

Motorized PC Control Pick and Place Robot Using Wireless Technology

M.Pushpavathi ¹, P.Giribabu ², K Mohan Krishna³

¹ PG Scholar, Mechanical Engineering, Chadalawada Ramanamma Engineering college of Engineering, Tirupati, Andhra Pradesh, India

² Asst.Professor, Mechanical Engineering, Chadalawada Ramanamma Engineering college of Engineering, Tirupati, Andhra Pradesh, India

³ Asst.Professor, Mechanical Engineering, Chadalawada Ramanamma Engineering college of Engineering, Tirupati, Andhra Pradesh, India

Abstract-Robot is a key part in automating the versatile gathering system that one fundamentally looked for after these days. Robots are in the blink of an eye more than a machine, as robots have transformed into the course of action without limits as cost work pay and customers' advantage. Regardless of the way that the cost of getting mechanical system is genuinely extravagant yet as today's quick headway and a claim in quality with ISO (International Standard Organization) benchmarks, human are not any more prepared for such demands. Imaginative work of Suture robots is movingly at an extraordinarily speedy once in view of the continually upgrading and overhauling of the quality measures of things. Robot and computerization is used with a particular deciding objective to supplant human to perform those errands that are typical. Risky dull. Besides in a risky domain. In a universe of bleeding edge advancement today. Motorization remarkably extends creation limit. Upgrade thing quality and lower decreasing cost. There's nothing more required than several people to program or screen the PC.

Keywords – Mobile Robots, Communication, Zigbee, microcontroller, L293D Motor Driver.

1. Introduction

A robot is an automatic or virtually perspicacious agent that can carry out tasks robotically or with some supervision, typically with the avail of a remote control. In practice, a robot is customarily an electro-mechanical machine that is guided by denotes of computer and electronic programming. Robots can be autonomous, semi-autonomous or remotely controlled. Robots are utilized within an increasingly wide variety of tasks such as for household appliances like vacuuming floors, mowing lawns, cleaning drains, building cars, in warfare, and in tasks that are too extravagant or too hazardous to be performed through humans such as exploring outer space or at the bottom of the sea. The wireless

communication technologies area unit speedily spreading to several new areas, together with the automation and therefore the importance of the utilization of wireless technologies within the information acquisition, building management, watching systems and automation of producing processes can grow. Intelligent mobile robots and cooperative multi agent robotic systems are often terribly economical tools to hurry up search and analysis.

The robot arm for this last develop is the revolute sort that about takes after the human arm. The arm's rotating base is controlled by a singular significant scale servo that turns the stragglng leftovers of the arm in a half-circle (180 degree) roundabout portion. Mounted to the base is a tallness joint, or shoulder, that can move the arm through 180 degrees, from even to vertical on every one side. The shoulder uses two colossal scale servos, chipping in to give the torque anticipated that would lift the stragglng leftovers of the arm, furthermore any article that it may understand. Joined to the shoulder piece is an elbow that can go through 180 degrees, similarly controlled by an immense scale servo. The wrist is embodied three standard servos and can go through 180 degrees, from a straight position to backtrack, furthermore rotating the gripper clockwise and counterclockwise. Joined with the wrist is a three-fingered gripper that uses a stand-out diagram produced around a single standard servo. The revolute geometry allows the robot arm to accomplish any point inside a half-circle, having the condition of an irritated dish. The compass of the half-hover should be the length of the arm when its shoulder, elbow, and wrist are rectified.

2. Existing Methods

2.1. RF controller Robot:

Radio frequency controlled robotic vehicle is designed using a robotic vehicle that is interfaced with radio frequency remote control. RF transmitter is used by control panel or controlling person and RF receiver is connected to the robotic vehicle that is to be controlled

remotely. Radio frequency remote control works over an adequate range (up to 20 meters) by facilitating with proper antenna.

The above existing technology is limited distance and requires line of sight.

2.2. RFID controller Robot:

Mobile robot navigation technique using a customized RFID reader with two receiving antennas mounted on the robot and a number of standard RFID tags attached in the robot's environment to define its path. The paper deals to design for skilled navigation in mobile robotic usually requires solving two problems pertaining to the knowledge of the position of the robot, and to a motion control strategy. When no prior knowledge of the environment is available, the problem becomes even more challenging since the robot has to build a map of its surroundings as it moves. These three tasks ought to be solved in conjunction due to their interdependency. In here, we show that using the RF signal from the RFID tags as an analogy feedback signals can be a promising strategy to navigate a mobile robot within an unknown or uncertain indoor environment.

