# ROBOTICS: A BOON OR A BANE? - A REVIEW

[1]Shruti Sunil Ajankar, [2]Aditi Rajesh Nimodiya,

[1]Student, B.E, Department of Computer Science & Engineering, Jawaharlal Darda Institute of Engineering and Technology, Yavatmal, Maharashtra, India

[2]Student, B.E, Department of Computer Science & Engineering, Jawaharlal Darda Institute of Engineering and Technology, Yavatmal, Maharashtra, India

***Abstract:*** In this Era the advancement technology is the necessity for us. Robotics is the intersection of science, engineering and technology that produces machines, called robots, that substitute for or replicate human actions. It is a domain in artificial intelligence that deals with the study of creating intelligent and efficient robots. Robotics development is the most important part for the future. We describe here about The basics of Robotics, automation and Importance of robotics for future also we have cleared some common doubts of the people whether it's a boon or a bane.

***Index Terms* - Robotics, automation, boon, bane.**

## I. INTRODUCTION

The word robot first appeared in print in the 1920 play R.U.R. (Rossum's Universal Robots) by Karl Kapek, a Czechoslovakian playwright. Robota is Czechoslovakian for worker or serf (peasant). Robots are the artificial agents acting in real world environment. They are aimed at manipulating the objects by perceiving, picking, moving, modifying the physical properties of object, destroying it, or to have an effect thereby freeing manpower from doing repetitive functions without getting bored, distracted, or exhausted. Robotics is a branch of AI, which is composed of Electrical Engineering, Mechanical Engineering, and Computer Science for designing, construction, and application of robots. It has the potential to positively transform lives and work practices, raise efficiency and safety levels and provide enhanced levels of service. Even more, robotics is set to become the driving technology underpinning a whole new generation of autonomous devices and cognitive artefacts that, through their learning capabilities, interact seamlessly with the world around them, and hence, provide the missing link between the digital and physical world.

The organization of this document is as follows, the Section 2 (**Basics of Robotics**) explains the basics of robotics like its components and all, the Section 3 (**Automation**) explains automation system and different types of automation, why we need robots in our life. Section 4 (**Robotics could transform our future**) discusses the different ways why the robots are important part of our life. The Section 5 (**A Boon or a Bane?**) gives a clear vision about it. And the section 6 (**Conclusion**) is the conclusion, i.e. the short summary of what we have seen in this review paper.

## II. BASICS OF ROBOTICS

**Aspects of Robotics**
• The robots have mechanical construction, form, or shape designed to accomplish a particular task.
• They have electrical components which power and control the machinery.
• They contain some level of computer program that determines what, when and how a robot does something.[4]

**Components of a Robot**

Robots are constructed with the following:
• Power Supply: The robots are powered by batteries, solar power, hydraulic, or pneumatic power sources.
• Actuators: They convert energy into movement.
• Electric motors (AC/DC): They are required for rotational movement.
• Pneumatic Air Muscles: They contract almost 40% when air is sucked in them.
• Muscle Wires: They contract by 5% when electric current is passed through them.
• Piezo Motors and Ultrasonic Motors: Best for industrial robots.

•    Sensors: They provide knowledge of real time information on the task environment. Robots are equipped with vision sensors to be to compute the depth in the environment. A tactile sensor imitates the mechanical properties of touch receptors of human fingertips.

## Computer Vision

This is a technology of AI with which the robots can see. The computer vision plays vital role in the domains of safety, security, health, access, and entertainment. Computer vision automatically extracts, analyzes, and comprehends useful information from a single image or an array of images. This process involves development of algorithms to accomplish automatic visual comprehension.

Hardware of Computer Vision System
This involves:
•    Power supply
•    Image acquisition device such as camera
•    A processor
•    A software
•    A display device for monitoring the system
•    Accessories such as camera stands, cables, and connectors

## Tasks of Computer Vision

OCR: In the domain of computers, Optical Character Reader, a software to convert scanned documents into editable text, which accompanies a scanner.

Face Detection: Many state-of-the-art cameras come with this feature, which enables to read the face and take the picture of that perfect expression. It is used to let a user access the software on correct match.

