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IOT and Electronics Technology in Agricultural Sector Development

KautharAbdulazeez[a], Deepak Gupta[a], Robin Mathew[a], Rakesh Jain[a], Dr Prachi Jhanwar[a], Sumit Yoga[b]

[a]Suresh Gyan Vihar School of Engineering and Technology, Suresh Gyan Vihar University, Jaipur, India

[b]Prime Vision Automation Solution Private Limited, Jaipur, India. kauthar.abdulazeez@gmail.com

Abstract - This paper presents an IOT based Voice Control Robotic Car(IOTVCRC) which is designed by the combination of hardware and software. The IOT based control car system automatically operates by the command it gets without being manually controlled. The proposed workis accomplished by utilizing the revised version of Arduino UNO(R3). Themain focus is to control the motions of the robot by giving specific voice commands on what to do through an Android Bluetoothapplication.The integration of control unit with Bluetooth device is made to detect and send commands in different modes (e.g., voice recognition, keypad, keyboard), through serial communication data to perform a particular task. The proposed systems can be executed in advanced stage that will be useful in agriculture and in rural areas.

Keywords: Arduino UNO(R3), Robotics, IOT, Voice control, Agriculture, Bluetooth device

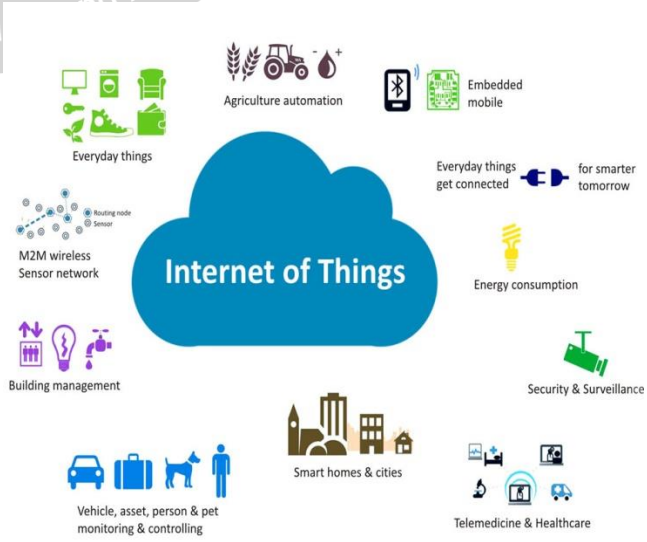
I. INTRODUCTION

Agriculture is necessary in our day to day life. But advancement intechnology is needed inagricultural sector to ease transportation and movement of people.To improve productivity, efficiency, global marketing and to reduce human intervention, there is a need to divert towards new technology named Internet of Things. IoT is a network of devices that provides an interface to transfer an information without human interference.The Internet of Things (IoT) has brought immense development in the agricultural sector through innovative and productive ways of transporting and monitoring agricultural processes. Due to its immense advantages, IoT installation is wide spread in agricultural sector.With the introduction of voice control robotic car, life has changed rapidly. The use of voice commands, keypads and keyboards to direct and control a robot is much easier for domestic as well as industrial users. This project demonstrates the use of an Android mobile application to direct and controla robotic car through voice commands, Keypads and keyboard. IOT based Voice Controlled Robotic Car (IOTVCRC) is a mobile robot whose motions can be controlled and manipulated by the user by giving specific voice commands. One of the advantages of using Voice control car is to reduce human work.

II. EXPERIMENTAL METHODOLOGY

With enormous demand in agriculture, the world needs to inculcate IOT and Robotics technology into agriculture to have a significant production output. IoT works in synergy with agriculture to secure efficient farming. IOT has become more notable and significant. According to the UN Food and Agriculture Organization, in order to feed the growing population of the Earth, the world will need to produce 70% more food in 2050 than it did in 2006. To meet this demand, farmers and agricultural companies are utilizing Internet of Things for analytics and substantial production capabilities.Internet of Things and roboticsare needed to play a considerablepart in increasing productivity, obtaining vast global market, reduction in stress andlabor time.Below figure shows the application of IOT in farming, it can be used in Agricultural automation, Embedded mobile, Security surveillance, Smart homes and cities and everyday things etc.

