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Pick and Place Robotic Vehicle Using Gripper

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ABSTRACT-Robotic systems are deployed with two-wayrequest-based systems which means, User need to integrate RX receiver panel or wired system for controlling. There by precious data rate of activation is low compared to proposed system. These robotic systems are less automotive when we talk about controlling aspects. The proposed system will be dealing with Internet Protocol – IP. As a part of Internet of things IOT and it is used to control the robotics system with interface Integrated Development Environment (IDE) withmicrocontroller with high baud rate & can be controlled from any part of the world. A local web server can be created using ESP8266 Node MCU interfaced with cloud framework. and based on the control interface commands, the details are updated in the server. Node MCU will be connected to the respective network (WIFI – Internet), thereby Router will allot a unique IP address for controlling of robotic system. The extracted datasets will be linked with respected string and uploaded in the server, and by this, a direct access will be enabled in the form of IP Address, logging into the web server gives us a dashboard access and through this controlling and accessing of robotic system through IP address globally pick and place object can deploy in a local area network through active port with the help of your modem/router.

KEYWORDS: Automation, Baud rate, Domain name server, ESP8266, Integrated Development Environment, MCU, Robotics. BAT.

I. INTRODUCTION

The robotics is the study which comprises of electrical engineering, mechanical engineering and computer science that deals with design construction andoperation. Now a days customers are mainly concerned about the quality and time of delivery of products. The industries utilize advanced mechanics widely in their processes, which can work at steady speed without stopping and at last can possibly create more in more limited time than a human worker The mechanical development of robot look like skeleton of human body. In human arm the interaction will be between muscles and bones whereas in robotic arm we are using motors and gears.

The mechanical design of a controller that consists of rigid bodies connected by means of joints, is segmented into an arm that ensures mobility and reachability. And an end-effector that performs the required task. The robotic arm used here is to pick and spot robot it is one of the advancements in manufacturing industries. The pick and place robot so implemented is controlled utilizing RF signal. prototype of 4DOF robotic arm is made whose control based on IOT. The robot arm is made utilizing servomotors whose control is achieved through an android application. servo motors help to move the arm in desired direction. The commands given by the android app is received to the Wi-Fi module and accordingly it sends the signal to the respective motor.

Servo motors are DC motors whose speed is slowly lowered by gears. The servo motors usually have a transformation cut off from 90° to 180°. A few servo motors also have transformation cut-off of 360° or more.

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The ESP8266 Wi-Fi Module this acts as receiver and gives received signal to microcontroller. As the functioning voltage extent of ESP8266 is 3V to 3.6V, the board goes with a LDO voltage regulator to keep the voltage constant at 3.3VNode MCU has 17 GPIO pins control several functions like IR Remote Control, LED Light, and Button programmability.

II. LITERATURE SURVEY

[1] k. Harish, D. Megha: It comprises of an Atmega328 Microcontroller IC, four DC Motors with driver IC, two servo motors and power supply. The robotic arm placed on a moving vehicle. The vehicle can move along any type of surfaces regardless of itis smooth or rough. The pick and place robot uses fourmotors for the operation of the moving vehicle, two servo motors for the operation pick and place operation. Thepick and place arm consists of an arm assembly with ajaw, which is only able to move in up and downdirection. There are two motors for the arm assembly, one for the up and down motion and other for jaw opening and closing. For the controlling of motor, motor driver IC and Atmega328 micro controller is used. The input signal or controlling signal is given from a wireless play station, which is interfaced with the microcontroller by a RF receiver module. When the signal is sent from the play station it is decoded in the controller and proper controlling signal are sent to actuators (dc motors or servo motors) in the system.

[2] Okubanjo, A. A, Oyetola, O. K., Osifeko: The robot arm was controlled to reach and remain inside desired joint angle position through execution and simulation of PID controllers using MATLAB/Simulink. Also, the outcome revealed thatchanges in initial joint angle positions of the robot arm resulted in different desired joint angle positions,and this necessitated that the gains of the PID controllers should be changed and turned at each moment to prevent overshoot and oscillation that associated with the change in parameters values.

