IOT Controlled Robotic Arm

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Abstract: **The ongoing revolution of Internet, together With the growing robotics in many activities of everyday life. Internet of things has taken over all the heavy loads from human to itself. Internet of Things (IOT)is basically a connection of many devices to interconnect themselves. Proposes a method for controlling a robotic arm using an open source web application. It is controlled by using mobile application and for continuous monitoring and observing by the user we use IP web cam application. And servomotor analysis are inbuilt in this project. In this method we use embedded C language for coding and debugging in arduino by using ISP programmer. Arduino-IDE tool. And for controlling we use L293D driver IC. Finding this robot is a reprogrammable, multifunctional manipulator designed to move or pick and place the materials, Parts and tools. These robots are not only used for lifting purpose but also for polishing, sealing, Machine handling and minor surgeries also.**

Index Terms: MIT, L293D driver IC, ISP programmer, Arduino-IDE tool.

1. INTRODUCTION

When we talk about robots, people tend to think that robots are only suitable to use in the industry or just for the scientist to test about new technologies. The main function of robot is to help humans in doing either in industries or just helping normal household chores [1].

For the people who are indulged in electronics either has a hobby or as a profession who kind off happens to have more interest in robotics this project is the key in which most of the precise [2], work which humans cannot be repeatedly, this is where a robotic armor we can say a pick n place robot comes into picture [3].

Robotics is the branch of mechanical engineering, Electrical engineering and computer science that deals with
The design, construction, operation, and application
Of robots, as well as computer systems for their control,
Sensory feedback and information processing [4-5]. A robotic Arm is a type of mechanical arm, usually programmable, with. Similar functions to a human arm; the arm may be the sum [6] .Total of the mechanism or may be part of a more
Complex robot.
The internet of things(IOT) is the network of physical devices, vehicles, buildings and other items embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data[7-9] .The IOT allows objects to be sensed and controlled remotely across existing network infrastructure, creating

opportunities for more direct integration of the physical world into computer based systems, and resulting in improved efficiency, accuracy and economic benefit[10-12] .The popular concept of a robot is of a machine that looks and works like a human being. The pick and place robot is a micro controller based mechatronic system that detects the object ,picks that object from source location, android object detection application is been developed by using programming codes[13-15].

2. PROPOSED MODEL

The automatic mode robot is programmed within the embedded C Programming and it makes the robot to act as human beings. This version of robot is mainly defined by the factor named Artificial Intelligence. The fig block diagram gives an idea of how the robot works. It shows how the system circuit works and how the current flow goes through it. The wireless communication used is WI-FI which helps in transferring the data and messages
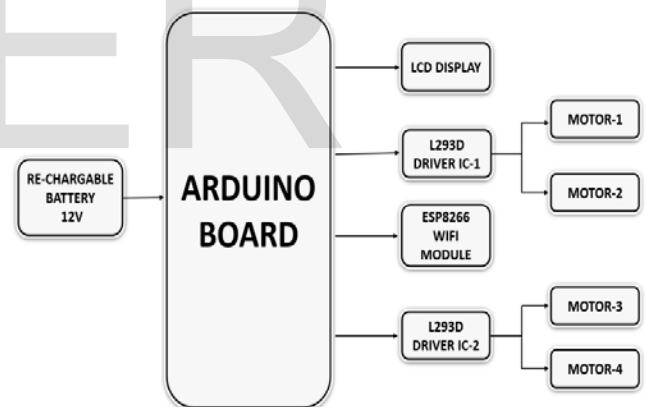

Fig1: Block diagram of IOT control Robotic Arm

In the block diagram consisting of the main parts of arduino, drivers, wifi modules and power supply. Arduino is the main part of the project. Its plays the one of the important role in the project. First battery is used to power the Arduino Uno and other is used to power the motor. The regulated 5V supply for rest of the circuit is provided by 7805 Regulator.LED on the board indicates the presence of power supply. Motor H-bridge is used to drive two-motors which work on 9V dc batteries. DC motors are interfaced to the Arduino-Uno. The data received by the WI-FI module from Android smart phone is fed as input to the ATMEGA328 MICROCONTROLLER. The robotic arm moves left,right, forward, backward and pick and place. An application run on a network, when it will send data to a device or another process using the TCP protocol, Each process is associated with TCP will have a IP address and port.