III. APPLICATION OF IOT



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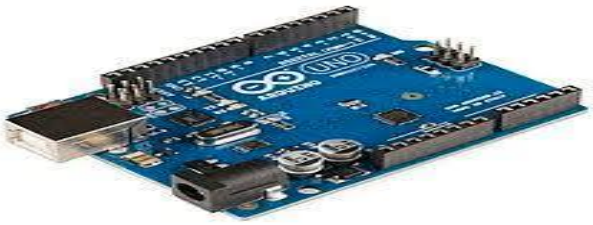
To alleviate the challenges encountered in agricultural sector, designing an IOT based voice control robotic caris implemented to have easy movement of objects and things.In this project,Our aim is to design a controlling robot that can be controlled by Voice, KeypadorKeyboard using Arduino Bluetooth application. To design a voice control robotic car,varioushardware components like Arduino board UNO, Bluetooth module have been studied and also the software implementation. The controlling device may be any android based Smartphone/tab etc. The android device sends a command to the Bluetooth module in a serial communicationdata, to move the car in different directions. After receiving the commands, the microcontrollerprocesses the message it receives and act according to. The microcontrolleris designed to move the motor through a motor driver IC as per the commands sent by the android device.With a voice control robotic car, one is able to give itcommands on where it should go, objects can be placed on it to transport it from one place to another and record the places it goes to when camera is mounted on it. When other farming equipments are attached to it, it can be able to carry out the required operation by controlling it from an Arduino Bluetooth application without being manually controlled.It ease humans labor. To design this robotic car, the following components are being used.

IV. COMPONENTS

1. Arduino Uno
2. L298N Motor Driver Module
3. Bluetooth Module
4. Geared motor

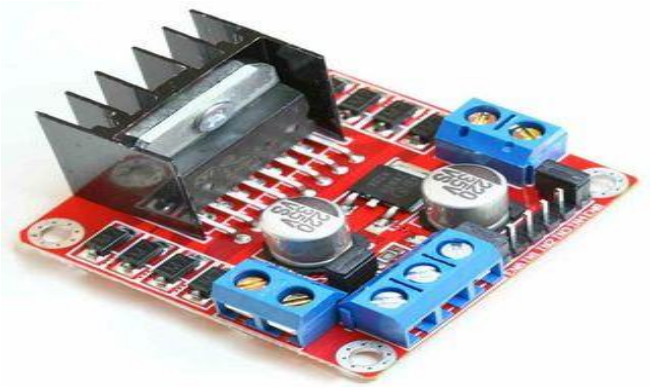
1. ARDUINO UNO

Arduino Uno a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs). It also has 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It is the most widely used and user friendly microcontroller.The microcontrolleris designed to move the motor through a motor driver IC as per the commands sent by the android device. The programming is uploaded from the Arduino software in any computer using a USB(Universal Serial Bus) cable. The connections are then made according to the circuit diagram.



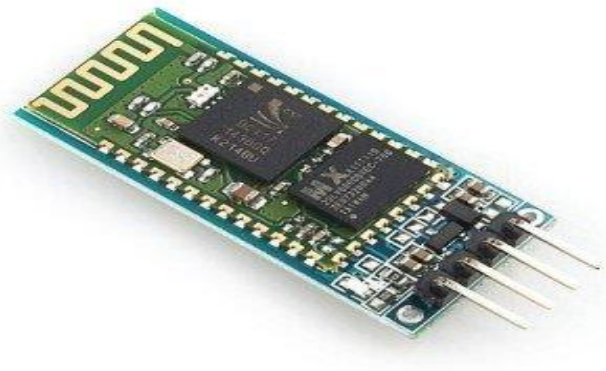
2. L298N MOTOR DRIVER

Motor driver is a double H bridge drive chip - L298N with voltage range of 5V-35V and current range of 0-36mA. It is having a 7805 voltage regulator IC. Its Maximum power consumption is 25W, dimension is 43 x 43 x 26mm, weight: 26g and a built-in 5vpower supply,the driving voltage is 7v- 35v. The motor provides a logical voltage of 5volt which provides supply to the geared motor.



3. HC-05 BLUETOOTH MODULE

The HC-05 is a class 2 Bluetooth module designed for transparent wireless serial communication. It is pre-configured as a slave Bluetooth device. Once it is paired to a master Bluetooth device such as PC, smart phones and tablet, its operation becomes transparent to the user. All data received through the serial input is immediately transmitted over the air.When the module receives wireless data, it is sent out through the serial interface exactly at it is received. No user code specific to the Bluetooth module is needed at all in the user microcontroller program.Bluetooth module has a typical -80dBm sensitivity and up to +4dBm RF transmitterpower. Its maximum output power is 2.5mW. It has a PIO control, UART interface with programmable band rate, integrated antenna and an edge connector.Its auto-pairing pin is"0000" as default pin and it auto-reconnect in 30 min when disconnected asa result of moving beyond the range of connection. It uses 2.45GHz frequency band.