[3] V. Varshney, A. Kumar, T. Saxena, P. Jha, M. N.Tiwari and Savita [4]: The robotic arm can move in 4axis regulation with the help of 4 servomotors. With the help of the holder, , we can hold the material and move it from one spot on to the next For doing this, we can interface the android applicationwith the Arduino UNO microcontroller via the Bluetooth module. The robot is controlled utilizing Bluetooth technology.

[4] Abdul Latif1, Hendro Agus Widodo2, Robbi Rahim3, Kunal Kunal: This line follower robot comprises of the ATmega32A microcontroller as the main regulator that will process the information. This microcontroller has input in the form of sensors and pushes buttons and output is driven to motor drivers and LCD. The sensor involved is the photo diode to work as a line detector, and press buttons are used to provide input information to the microcontroller. The output will be displayed in the LCD and the motor driver as a controller of the motor rotation, which will be a robot drive. Here can be seen the significance of the role of the microcontroller, in which the microcontroller will process the input data and direct the output. This robot as per the program embedded in the ATmega32A Microcontroller.

III. PROPOSED SYSTEM

The pick and spot robotic gripper is one of the innovation in manufacturing industries or any other industry which is designed to perform pick and spot activities according to requirement. In our project, we have mainly concentrated to make an automated arm whose primary function is to do pick and spotoperation. We have designed a system which takes out the human error and human intervention to get more precise and efficient work.

The project deals with implementing of a pick and spot robotic arm using Arduino and NODEMCU microcontroller. The focus of our project was to design and develop the mechanism for robotic arm for pick and place applications. We have designed a mechanical arm which is having four degree of freedom and we programmed to complete accurately simple light material lifting task which might be assist in the production line or sequential construction in any industry.

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Our automated arm is equipped with 4 servo motors to interface the parts and bring arm movement. It is constrained by an NodeMCU microcontroller which accepts input signals from a mobile application named Blynk.The working of the project is so basic, we aresimply controlling the Robotic Arm's four servo motor from an application named Blynk using the web. This requires consistent web availability.

The NodeMCU has an inbuilt ESP8266 Wi-Fi Module so that we can connect the NodeMCU to the web. Next using the Blynk application in the mobile we have made an application to send values through web to control the PWM values for the four-servo motor that relate to the NodeMCU.

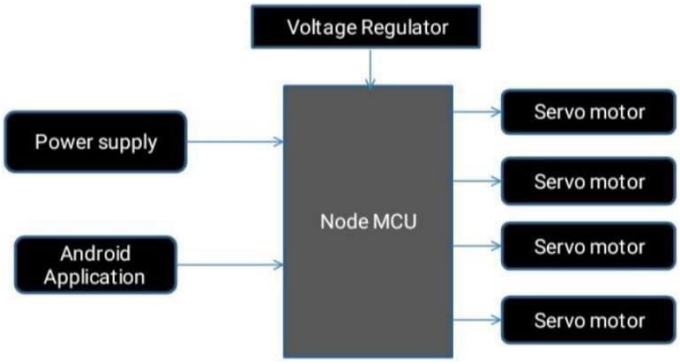
In the Blynk application 3 sliders are utilized and we have given two tasks to the automated arm to perform. The Servo motor is controlled according by the slider movement. advances are utilized to develop machines that can substitute for people.

Robots can be utilized in any situation and for any purpose, but today many are utilized in dangerous conditions (including bomb detection and de-activation), fabricating processes, or where people cannot survive. Robots can take on any structure, but some are made to resemble humans in appearance.

It is said that it helps in the acceptance of a robot in specific replicative behaviors usually performed bypeople.Such robots attempt to replicate walking, lifting, speech, comprehension, and essentially.