The above existing technology is applicable indoor and very short distance between transmitter and receiver.

2.3. DTMF Controlled Robot:

Cell phone operated Robot is a Robot whose movement can be controlled by pressing the number of cell phone. The robot can move forward, backward, right or left which depends on the numbers you are pressing. The property of Robot to operate by the cell phone helps you to operate the robot from some distance. The Cell Phone controlled Robot uses DTMF (Dual tone-multi frequency) module. It is capable of receiving a set of command (instructions) in the form of DTMF (Dual tone multiple frequency) tones and performs the necessary actions. The robot is controlled by making call to the mobile connected to the robot. The robot performs various operations like moving forward, backward etc. if any key is pressed in the course of the call, by hearing at the other end of the call (i.e. at the mobile connected to the robot). Each key corresponds to a particular frequency which is decoded by the DTMF decoder & processed by logic circuit by giving each key a particular operation like moving forward, backward, right, left etc. The benefit is that we can operate the robot by using any mobile with the working range as large as the coverage area of the service provider.

The above existing technology is depends upon the signal availability and paid service.

2.4. Bluetooth Controlled Robot:

Bluetooth is an open standard specification for a radio frequency (RF)-based, short-range connectivity technology that promises to change the face of computing and wireless communication. It is designed to be an inexpensive, wireless networking system for all classes of portable devices, such as laptops, PDAs (personal digital assistants), and mobile phones. It also will enable wireless connections for desktop computers, making connections between monitors, printers, keyboards, and the CPU cable-free.

The controlling device of the whole system is a Microcontroller. Bluetooth module, DC motors are interfaced to the Microcontroller. The data received by the Bluetooth module from Android smart phone is fed as input to the controller. The controller acts accordingly on the DC motors of the Robot.

The above existing technology is limited distance and very short distance to control.

2.5. SMS Controlled Robot:

GSM controlled robot or SMS controlled robot is a wireless robot which performs the necessary actions by receiving a set of instructions in the form a Short Message Service (SMS).

Mainly consists of 2 sections, one is mobile unit and the other one is robot unit. The GSM modem which is fixed at the robot receives the messages sent by the mobile and gives the instructions to the microcontroller to control the robot directions.

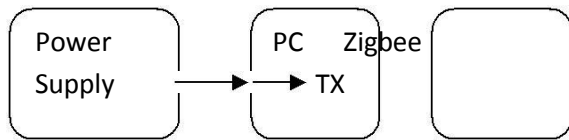
GSM (SMS) Controlled Wireless Robot" is automatic robots which capable of receiving a set of command instructions in the form of Short message service and performs the necessary actions. We will be using a dedicated modem/mobile at the receiver module i.e. with the robot itself and send the commands using SMS service as per the required actions.

The mobile unit which is dedicated at the robot is interfaced with an intellectual device called Micro controller so that it takes the responsibility of reading the received commands in the form of SMS from the mobile unit and perform the corresponding predefined tasks such as move front or back, left or right etc. The micro controller is also interfaced with few DC motors in order to move the robot in different directions. The ON and OFF of the DC motors depends on the direction it has to move which is the complete responsibility of the controller to take those intelligent decisions.

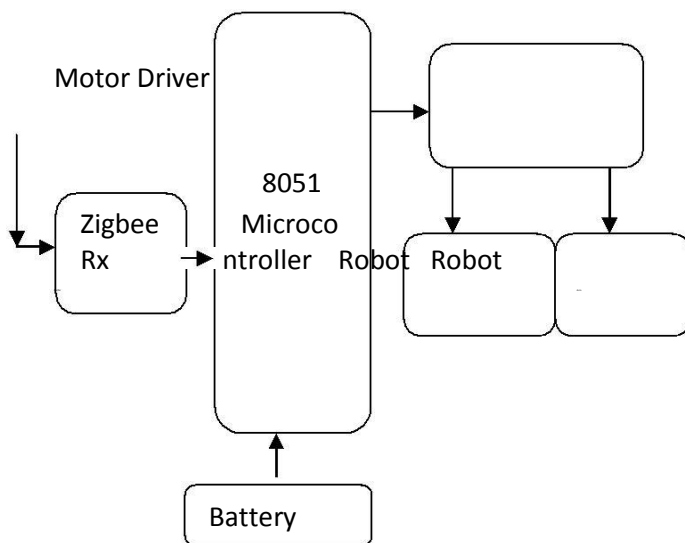
The above existing technology is depends upon the signal availability and paid service.

