Life inside the Robot

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I. INTRODUCTION

I. Hundreds of years ago the human race, using simple tools, accomplished dangerous, unpleasant, and repetitive tasks. Then throughout history we see humans discovering ways to make jobs easier and more lucrative through the use of machines. With the beginning of industrialization, large machines were being used in factories. The machine helped the person using it have more work done in less amount of time. They also didn't have to hire workers to do the dangerous, cumbersome and tedious work. There are certain tasks robots can accomplish quickly and consistently such as assembling products, handling dangerous materials, inspecting parts, cutting and polishing. Robots have also become a very important part of the military in missions that a soldier could possibly lose his life partaking in.

II. In today's world, machines have become a very important part of the economy. Nowadays businesses need a work force that is efficient in order to keep up with its' competition. Installing robots is often a way business owners can be more competitive, because robots can do some things more efficiently than people. For example A Robot can work around the clock every day without pay, never need a sick day, and are reliable. They are multi-functional machines that can handle a variety of tasks simultaneously.

II. BACKROUND

I. A robot is defined as “a programmable, multi-functional manipulator designed to move materials, parts, or specialized devices through variable programmed motions for the performance of a variety of tasks”. There are several unique characteristics of a robot. A robot can be programmed to perform a particular task. If this task is to be completed a human has to use his reason by thinking through the entire sequence of motions and operations, and then write a program that will allow the robot to carry out those motions. A robot can perform multiple tasks at a given time and is able to remain multi-functional. This basically means that when a robot is finished with one task it can be programmed to work on something else. Robots are devices that imitate human manipulation. This means that a robot can be adjusted and remain flexible to meet a persons special need. Robots are built by people, programmed by people, and maintained by people; therefore, they are what people make them.

III. ARTIFICIAL INTELLIGENCE

I. The term “Artificial Intelligence” is defined as “both the intelligence of machines and the branch of computer science which aims to create it.” It is the study of how to make

machines do things more productively than humans do. gather data and then compare the sensate inputs with expectations that are embedded in its world model. Therefore the effectiveness of the robot is limited by the accuracy to which its programming models the real world. Artificial intelligence is now getting to the point to where the Robot is almost able to program itself.

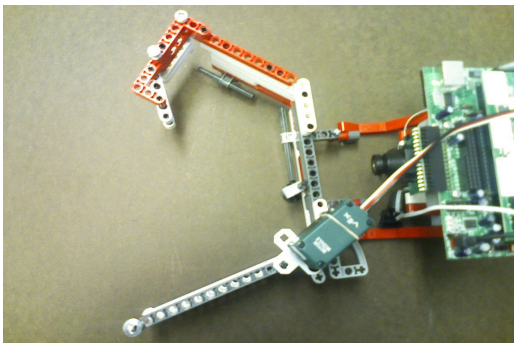
IV. PARTS OF A ROBOT

I. Control :-

I. A robot connects to a computer, which acts as a control of the controller.. A robot needs to be programmed and the program has be loaded with these programs onto the controller. The controller functions as the "brain" of the robot. The controller can also network to other systems, so that the robot may work together with other machines, processes, or robots. Given that the robot arm movement is appropriate to its application, that the arm strength and rigidity meet the payload needs and that servo drives provide the necessary speed of response and resolution, a robot controller is required to manage the arm articulations, its end effector, and the interface with the workplace.

II. Arms :-

I. The robot arm comes in all shapes and sizes and is the single most important part in robotic architecture. . Many (but not all) resemble human arms, and have shoulders, elbows, wrists, even fingers. There are many different ways and styles to a robots arm. This arm gives the robot a multitude of positions for use in its environment and options for moving. In order to reach any possible point in space within reason, a robot needs a total of 6 degrees of freedom. Each direction a joint can go gives an arm 1 degree of freedom. So, a simple robot arm with 3 degrees of freedom could move in 3 ways: up and down, left and right, forward and backward. As a result, many robots of today are designed to move with at least 6 degrees of freedom. The jointed-arm robot has six degrees of freedom, which enable it to perform jobs that require versatility and dexterity.



III. Drives and Actuators :-

I. The drive is the "engine" that drives the links (the sections between the joints) into their desired position. Without a drive, a robot would just sit there, which is not helpful. Most drives are powered by air (pneumatic control), water pressure (hydraulic control) and

electricity. Most actuators use electromagnetic motors and gears but there have been frequent uses other forms of actuation including "muscle-wires" and Radio Control servos. To get a motor under computer control, different motor and actuator types are used. Some of the motor types are Synchronous, Stepper, AC servo, Brushless DC servo, and Brushed DC servo. Radio Control servos are light, rugged, cheap and fairly easy to interface. Some of the units can provide very high torque speed. A Radio Control servo can be controlled from a parallel port. With one of the PC's internal timers cranked up, it is possible to control eight servos from a common parallel port with nothing but a simple interrupt service routine and a cable.

IV. Sensory Perception :-

I. The sensor sends information as electronic signals back to the controller. Sensors also give the controller information about its surroundings and let it know the exact position of the arm and the state of the world around it. Sight, sound, touch, taste, and smell are the kinds of information we get from our world. Robots can be designed and programmed to get specific information that is beyond what our 5 senses can tell us. For instance, a robot sensor might see in the dark, detect tiny amounts of invisible radiation or measure movement that is too small or too fast for the human eye to perceive. The critical senses for robots are seeing and feeling, also known as vision and tactility in robotics jargon. Television cameras can be used to sense patterns of light and dark just as the human eye does, but the analysis of such data is extremely complex. Likewise, it is easy for robots to hear but difficult for them to understand. Voice recognition is already practical for limited voice commands. The last two human senses, smell and taste, have little utility for robots.

V. TYPES OF ROBOTS

I. Mobile Robots

I. Majority of all mobile robots in use are Automated Guided Vehicle(AGV's). They are common in factory automation and usually consist of mobile platforms for transporting goods and materials within factories.

II. Manipulator robots

I. Manipulator robots(robotic arms) in use, the jointed-arm robots, mimic the human arm capability. They have increased factory production as well as quality control.

III. "House" robots

I. The small robots in our homes are mostly robots in which they may be built at home for several hundred dollars. A majority of the small robots are sold in construction kits which have the capability to run on the desktop. Now we are starting to see household cleaning robots called roomba's which can be dissembled and programmed to do almost anything.

IV. Entertainment robots

I. The entertainment industry is seen as a potentially lucrative and large market for interactive robotic systems ranging from theme park venues to retail attractions and museum events. The robots that entertain us in the movies are remotely controlled

devices using conventional servo and actuation technology, perhaps enhanced with some teach playback capability.

VI. FUTURE OF ROBOTICS

I. As of about ten years ago 9 out of 10 robots were being bought by auto companies, but now, robots are finding their way into warehouses, laboratories, , energy plants, hospitals, even outer space. Robots are likely to become more significant in several industries and can be expected to enter smaller industries in the future. There are now over 400,000 robots working in conventional factories. factories. Robots are used in many other countries. As robots become more common, and less expensive to make, they will continue to increase their numbers in the workforce. Naturally, this is a matter of concern for factory workers, who may see their positions filled by robotic systems.

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