BLOCK DIAGRAM:

Figure: Block Diagram of Robotic Gripper



Block diagram Consisting of Node MCU, Power supply, Android Application, Four Servomotor, and Voltage regulator. The inputs of Node MCU are Android Application and power supply, and outputs are taken across the servomotors. Voltage Regulator is given to Node MCU to keep voltage constant 3.3v.

Servo motors are DC motors whose speed is slowly lowered by gears. The servo motors usually have revolution cut off from 90° to 180°. A few servo motors also have revolution cut-off of 360° or more.

The robot arm is made using servomotors whose control is achieved through an android application. Motors help to move the arm in desired direction.

Node MCU has 17 GPIO pins control several functions like IR Remote Control, LED Light, and Button programmability.

It consists of Bread board, Node MCU, Four Servomotors, the servo motors are used to move the robot. The Servo Motor consists of three pins namely VCC,GND, and Pulse.

VCC and Gnd are connected to the Bread board and pulse is connected to digital pins of input digital pin od Node MCU i.e. D1, D2, D3, D4.

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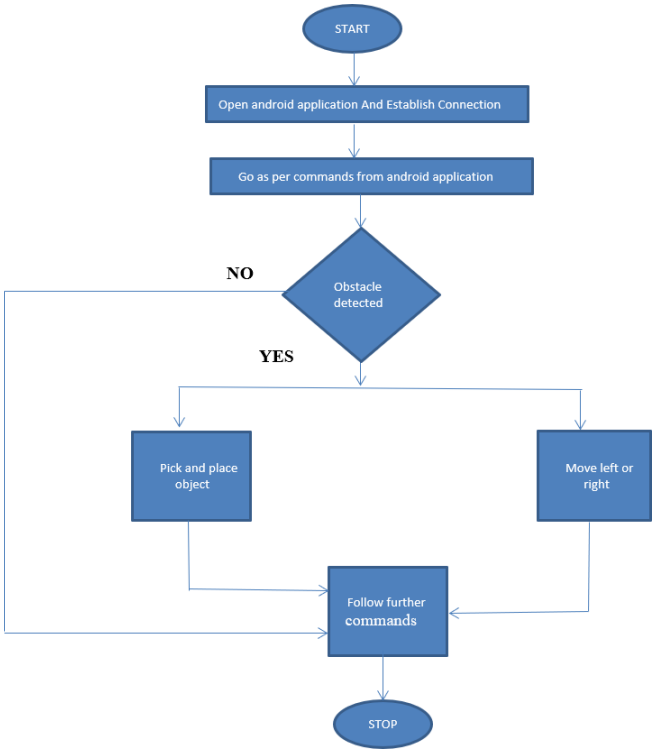
FLOW CHART:



Start the process. Open the Android application andestablish theconnection as per the circuit diagram.

Wait for the commands fromthe user.

At initial stage the robot will be in the home position then follow the command and move the robot a.

When the desired position is reached the robot willfollow the further commands.

The robot will follow the commands such as move left, right, forward, backward and pick theobject.

Follow the further commands to place the object.Stop the process.

IV. RESULT AND DISCUSSIONS

The controlling of the robot arm by
using mobile application by giving commands from those applications.
This mobile application is an open-source application. It was made by Google and is maintained by BLYNK. This allows newcomers 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)