3. Design of the Pick and Place Robot

Transmitter:



Receiver:



4. Microcontroller

The Intel MCS-52 (ordinarily alluded to as 8051) is a Harvard structural engineering, CISC guideline set, single chip microcontroller (μC) arrangement which was created by Intel in 1980 for utilization in implanted frameworks.

The Intel 8052 microcontroller is a standout amongst the most well known universally useful microcontrollers being used today. The achievement of the Intel 8051 brought forth various clones which are on the whole alluded to as the MCS-52 group of microcontrollers, which incorporates chips from sellers, for example, Atmel, Philips, Infineon, and Texas Instruments.

The Intel 8051 is an 8-bit microcontroller which means that most available operations are limited to 8 bits. There are 3 basic "sizes" of the 8051: Short, Standard, and Extended. The Short and Standard chips are often available in DIP (dual in-line package) form, but the Extended 8051 models often have a different form factor, and are not "drop-in compatible". All these things are called 8051 because they can all be

programmed using 8051 assembly language, and they all share certain features (although the different models all have their own special features). Some of the features that have made the 8051 popular are:

- 8 KB on chip program memory.
- 256 bytes on chip data memory(RAM) [32 bank reg + 16 bit addressable reg + 80 general purpose reg]
- 4 reg banks.
- 128 user defined software flags.
- 8-bit data bus
- 16-bit address bus
- 16 bit timers (usually 2, but may have more, or less).
- 3 internal and 2 external interrupts.
- Bit as well as byte addressable RAM area of 16 bytes.
- Four 8-bit ports, (short models have two 8-bit ports).
- 16-bit program counter and data pointer.
- 1 Microsecond instruction cycle with 12 MHz Crystal.

5.,Zigbee technology

In telecommunication and computer science, **serial communication** is the process of sending data one bit at a time, sequentially, over a **communication** channel or computer bus. This is in contrast to **parallel communication**, where several bits are sent as a whole, on a link with several parallel channels.

ZigBee is a specification for a suite of high-level communication protocols used to create personal area networks built from small, low-power digital radios. ZigBee is based on an IEEE 802.15.4 standard.

6. Motor Driver

A motor driver is a little current amplifier; the function of motor drivers is to take a low-current control signal and then turn it into a higher-current signal that can drive a motor.

It works on the concept of H-bridge. H-bridge is a circuit which allows the voltage to be flown in either direction. As you know voltage need to change its direction for being able to rotate the motor in clockwise or anticlockwise direction, hence H-bridge IC are ideal for driving a DC motor. In a single l293d chip there two h-Bridge circuit inside the IC which can rotate two dc motor independently. Due its size it is very much used in robotic application for controlling DC motors.

