Robotics Principles, Technologies and Real-World Applications

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Abstract: The robots are used instead of human being to perform a particular task. It is inbuilt with some intelligence called artificial intelligence. Technology and engineering are involved in building a robot thus, making the field of robotics a highly interdisciplinary area of specialization. Robots are specialized mainly in Mechatronics engineering (combination of electronically and Mechanical engineering). Computer engineering. Manufacture engineering, Material technology. To in build intelligence into a robot a powerful Computer with artificial intelligence, artificial neutral network and genetic Algorithm set care involved.

The work presented here oriented in this direction. It proposes the introduction of basics of robots. The primary contribution of this work is in the area of representation and conceptualizations for modern robots like Mobile robot, Industrial robot, Service robot, Military robot, Telerobots, Medicinal robots, Space robots, BEAM robots, Humanoid robot, Micro robots.

Keywords: Robotics, Sensors, Humanoid Robots, End effectors

I. INTRODUCTION

Robotics is a branch of technology that deals with the design constructions; operations and application of robots. Robots are the physical that performs the task by manipulating the physical world. They are setup with sensors to make out their environment and effectors to insist physical forces on it. Robots are needed because of its speed, accuracy. Robots can work in dangerous temperatures and can do repetitive task. Robots have character of movement, energy, intelligence.

II. HISTORY

The word "Robot" is derived from Czech word Robot which means forced work or compulsory service. It was firstly used by Czech Play Wright Karel Capek in 1918 in his short story and again same concept was used in 1920 for the title R.U.R. which stood for RASSUM'S UNIVERSAL ROBOTS.

The first industrial robot "UNIMATE" in 1954 and it was designed by George Devol which was call as Universal Automation and this became first Robot Company (1962). The first human robot "ELEKTRO" which was designed by Westinghouse in 1937 that could walk, talk and smoke. The first space robot NASA'S Pathfinder landed on Mars. The wheeled Robotic rover sent images and data about Mars back to Earth.

The term Robotics was coined by Russian born American Scientist and writer Isaac Asimov

With Robot reality and intelligence robot a likely prospect a better understanding of interaction between robots and human are embodied in such as modern films as Spielberg's A.J(movie in 2001), Proyas I robot (2004) and Shankar's Robo (2010) and Robo 2.0(2018).

III. THE LAWS OF ROBOTICS:

It was proposed by author and scientist Isaac Asimov in 1940

First Law:

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

Second law:

A robot must obey orders given it by human beings except where such orders. would conflict with the first law.

Third law

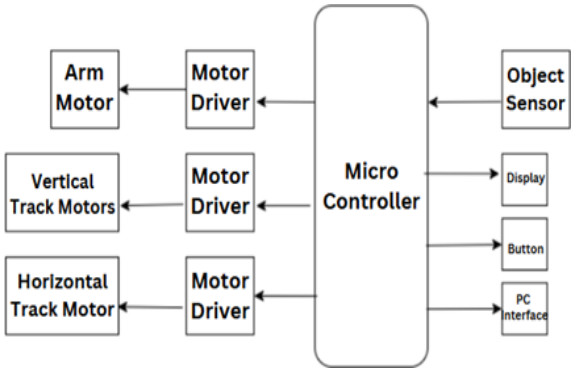
A robot must protect its own. existence as long as protection does not conflict with the first or second law.

Asimov's reversed law of robotics (1985);

Zeroth law:

A robot may not injure humanity. or, through inaction allow humanity to come to harm

IV. ROBOTIC HARDWARE



Sensors:

These are the sub area of robot intended to give sensing capabilities so that robots are more humanlike. The different sensors in robots are:

Light sensor, Proximity sensors, Sound sensors, Temperature sensors, Acceleration sensors are the types of sensors in robots. The sensors in robots are based on function of human sensory organ.

End Effectors:

These are devices that attaches to the wrist of the robot arm. And it enables robots to perform particular task. The major effectors are Grippers which are used to grasp and manipulates objects. These are the tools to perform a process like spot welding spray painting.

Robot Power Generation:

The three important things of power generation circuit of robot should do are:

1. Regulate at set voltage.
2. Supply a minimum required amount of power.

Robot Software:

The minimum specification is a pc with Intel® Core™ i5- 8250U CPU @ 1.60GHz 1.80GHz, 8.00GB RAM, 2TB free HD space. Advance graphics performance using a standard 3D graphics card with hardware support of OpenGL. OpenG specification describes and abstract for drawing 2D and 3D graphics. Robots are controlled by programming languages such as C, BASIC. Assembler, or SBASIC.

V. WORKING OF ROBOTS

Robots are not directly controlled by human but it includes feedback-driven connection between sense and action takes electromagnetic motors or effectors to move up open or close gripes.

The step-by-step control is provided program by computer run on microcontroller (embedded computer).

VI. MODERN ROBOT

Mobile Robot:

This robot resembles human body. These humanoid robots have torso with head, two arms and two legs. The first robotic citizenis "Sophia" which was developed by Hong Kong based company Hanson robotics.

VII. CONCLUSION

There are many applications on robots in today's generation like in industrial purpose, military purpose and medicinal purpose also on. There are many research university associated in the field of robotics which aids in bringing an improvement in the present technologies, and then we can expect new ways of using robots. which will bring new hopes and new potentials. So robots can be used in better way in today's generation.

REFERENCE

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