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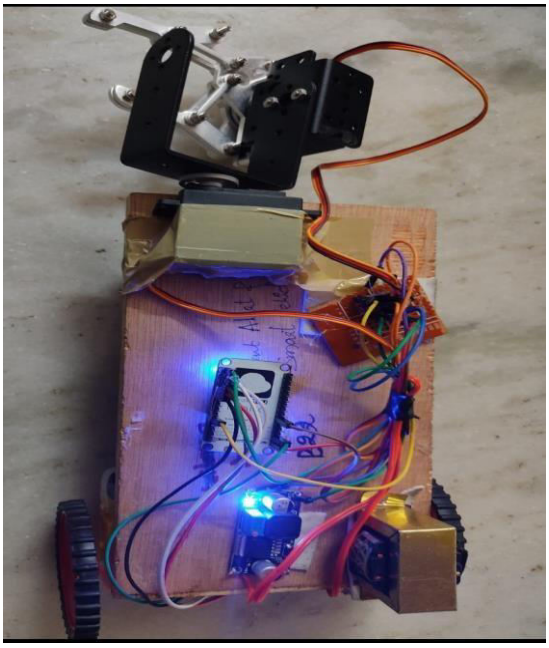

Figure 1: Hardware implementation of Robotic Gripper

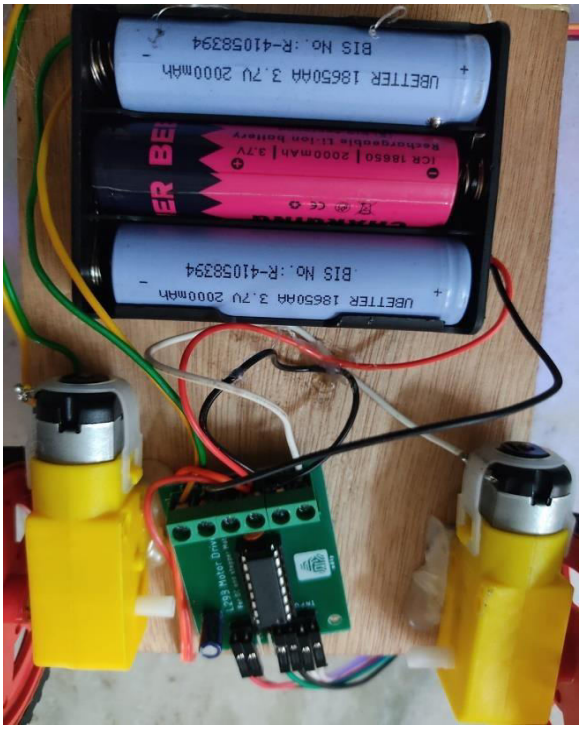

Figure 2: Commands given to robot through blynk IOT app

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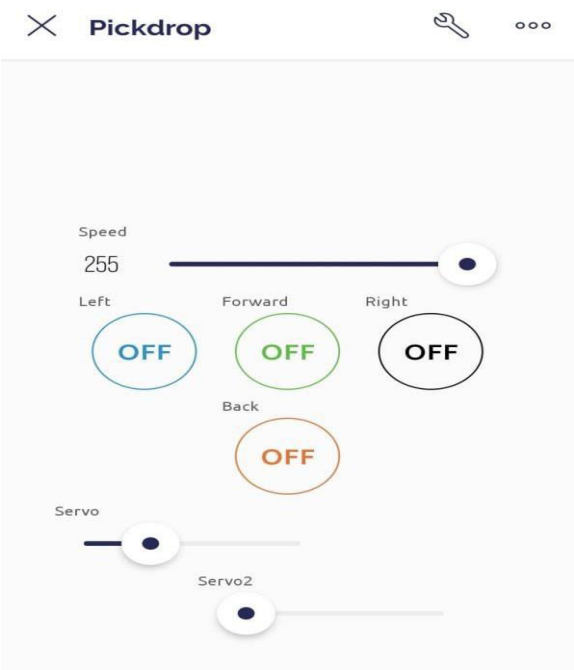

V. CONCLUSION

A user-friendly, low-cost object picker robot was implemented using NODE MCU. The robot uses a soft gripper to handle the object safely. The robot is controlled by BLYNK android application. Therealized robot can be used to pick only small objects which are helpful for disabled person who feels hard to move. The Android app helps in controlling the robot efficiently.