Fig2: Arduino-Uno

Arduino:

Uno is a microcontroller board based on ATMEGA328P.It has 14 digital input, output pins,6 analog input,16 MHZ quartz crystal, a USB connection, a Power jack, an ICSP header and a reset button.

It consists of both a Physical programmable circuit board and a piece of software, or IDE that runs on your computer, used to write and upload computer code to physical world. The arduino consisting of number of capacitors, thyristors, crystal oscillators, USB cable, power supply and analog, digital pins.

L293D driver IC:

It is a 16 pin IC with eight pins on each side dedicated to the controlling of motor. It works on the concept of H-bridge concept..It is a circuit which allows the voltage to be flow in Either direction..It is allowable for only two motors for one.

Fig3: L293D driver IC

Pin 2 INPUT	Pin 7 VCC	state
1	0	Clock-wise
0	1	Anti-clockwise
0	0	HI-impedance
1	1	NO-rotation

Table1. Logic table for L293D Driver IC

LCD DISPLAY:

It is a combination of two states of matter solid and liquid. It is used as a liquid crystal to produce a visible image. It is mainly composed of two polarized panel filters and electrodes. It is either made up of an active matrix or passive display grid. It works on the principle of blocking light. When electric current is LC molecule it causes angle of light passing through polarized glass that particular area will become dark. When there is no current then light passes through front of LCD it will be reflected by mirror and bounces back.

The section presents that essential components include-

ing, advanced robotic systems, additional sensor/actuator based devices, resource constrained but appropriate processing units, and existing cloud supported robotic platforms, maybe accumulated to develop the Internet of Robotics Things.
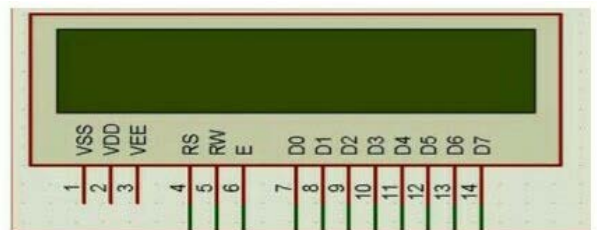

Fig4: LCD display

As Internet of Things and cloud assisted robotics establishes

the foundation of Internet of Robotics Things, it is predicted

that Internet of Robotics Things shall arise in a novel formation of robotic world. As of others, the proposed architecture of Internet of Robotics Things is no longer void of worries.

The important challenges that may resist its path to grow are elaborated in the next section.

Fig5: Hardware components used in robotic arm

3. PARTS USED TO MAKE AN ARM:

DC MOTOR:-

These motors can rotate in both directions depending upon the polarity of the current through the motor. These motors have free running torque and ideally zero current.

GRIPPER ARM:

It is the start of the robotic arm. It can be used for 'pick

and place 'the objects. It is the main part of the arm.

LIFTER ASSEMBLY:

It is made from laser cut metal and acrylic..There is a worm gear and spur gear assembly. It is connected to the dc gear motor.

TRACK WHEEL:

It is a circular wheel with rubber grip fastened on DC motor shaft by screw.

WORM DRIVE:

It is gear arrangement in which a worm meshes with a worm gear.

CHASIS:

It consists of an internal framework that supports a manmade object in its construction and use. It is an under part of a motor vehicle.

POWER SUPPLY:

To provide energy to DC motors for movement of robot a battery of 6v-12v is used.

SOFTWARE COMPONENTS:
ISP PROGRAMMER:

It is also called in-circuit programming. It is the ability of some programmable logic devices, microcontrollers and other embedded devices to be programmed while installed in a complete system, rather than requiring the chip to be programmed while Installed in a complete system, rather than requiring the chip to be programmed prior to installing it into the system.