7. Result

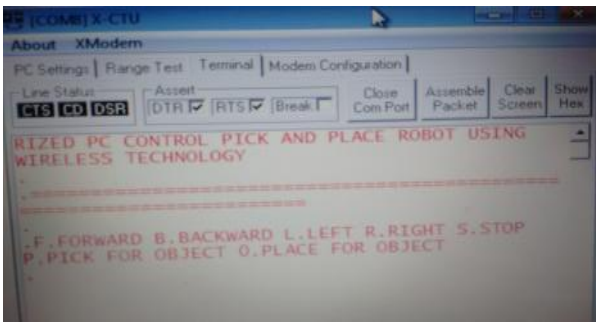


Fig 1:PC Controlled Robot

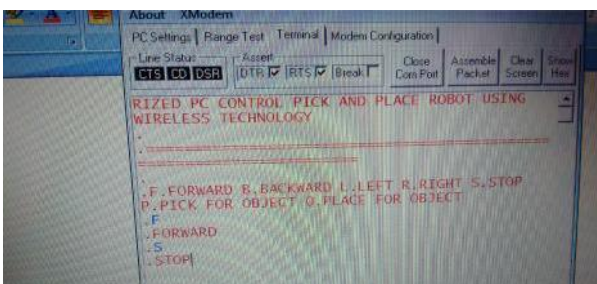


Fig 2:Forward Controlled Robot

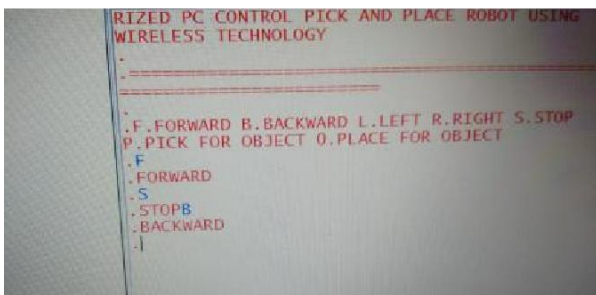


Fig 3:Backward Controlled Robot

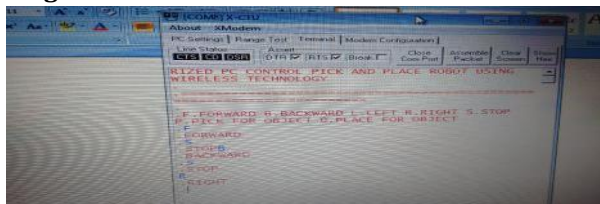


Fig 4:Right Controlled Robot

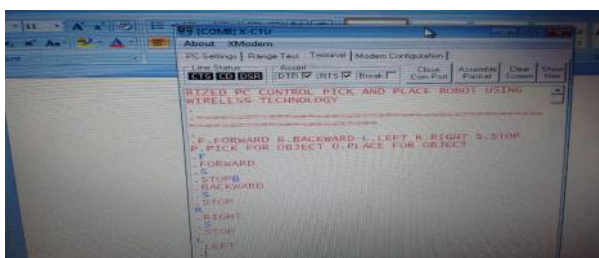


Fig 5:Left Controlled Robot

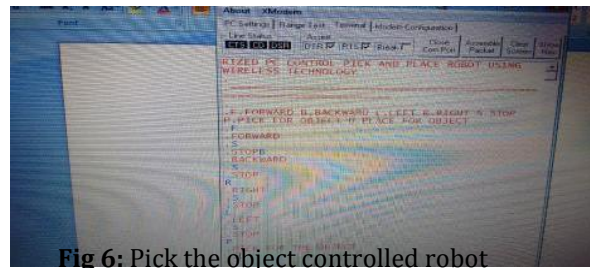
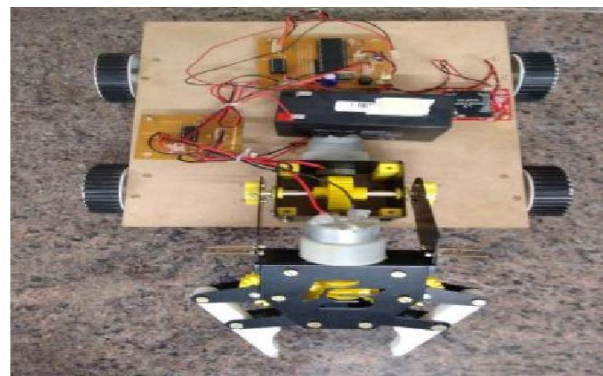


Fig 6: Pick the object controlled robot



Fig 7:Place The Object Controlled Robot

6. Practical Design Of Pick and Place Robot



8.CONCLUSION

This paper has undergone various aspects to design a robotic arm based on the technology considering various aspects of it, and the basic of machine designing are observed that are explained clearly. These robots have a wide range of industrial and medical applications such as pick and place robots, surgical robots etc. They can be employed in places where precision and accuracy are required. Robots can also be employed where human hand cannot penetrate. The screenshot shows the designed robot and its functionality. It is clearly shown that the robotic arm is designed every efficiently and that the designed robotic arm is capable to lift the objects of medium weight.

9.FUTURE SCOPE

The robotic arm so far designed is able to lift the objects. It is able to lift the objects of medium weight. In order to extend it to some extent, more advanced tools and material with the capacity to withhold the heavy weight objects are to be used, which is then applicable in warfront and used as a rescuer at several places where there is a need and also in industrial areas, military, and so on

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