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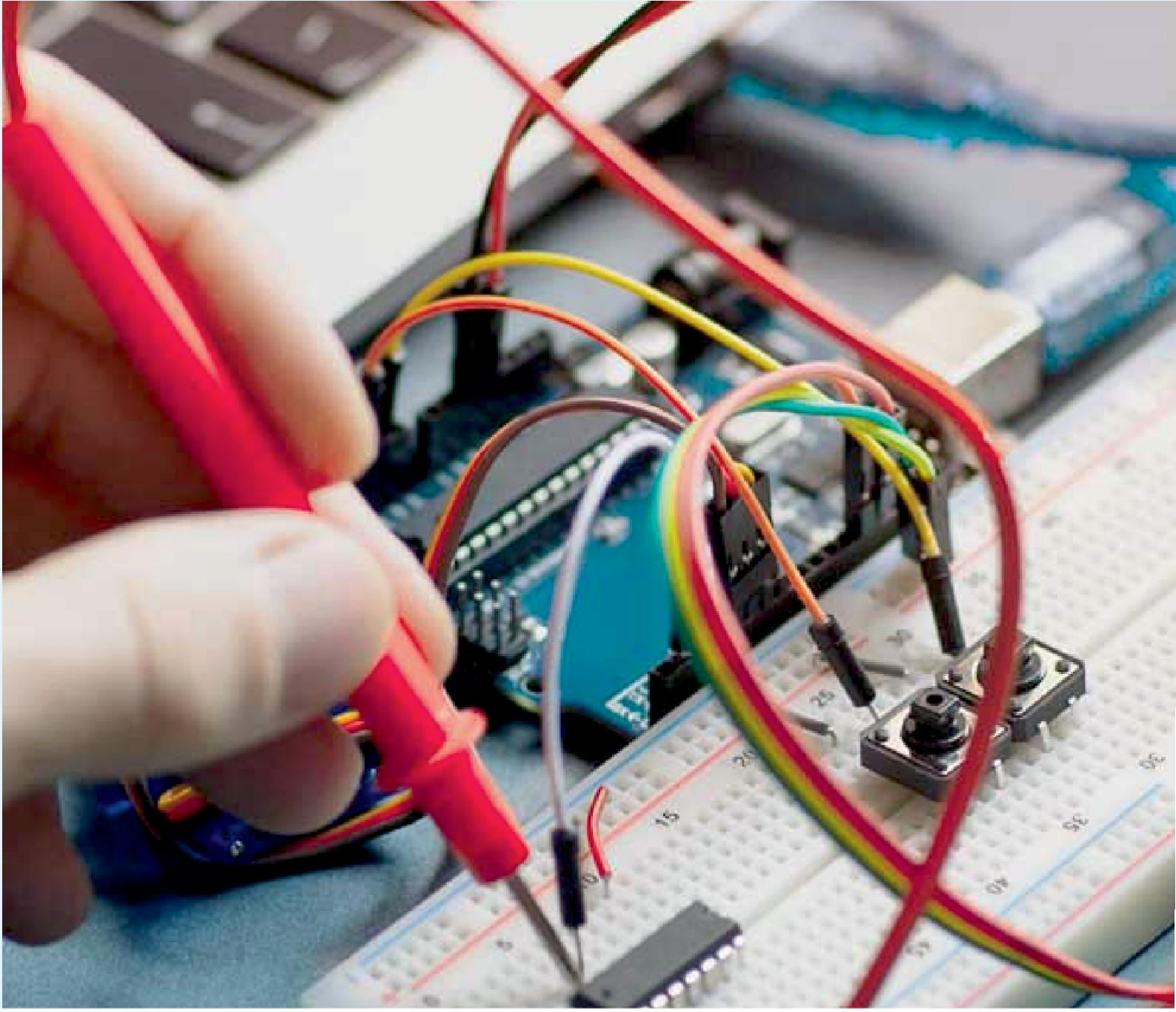

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