investigate the challenges, hazards, issues, and disadvantages of having and using these robots in many parts of human life, including health, agriculture, and social institutions, as well as assault and defensive activities. While it examines reports from human rights organizations and the general population, it will investigate many revolting views on why these breakthroughs aren't at the forefront of human civilisation.

INDEX TERMS: Humanoid robots, Autonomous robots,Co-robot, Weapons, Killer-robot, Botnet, robo-machine.

1.INTRODUCTION

A robot is a machine, particularly one that can be programmed by a computer and can perform a complex set of activities automatically. An external control device can direct a robot, or the control can be included into the robot itself. Although some robots are created to resemble humans, most are task-performing devices with a focus on stark functionality rather than expressive aesthetics. The American Robots Association characterized robots in the late 1970s as a "multi-functional operator controlled by programs that moves materials, components, tools, and other specific apparatus through control programs." "A reprogrammable, versatile manipulator designed to move materials, parts, tools, or specialized devices through numerous programmed functions for the completion of a variety of tasks," according to another definition. A robot, in its most basic form, is an electromechanical device with several degrees of freedom that can be programmed to perform a number of activities.

Humans have been replaced by robots in the performance of repetitive and risky activities that humans prefer not to do, are unable to accomplish due to size constraints, or occur in extreme conditions such as outer space or the ocean's depths. Concerns have been raised concerning the growing use of robots and their impact on society. Robots are being blamed for the rise in technical unemployment since they are replacing employees in an increasing number of roles. Ethical considerations surround the use of robots in military warfare. The potential for robot autonomy and its ramifications has been explored in fiction, and it may become a serious issue in the future.

Historians think that robo-machines or robots date back to 350 B.C., when Archytas of Tarentum, a genius and excellent mathematician, developed a mechanical bird called "The Pigeon" that is powered by Stream. It is thought to be one of the first investigations of flight. The term "robot" was first coined in 1920 by Karel Capek, a Czech novelist, in one of his plays, RassumUniversal Robots. The word robot comes from the Latin word robot, which implies worker, servant, or assistance.

The original machines were not created to be used in the manufacture of commodities or to replace human laborers; rather, they were created to provide viewers with entertainment on stage. The idea behind this design was to have the robot move like a knight. More specifically, between 1977 and today, the invention of robots has taken on a new face, with more advanced warfare robots being built for a variety of uses. R2-D2 and C-3PO are introduced in George Lucas' Star Wars film about a universe governed by the force. The film is supposed to have given rise to a fresh vision of how future robots will appear. In addition, between 2000 and 2004, robotics progressed to the next level.

Humanoid Robots

A humanoidrobot is a robot that looks like a human. The design could be for utilitarian goals, such as interacting with human tools and settings, or it could be for experimental objectives, such as studying bipedallocomation. Humanoid robots feature a torso, a head, two arms, and two legs in general, while some humanoid robots may merely duplicate a portion of the body, such as the waist up. Some humanoid robots have heads that are meant to look like human characteristics like eyes and mouths. Ethiram (The Robot) is a Tamil Indian film directed by S. Shankar. They are programmed to

think and act in the same way that humans do.

Humanoid robots are increasingly being employed as research tools in a variety of fields. To create humanoid robots, researchers investigate human body structure and behavior (biomechanics). The endeavor to imitate the human body, on the other hand, leads to a deeper comprehension of it. Human cognition is a branch of psychology concerned with how people gain perceptual and motor skills through learning from sensory information. This information is used to create computational models of human behavior, and it has gotten better over time. These robots work as receptionists in homes, workplaces, and businesses, as well as as customer service representatives for telephone companies.

5 Best Humanoid Robots in The World
- a) 1.Nadine.
- b) 2.Sophia.
- c) 3. Erica.
- d) 4.JunkoChihira.
- e) 5.JiaJia.

Autonomous Robots

Autonomous robots can learn about their surroundings and work for long periods of time without the need for human interaction. These robots include everything from autonomous helicopters to robot vacuum cleaners. These self-contained robots can navigate the operation without the need for human intervention and can avoid circumstances that are hazardous to themselves, other people, or property. Autonomous robots are also more likely to adapt to their surroundings as they change. Simpler autonomous robots perceive obstacles using infrared or ultrasound sensors, allowing them to maneuver past them without human intervention. To view their surroundings, more advanced robots use stereo vision; cameras provide depth awareness, and software allows them to find and classify items in real time. In a crowded environment, such as a hospital, autonomous robots are beneficial. An autonomous robot can deliver lab results and patient samples quickly instead of employees leaving their posts. These robots can navigate the hospital hallways without any traditional supervision, and they can even locate alternate paths when one is blocked. They'll make pit stops along the way to collect samples to take to the lab.