4. RESULTS & DISCUSSION:

Fig 6. Represents the controlling of the robot arm by using mobile application by giving commands from that applications.
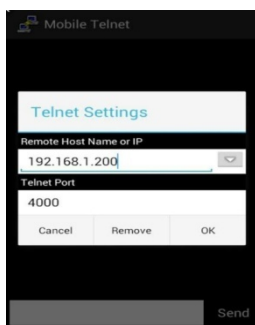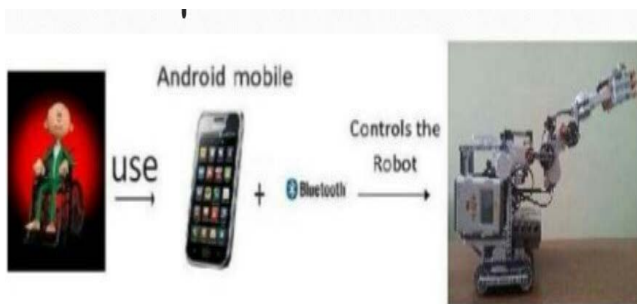

Fig6: Smart Phone acts as a remote

This mobile application is a open source application. It was made by Google and is maintained by MIT .This allows new comers to computer programming to create software applications for android OS.

APP INVENTOR is a free ,cloud-based service that allows you to make your own-mobile apps using a blocks based programming language .You access app inventor using a web browser(Chrome, Firefox, Safari).It required a EPA CHICA SQUAD'S story about using code to improve their local community they actually used app inventor to develop their mobile app.

5. CIRCUIT DIAGRAM:

The Fig 7: represents the basic circuit diagram of the project. The circuit consisting of the entire pin connection of the project.
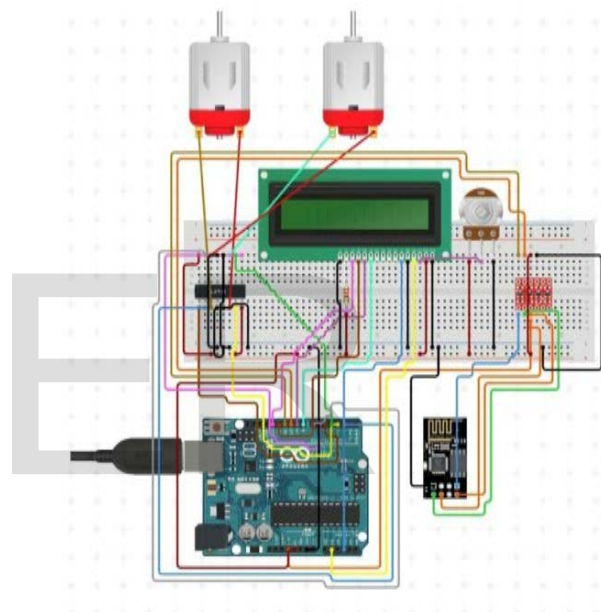

Fig7: Circuit diagram

The l293d driver IC pins 1, 2 are connected to power supply, And 4,5,6,7 pins are connected to the arduino Uno pins 2,3,4,5 pins .Two l293dmotors are used in same format connections. And 8 pin of both motor are connected to wifi module. In this we are giving 12 volts power supply to the ardiuno undo. By using 7805 regulator the given supply voltage is reduced and it is given to the two driver IC's and LCD display. And the wifi module requires 12volts power supply to provide wifi host. The first important thing to remember is that we will be programming the Arduino and it is responsible for configuring the ESP8266 Module through Serial Communication and also controlling the L293D Motor Driver Module. Software Serial Library is used to allow serial communication on pin 2 and 3 of Arduino. . Input pins of motor driver IC are directly connected to pin 8, 9, 10 and 11 of Arduino. And DC motors are connected at its output pins. Here we have used 12 Volt batteries for driving the Circuit and DC motors.