Object Recognition: They are installed in supermarkets, cameras, high-end cars such as BMW, GM, and Volvo.
Estimating Position: It is estimating position of an object with respect to camera as in position of tumor in human's body.[4]

## Three Laws of Robotics:

1.    A robot may not harm a human or, through inaction, allow a human to come to harm.

2.    A robot must obey the orders given by human beings, except when such orders conflict with the First Law.

3.    A robot must protect its own existence as long as it does not conflict with the First or Second Laws.[8]

## III. AUTOMATION

**Hard automation:** This kind of automation cannot handle product design variations, mass production for example; conventional machinery, packaging, sewing and manufacturing small parts. Adjustability is possible but it can only handle specific tasks with no possibility of changing its own task. These machines can be seen in our homes (washing machines, dish washers, etc).

**Programmable Automation:** This form of automation began with the arrival of the computer. People began programming machines to do a variety of tasks. It is flexible because of a computer control, can handle variations, batch product, and product design.

**Autonomous (Independent):** Endowed with a decision making capability through the use of sensors. A robot belongs to this kind of automation and it is a combination of microprocessor and conventional automation systems which can provide a very powerful system. Its high level machinery capabilities combined with fault recognition and correction abilities provided by highly evolved computer systems. This means it can carry out work traditionally carried out by humans. Examples of existing autonomous systems are animals and human beings.
Animals when they see food they move toward it using sense of smell or they escape when they react against danger due to senses of fear (sensors).

Human beings are the highest level of autonomous systems because they think and they can change plan at any moment due to their high intelligence.

Robots cannot reach the same high level as humans because they are programmed to do certain tasks according to certain factors which are completely programmed by human beings, but they have no possibilities to change plan like humans or plan new things unless the programmer programs them to change the plan. Because of high development of machines, sensors, actuator, digital electronics and microprocessor technology it became possible to create a robot which is autonomous (Teijo Lahtinen, Lecture at Lahti University of Applied Sciences 2009).[4]

## IV. ROBOTICS COULD TRANSFORM OUR FUTURE

It's easy to get an impression of the way robots are changing our daily lives: simply think of the self-serve pump next time you stop for gas. Such progress was hard to imagine when gas stations began. Top tech companies are in a constant race to change the way robotics are implemented in people's everyday lives which will lead us to a really exciting future. So, based on the current trends, here are the ways we can expect robotics to transform our future.

1. **Robotics in public security**
   Artificial Technology for predicting and detecting crime might seem far-fetched, but it's quite possible for the future we're looking at. Drone footage, for instance, make that happen. In addition, automatic recognition of suspicious activities is already a reality for camera-based security systems. This technology change society in a very important way: it allow law enforcement officials to act quickly whenever a suspicious behavior is spotted.

2. **Robots in Education**
   The line between classrooms and individual learning setting is already starting to blur. As Kendra Roberts, an educational expert, explains, "A single teacher does not have the capacity to meet the needs of personalized learning for every student in the classroom. Computer-based learning is already changing things in that matter. It's not replacing the teacher, but it enables students to learn at their own pace." Robots will boost the process of personalized learning. NAO, the humanoid robot, is already forming bonds with students from around the world. It comes with important senses of natural interaction, including moving, listening, speaking, and connecting.

3. **Robots at home**
   Cloud-connected home robots are already becoming part of our lives. We can set up the vacuum cleaner to do the chore for us, and we can schedule a warm home-cooked meal to be ready by the time we're finished with work. Multi-function robotic cookers are able to fry, steam, bake, slow cook, and perform any other action without our intervention. We just set them up. These cloud-connected robots are likely to evolve into more advanced version. We expect to see speech comprehension and increased interactions with humans in the upcoming years. These developments may end up changing the entire look and feel of our homes.

4. **Robots as co-workers**
   Robots will have a profound effect on the workplace of the future. They'll become capable of taking on multiple roles in an organization, so it's time for us to start thinking about the way we'll interact with our new co-workers. The machines will likely evolve more in terms of voice recognition, so we'll be communicating with them through voice commands. This is how futurist Nikolas Badminton expect things to develop: "You're probably going to walk into an office and your system's been churning over the last couple of hours considering what's been going on in business, your role, your job, what you need to do that day, and probably offer up several ideas about the right direction of what to do."