DARPA, or the Defense Advanced Research Projects Agency, is a section of the US Defense Department tasked with surprising our adversaries with technical advances. This group is at the forefront of military and disaster relief technology, and after inventing autonomous vehicles, they are now focusing on producing autonomous robots capable of executing difficult jobs in hazardous conditions. Another application for autonomous robots is in our natural environment. Researchers at Virginia Tech built an autonomous robotic jellyfish in 2013 with the goal of conducting undersea military surveillance or environmental monitoring in the future. The 5 foot 7 inch jellyfish has a lengthy lifespan and operating range.

The main points raised were that autonomous armed robots are unable to distinguish between fighters and non-combatants, as well as other immune actors such as service workers, retirees, and wounded or surrendered victims, in a way that is consistent with the principle of distinction. Similarly, the

Board of Registration in Medicine of the Commonwealth of Massachusetts releases an advisory report on robot-assisted surgery, citing worry over incidences of autonomous robots hurting patients during surgery. According to the study, the Quality and Patient Safety Division has been receiving an increasing number of Safety and Quality reports of patients experiencing difficulties as a result of robot-assisted surgery for the past two years.
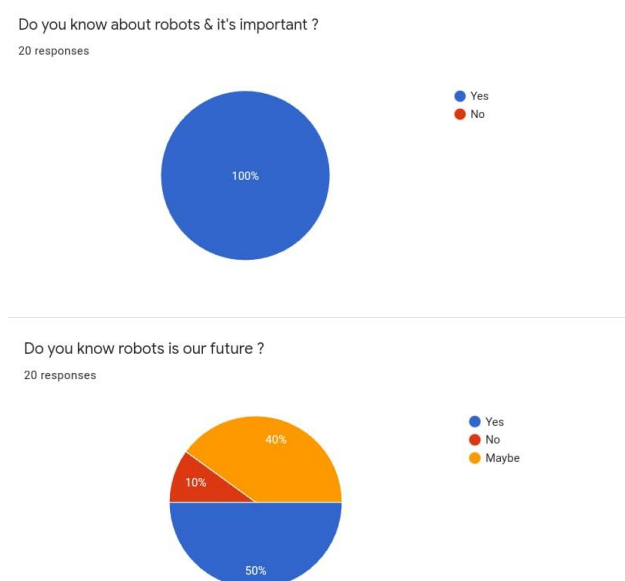
TypesOfRobots

1. Stationary Robots: Stationary robots are not mobile and conduct duties in a specific location. These robots are immobile and can only move in one direction. Robotic arms, computerized machine tools, and the majority of other Industrial Robots fall within this group. Surgical robots, for example, are frequently found in hospitals. Security detection robots, which are stationed to detect unlawful entry inside a certain environment, are another category that can fall into this category. Commercial robots, Cartesian robots, cylindrical robots, parallel robots, and so on are some further examples.
2. Wheeled Robots: Wheeled robots are self-propelled robots that navigate the ground using powered wheels. This design is easier to design, build, and program for movement in flat, not-so-rugged terrain than treads or legs, and by employing wheels, it is easier to plan, build, and program for movement in flat, not-so-rugged terrain. Single-wheel robots, two-wheel robots, military robots, and so on are some of their examples.

3. Legged robot: Legged robots, also known as walking machines, are built for mobility on uneven terrain and require leg actuator control, sensors to establish foot location, and planning algorithms to determine movement direction and speed. The stride of the walker refers to the periodic contact of the robot's legs with the ground. The walker's center of gravity must be sustained either statically or dynamically in order to maintain locomotion. The center of gravity must be within the support pattern generated by legs in contact with the ground to provide static support. The center of gravity's trajectory is maintained such that it can be adjusted by forces from one or more of its legs, providing dynamic support.

4. Vehicle Robots: This is one of the most diverse categories of robots, as it includes those that travel long distances. They feature locomotive components that can withstand any climate, including rocky terrain, deserts, water, and even space.