Fig8: Representing robotic arm

In this robotic arm we are going to use servomotors gives good accuracy than any other motors. It is a combination of mechanical, electrical engineering. The Robotic arm can be controlled by the app consists of options in main screen seen in smart Phone acts as a remote whether to use the accelerometer or to use the buttons to control the Robotic arm.. WI-FI device has a MAC address. When a particular MAC i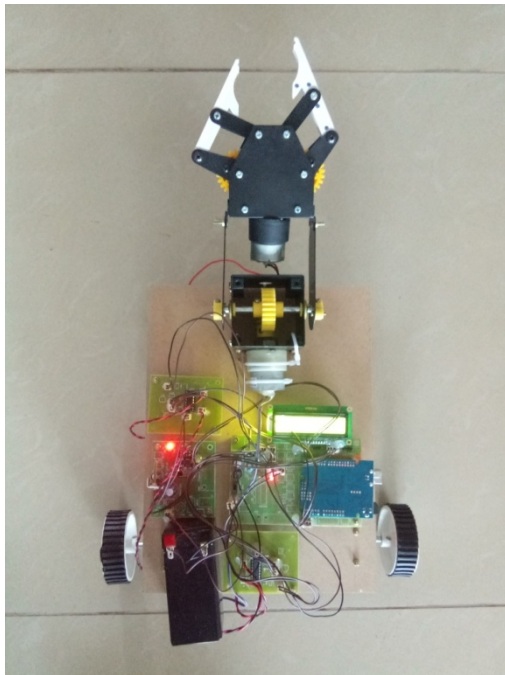s selected, the status is connected and shows on the screen. The primary advantage of this feature is that it allows manufacturer of electronic devices to integrate programming and it save money.

Fig9: Picking an object using robotic arm

Actually the gripper is the start of the Robotic arm. It is designed to perform any desired tasks such as welding, gripping, Spinning etc depends on application.

Besides it might be difficult or dangerous to humans to do some specific task like picking up explosive

chemicals and diffusing bombs. Where the work is done by Robotic arm.

The connection of mobile robot with the help of programs an internet connection is established between the robot and user. The Robotic arm can be controlled by the app consists of options in main screen seen in smart Phone acts as a remote whether to use the accelerometer or to use the buttons to control the Robotic arm.. WI-FI device has a MAC address . when a particular MAC is selected ,the status is connected and shows on the screen.

Fig10: Carrying an object

Usually the transfer process of heavy material is being carried out, using man power and if the transfer process is repeated for a period of time. By using robot to bent and lift up heavy loads thus preventing Injuries and increases the efficiency of work .It reduce the human man power. **For** material handling and debarring Using as a Industrial robot and welding purposes. For spraying and palletization.

For automated assembly Operations like flexible and bowl feeding and part sortation. Packing syringes, meat, modules, memory and collecting fruits from trees.

6. CONCLUSION:

The prepared Mechanism has been successfully constrained and executed to carry out the required work of picking up the weight of the object like box and put them in to placed at different location.

This robot can be modified using some of latest techniques to make it more flexible and addition of IP cam app invented by MIT is helpful for continuous monitoring of the Robotic arm by the user. The designed dimensions length is 12Cms and it as a load bearing capacity of around 200Gms.

The pick and place robot being implemented to ease process of sorting. This can be helpful to various industrial application where machines need to be controlled from distant places.

Virtually reality concept can also be included in this implemented to explored the human accessibly region.
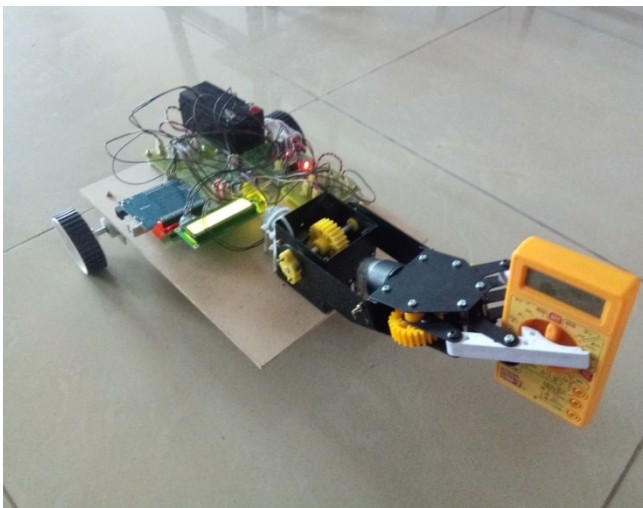
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