5. **Robots create jobs**
   "Robots will take our jobs!" is perhaps the most common fear surrounding robotics development! Yes, technology is changing fast and it does have economic ramifications. Driverless cars, for instance, are highly likely to replace cab drivers in the future. In the near future, however, artificial intelligence will most likely replace tasks, not jobs. The good news is that it will also create new markets and jobs. We might need additional education and re-training for those jobs, but the opportunities will be there.

6. **Autonomous cars**
   Self-driving cars still require some human intervention, but we're getting closer to the day when they won't. In the past decade, the perception of this technology among the public went from "How is it even possible?" to "Maybe it's possible..." to "Definitely getting there!"

7. **Healthcare robots**
   We're looking into a different future for healthcare, too. Instead of visiting a primary care physician who will give us a check with a simple stethoscope, we'll have intelligent robots performing these tasks. They will interact with patients, check on their conditions, and evaluate the need for future appointments. Pharmabotics will bring more huge changes. They'll be like ATMs for medicines, so we can get the medications we need while avoiding the inconvenience of talking to a stranger about our health issues.

8. **Robotics for entertainment**
   Robots are getting more personalized, interactive, and engaging than ever. With the growth of this industry, virtual reality has already entered in our homes. We're able to interact with our home entertainment systems through conversations, and they respond to our attempts to communicate.

9. **Robots will boost our standard of living**
   We've seen this throughout our history: automation and mechanization boosts the overall standard of living. We've seen it with the Industrial Revolution, and it's going to happen again. According to estimates from the United Nations, poverty was reduced to a greater extent over the past five decades than the previous 50. That's because the global economy grew sevenfold, and the technology played a huge part in that progress.[9]

## V. A BOON OR A BANE?

With the growing developments in the field of AI, the robots are becoming more human-like and are to understand and expressing emotion. If this continues at the same pace a time will come everything would be controlled by robots. The robots will be everywhere which will significantly reduce the need for the human resource. Robots will be helping us in every field like banking, aviation, production and much more, as mentioned above. Actually it has already started to take over many sectors in India like in banking where HDFC has deployed robots to resolve customer grievances. But as it was rightly said, "with great power comes great responsibility". If we rely more on AI, it would become a danger to us and on the other side it would be beneficial for humans  and will ultimately improve the standard of living of the individual. So over-dependence on anything beyond a certain limit is harmful and could be dangerous as well but it doesn't means that it's a bane.[10]

## VI. CONCLUSION

1. Traditionally, robots are applied anywhere one of the 3Ds exists: in any job which is too Dirty, Dangerous, and/or Dull for a human to perform. They eliminate dangerous jobs for humans because they are capable of working in hazardous environments.

2. Robots are considered more productive than humans. The advancement of robotics offers new jobs in society. In the field of robotics there are a lot of opportunities for youths. From making robots to tackling them a number of jobs are created in this field. Some people assume that robotics snatched the jobs of many workers but it is false in different aspects.

3. There are many applications of robots, so we just can't underestimate them by saying that it would leave the workers jobless. If we want progress then we can't stop the world from adopting the technologies. So definitely we can say that robotics is a boon.

## REFERENCES

[1] Artificial Intelligence - Media and Information Literacy, Human Rights and Freedom of Expression by Igor Shnurenko, Tatiana Murovana and Ibrahim Kushchu, UNESCO Institute for Information Technologies in Education in cooperation with the TheNextMinds.
[2] https://www.tutorialspoint.com Artificial intelligence - Intelligent systems
[3] Artificial Intelligence and the future of work by Thomas W. Malone, Daniela Rus, and Robert Laubacher, MIT work of the future,   RESEARCH BRIEF 17, DECEMBER 2020.
[4] The Basics of Robotics by Lahti University of Applied Sciences ,Machine- and production technology.
[5] Lecture Notes on Artificial Intelligence by Dr. Prashanta Kumar Patra, College of Engineering and Technology,  Bhubaneshwar.
[6] The role of Artificial Intelligence in future technology by Amr kayid, Department of Computer Science, The German University, Cairo, March 15, 2020.
[7] What is Robotics and Importance of Robotics for Future by Rahul Shukla, Trotons Tech Magazine, AIOps platform, 2021.
[8]  An Introduction to Robotics by Dr. Bob Williams, williar4@ohio.edu , Mechanical Engineering, Ohio University
[9] 10 Ways Robotics Could Transform Our Future by Laura Buckler, Jul 27,2021.
[10] https://brainly.in