5. Cloud robotics: A cloud robot is a "collection of robots or equipment that are connected via wired or wireless communication networks."
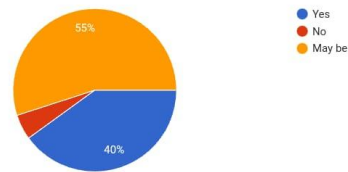
PUBLIC SURVEY

From the moment they were invented until now, robots have unquestionably contributed to human advancement. We must accept that some well-programmed robots have helped to save lives and property. Today, the world's leading automobile firms rely on robots for production, which makes life more easier and better for everyone; at the very least, laborers are protected from all types of occupational risks. However, in recent years, a number of observers, including some scientists, have expressed worries that the existence of robots is posing a threat to human safety.
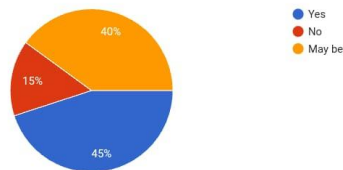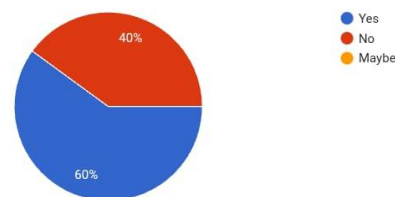
Figures and Survey Results

Do you know about robots & it's important ?
20 responses

- Yes
- No

100%

Do you know robots is our future ?
20 responses

- Yes
- No
- Maybe

40%
10%
50%

Life is easy with robots ?

20 responses

- Yes
- No
- May be

55%

40%

Robots is affected in jobs & economy ?

20 responses

- Yes
- No
- May be

40%

15%

45%

Do you know about Humanoid Robots ?

20 responses

- Yes
- No
- Maybe

40%

60%

Key Issues and Problems in Robots

Following extensive research and consultation, I have concluded that robots are far safer in the production sector and in enterprises than in homes and communities. As a result, I strongly advocate for the abolition of humanoid and autonomous robots, based on the following carefully selected points:

1. Industry of Health Care:-

Healthcare robots is progressing rapidly, and it has the potential to transform the world physically. However, it is critical to carefully include healthcare robotics. Especially when it comes to the safety and well-being of those who may be at risk of harm as a result of a disability, disorder, injury, or disease. Stakeholders face five major hurdles when it comes to the usage of healthcare robots. Usability, Acceptability, Safety, Functional Capability, and Cost are all factors to consider.

Humans have been forced to use robots as part of medical health care facilities as a result of technological improvements. It's more accurate to state that robots are taking over some areas of patient care and assisting in complex operations and surgeries. And there's no denying that robots are the way of the future in health care. However, many questions have been raised that cast doubt on their powers. "The health-care industry is unlikely to adopt robots unless the risk and cost are low, and tangible evidence of success is required before pursuing the broader opportunity," says the report.

He went on to say that the uncertainty and hazards associated with the outcome outweigh the benefits. That is, without a doubt, correct! Furthermore, these robots in issue are merely machines with a small chip that has been programmed; they are not aided by anyone, except in a few circumstances. And, as we all know, even after extensive testing and assessment, programmed things frequently fail. Second, will they be able to detect flaws or errors in real time during operation? No, the answers are negative. Take, for example, the well-known case of da Vinci Surgery. Doctors can use the da Vinci surgical robot to do intricate surgeries that take a long time. "The robot comes with all the instruments a surgeon needs to undertake a comprehensive set of complicated surgeries," the creators of the da Vinci robot claim.

2. Financial and economic issues:

Several industries throughout the world have seen a rise in revenue just by incorporating robots into their manufacturing line. It is the most significant achievement in the history of the industrial industries. In today's world, the usage of robots in offices and businesses is unavoidable. According to the

International Federation of Robotics, in 2013, South Korean enterprises used 437 industrial robots for every 10,000 manufacturing workers. There are three ways that robots affect the economy:-

• Your job is being taken over by robots!

• While robots and automation may have a detrimental impact on some labor categories, they boost productivity, cut production costs, and have the potential to create new jobs in the tech industry.

When looking at the difficulties from a financial standpoint, building a robot necessitates a significant investment. This is why the majority of organizations who opt to deploy robots must have a long-term strategy that includes laying off at least half of their workforce so that all of their pay may be used to fund robot development projects. Robots can truly serve the goal, but maintaining them is just as difficult as obtaining them. The anxiety isn't so much about the cost of the investment as it is about the implications that come with it. Such predictions are also depicted in S. Shankar's Tamil film Enthiran (The Robot), in which a humanoid robot gains freedom and begins to create more robots under his direction. In the end, these robots harmed a large number of people by killing hundreds of Indians. As a result, the Indian government decides to halt the project after reviewing evidence provided by specialists who oppose humanoid robots.

3. Social problems:

We will discuss a specific sort of humanoid robot known as the Social co-robot on the social aspect of the robotic problem. A social co-robot is a sort of humanoid robot that may be deployed into social communities to interact with people and provide support to them. They operate as personal assistants, community workers, home delivery agents, and local transportation, among other things. They have learnability and consciousness, which allows them to have sentiments, emotions, and a desire for self-control. However, scientists believe that with all of these artificial qualities in place, there are numerous unforeseen problems that are likely to create many encounters.

