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TITLE: THE WORLD OF HUMANOID ROBOTS

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Abstract

This paper broadly explore about the Past-Present and applications of humanoid robots. It illustrates about the recent trends in the robotics world. This paper focuses on how efficiently the robots are used in the fields like Medical science, Education and wide industrialization. It also includes the existing means of motion of the humanoid robot. It shows some of the designs of humanoid robots is used for functional purposes, such as interacting with human tools and environments, for experimental purposes. The gadgets are developed for interactions and communications such as Human-Robot-Interactions (HRI) and Human-Computer-Interaction (HCI) .In these paper we have given the short views about the humanoid robots called Sophia and the Indian Robot Rashmi. It also includes the various types of abilities of humanoid robots. The efforts which were taken by the scientists while developing the humanoid robots is also illustrated in the paper. In the last decade the robotics industry has created millions of additional jobs led by consumer electronics and the electric vehicle industry, and by 2020, robotics will be a \$100 billion worth industry, as big as the tourism industry.

Index Terms: *Humanoid robot, past life, current trends in humanoid robots, Applications, Advantages and disadvantages of humanoid robotics.*

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1. INTRODUCTION

Rapid development of humanoid robots brings about new shifts of the boundaries of Robotics as a scientific and technological discipline. New technologies of components, sensors, microcomputers, as well as new materials, have recently removed the obstacles to real-time integrated control of some very complex dynamic systems such as humanoid robots. Humanoid robots look like us, they communicate like us, they walk like us; all of these simple actions that humans are born with are nearly perfected to be duplicated by humanoid robots nature. This paper goes by the notion of bringing the past of a humanoid robot and its change into the present and the application of humanoid robotics development in the field of robotics. The growth of the development of humanoid robots has to be considered one of the best possible growths in the field of robotics.

The term robot was point by a play writer, Karel Capek in his Play [1]. In second century, Leonardo Da Vinci created Mechanical robot knight. The robot could sit, stand and could Move its head. In past era, robots were mainly use in industries. In 1940, the first humanoid robot named Electro[2]was created by Westinghouse electric corporation.

Using the structure of the robot which was developed by Leonardo Da Vinci the scientist name Mark Rosheim built a prototype of the same in 2002. He further modify it and made more advanced so the robot was able to walk. Despite it could walk but the major challenge for developers was it could walk only on flat floors. This bipedal movement was the biggest invention but brought more difficulties into the industry-self balancing, walking on uneven surfaces, climbing etc. After a force is applied to push the robot called as Bipedal Push Recovery. The Bipedal Push Recovery was achieved by using hydraulic actuators and was implemented on quadruped robot

1.1 History of humanoid robots:

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called Big-Dog[3] which use a combustion engine for power. The real efforts in development of humanoid robot are not just the designing but also programming and functions. The major challenges such as communication, taking decision on its own, expressing feelings, highly intelligent and the major consequence was balancing in any type of environment so all this issues were overcome in past.

1.2 Current trends in humanoid robots:

Humanoid robot lifespan is ever increasing with the ageing of population and declining of the birth rates[4]. With the increasing need for the manpower which is not found in human the best possible substitute have become humanoid robot due to which the technology related to the humanoid robot have been increase in the present year. The elements of the humanoid robot should have less mistakes as compared to the actual humans. The ability of the humanoid robot also comes in the picture. Persons detecting system using vision sensors are most used in the present method is simple. It detects the person using individual camera with an incorporated image formation system [5]

The communication between the human and robot is termed as HRI. The need for the robot to have an appearance more like a human is essential for the HRI. Studies have been carried and robot with the ability of showcasing facial expressions and behaviours in response to its communication is much selected over the others. The need for facial expression and behaviour is an essential requirement [6]. Robots has been employed in shopping malls, train stations, schools, streets and museums. In addition to entering new human environments the design of HRI recently started shifting more and more from being solely technologically driven towards the user centred approach.

HCI (Human computer Interaction) is the study of how people interact with computer is not developed interactions with human being.

One of the robot named Sofia is a social humanoid robot developed by Hong Kong based company Hanson Robotics. Sophia was activated on Feb. 14 2016[7]. In Oct 2017 Sophia became the first robot to receive the citizenship of any country [8,9]. Sophia is able to process speech and have conversation using a natural language[7].

Around Jan 2018 Sophia was upgraded with a functional leg and ability to walk [10]. Sophia's expressions are likely to have fewer errors and it should answer increasingly complex questions with accuracy [11].

Ranchi-based software developer Ranjit Shrivastav has develop Indian version of Sophia, named Rashmi. The humanoid robot Rashmi can speak Hindi, Marathi, Bhojpuri and English.

1.3 Applications of humanoid robots

With the advancement humanoid robot have come a long way in last few years from cleaning houses to cooking meals they

can perform any task like human. According to new research almost two third (60%) of British people believe there will be robot in every home within next 50 years.

The numbers of robotic fields are uncatchable

In various domains it is use and will be used:

- **Healthcare Robotics:** Robotics used in the context of patient monitoring, medical supplies delivery and assisting healthcare professions in unique capabilities as well as collaborative robot and robotics use for prevention[12,13,14].
- **Medical and Surgery Robotics:** Devices use Leonardo Da Vinci in medicals or hospital mostly for assisting surgery since they allow great precision and minimum invasive procedure [15,16].
- **Humanoids combine artificial intelligence and machine learning technologies to give robot human-like experience and reaction [17].**
- **Industrial:** Arm, grippers and all of the warehouses robotics used for automation off industrial processes.

They are both used for saving money and speed up the production[18]. Leonardo Da Vinci

Housekeeping: Floors, gardens, pools and all the robot cleaners[19].

Humanoid robot research is mainly focused towards making it more human like principle rather than human like outer design.

The humanoid robot differ mainly due to balanced body for example the legs of a humanoid can be articulated with dual foot planner surface this is because it tries to mimic the biological foot movement.

The following approaches can be done with an overall body of humanoid consequently all the mentioned approaches are still in there development stages and have yet to be finalized.

Educational robot can be made to be used as a tool to make the students more motivated and interested. The Nao robot was basically created for educational purpose for the students to interact more robots can be programmed to do tasks. It has been used as a tour guide for laboratories.



2. Advantages of Humanoid Robot:

- Humanoid robots are able to do many things that the people can do and even things that the people are unable to do.
- Having these robots can make the companies more efficient in their work.
- Robots don't get distracted or need to take breaks.
- Robots can work in iron industries where human cannot sustain because of abundant amount of heat .



: Disadvantages of Humanoid Robot:

- People are having one worry about humanoid robots is that they will replace jobs.
- Another disadvantage to robots could be the price, depending on how advanced the robot is.
- If we begin to replace the humans in every field, They will lead to unemployment.
- The robots can store large amounts of data but the storage, access, retrieval is not as effective as human brain.

3. CONCLUSION

In this paper we tried to summarize and analyse which are the most profitable and promising branches and where to look for

new horizons. I would like to conclude by asking that Are we ready to move towards personal robotics, and what might be the first step? A possible answer to this question might be given through the analysis of the human-like characteristics a personal robot must possess human-like motion, human-like intelligence, and human-like communication. Such a challenging goal requires coordinated and integrated research efforts that span over a wide range of disciplines such as system theory, control theory ,artificial intelligence, material science, mechanics, and even biomechanics and neuroscience. Thus, the research is risky, but the target is challenging and promising.

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A humanoid may be defined as something that resembles or look likes a human and having characteristics like opposable thumb, ability to walk in upright position, etc. Androids are humanoid robots built to resemble a male human and Gynoids are humanoid robots built to resemble a human female.

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