1. Familiarity – A community is a broad term that refers to a huge group of people and objects, both living and non-living. As time passes, new people arrive and some depart. Most robots, especially community members, struggle to recognize strangers as a result of this. As a result, if the goal is for the robot to provide security, it is likely that the robot will be unable to recognize all of the persons in the area.

2. Distinction - It is difficult for a robot to discern between deadly and harmless objects, no matter how expertly programmed it is. For example, if a robot is utilized as a cop, it will have a hard time distinguishing between a target and an innocent individual moving with a stick.

4. Concerns about warfare:

Killer robots are a subset of robots that are classified as such in robotics. These robots are utilized in battlegrounds and as defense systems. These robots are programmed to choose and engage their targets without the need for human involvement. This suggests that they don't act on human orders, but rather on their own internal decisions, whether or not those decisions are destructive. According to Vincent Muller. "Ships have been protected by automatic radar-guarded gun systems since the 1970s." We now have devices that can automatically detect and attack impending missiles, rockets, aircraft, and other threats. These systems are rapidly gaining popularity, since the United Kingdom, the United States, China, Israel, and Russia, among others, have already implemented them. As a result, many questions and complaints have been raised by various human rights organizations and even governments, demonstrating their disinterest in these advancements. In contrast, in other parts of the world, a campaign to stop killer robots has already begun. As previously stated, around 44 countries have signed documents opposing the continuation of such initiatives. So, why should warfare robots be prohibited? Following are some reasons based on various submissions by various critics:

1. A lack of morality

2.Unpredictableactions

3.Order non-compliance and machine failure

Conclusion

During the course of this investigation and study, I discovered that? Industrial robots that can reduce human exposure to risks, increase production, and increase profit may be an excellent concept. It is, however, insane to design or construct something that threatens the very existence of its creator. Ex-Machina, The Machine, and Chappie (film) show how, in their drive for freedom, machines rebel against their creators and even consider replicating themselves. In actuality, their acts will only jeopardize man and his safety.Another thing they've learnt from their flaws is the need of security. I'd want to take this opportunity to emphasize two key points. Our research on a variety of materials shows that security flaws commonly discovered in robot neural schemes can be exploited by hackers to override the robot's initial aim. And if the control of a robot can be taken away in the middle of a combat, catastrophic consequences should be predicted.My second concern is how robots are connected to the network. Suppose a robot is directly connected to the global network or the internet, this means it can be controlled remotely and perhaps gets hijacked by hackers, if access is gained, then same access can be traced back to the main frame machine or server machine that is aiding the control of the robot. Hence, the robot can be used as a zombie (intermediary) to launch a bigger attack on innocent people. So, until and unless these problems are solved robots will remain vulnerable to attacks. More so, there are advanced cloud robots that get attacked through a mechanism known as Botnet. Botnet attack is when a collection of comprised machines called zombies are infected with a malware that allow an attacker to remotely inspire the machines to do something inappropriate such as attack, this is what is called botnet attack. However, if such machines are peered together, they can cause a massive destruction which might take a long time to reverse. One might ask; how can this happen, studied evidence shows that if machines are connected together, there are high chances that they can exchange information that can be of help coordinate an attack on anything including human race.

Another good point worth mentioning is about robot"s consciousness. Several tests proved that machines are vulnerable to Social engineering (an act of using trick and deception to extract information from someone or something) attacks as it has been seen in the movies titled Enthiran. The humanoid robot could not differentiate normal conversation from abnormal one that could lead to the exposure of the machine schematics. Lots of robot know about themselves more than they should know, therefore if care is not taking, then can say even the most confidential things they know. Finally, I am calling on the concerned bodies to revisit their decisions on building such robots; they should at least consider the future generations to come. They should also consider the consequences of what robots could cause including unemployment, increase in crime rates and fatal accidents that could lead to death.

ACKNOWLEGMENT

It gives me great pleasure to present my Research paper on "A Critical Review of the Challenges, Threats, and Drawbacks of Humanoid and Autonomous Robots". I would like to express my sincere thanks to all the teachers who helped us throughout. I would like to acknowledge the help and guidance provided by our professors in all place during the presentation of this research paper. We are also grateful to, Head of Department. This acknowledgement will remain incomplete if we do not mention sense of gratitude towards our esteemed Principal who provided us with the necessary guidance, encouragement and all the facility available to work on this project.

REFERENCES

[1] https://www.google.com
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