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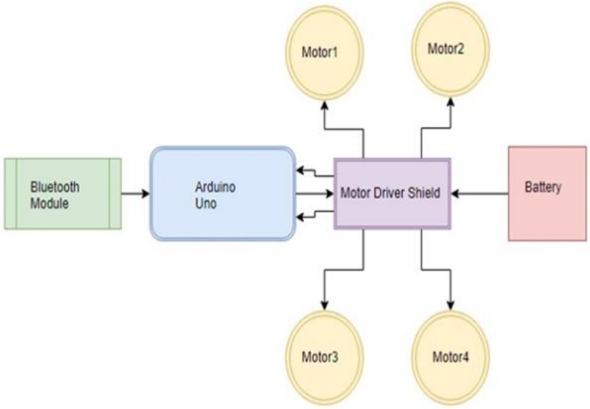
4. GEARED MOTOR

It is a simple DC motor featuring metal gearbox for driving the shaft of the motor, so it is a mechanically commutated electric motor which is powered from DC supply. The Geared Motors are known for their compact size and massive torque-speed characteristic.

ii) **BLOCK DIAGRAM**

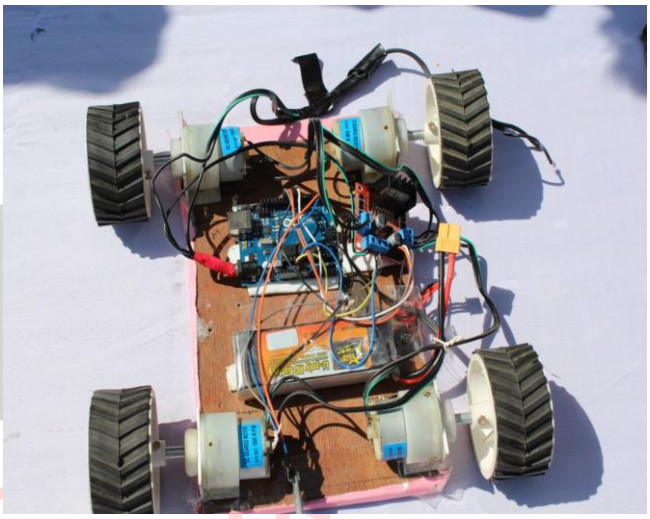


iii) Different Voice command and Robot reactions

Voice Command	Robot Interaction
Forward	The Robot moves forward.
Reverse	The Robot moves backward.
Left	The robot turns left
Right	The robot turns Right
Stop	The robot stops

V. RESULT

In this project we are able to design a voice control robotic car with the application of embedded system, that will ease farmers work in agricultural sector. varioushardware components like Arduino board UNO, Bluetooth module are used. All these hardware components are embedded together to control the robotic carin a particular motion through Arduino Bluetooth controller by voice, keypad or keyboard.The voice commands are successfully transmitted via an android application called Arduino Bluetooth controller and on receiving the command, the robot will act according to it. It certifies that we can manipulate and control real world objects with voice commands as a control means. It can performed the required operation on the farm as per the instruction given to it. This project reduceshuman work and helps in reaching places where it is dangerous or unsafe for human.It is also used in places such as industries, military, research purposes, etc. It is also useful for educational robotics.



VI. CONCLUSION

The proposed system demonstrates how an android smartphone application can be used as a remote control for controlling robots and various embedded system technologies with the aid of Bluetooth technology.The voice control robotic car can also be used for transportation of objects from one place to another in the farm and can be used for monitoring of surroundings when a camera is mounted on it. Automatic Targeting system can also be implemented in the robot for tracking targets. Farming will play a vital role across the globe in sometimes times to come. Thus there is need for advanced farming. Internet of Things will help to enrichadvanced farming. IoT works in distinct domains of farming to improve time, crop monitoring,efficiency,water management, soil management, control of insecticides and pesticides etc. It simplifies the techniques of farming and alsoaids efficient farming.

VII. ACKNOWLEDGMENT

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REFERENCES

[1] D.Saravanan, R.Parthiban, G.I.Archanaa, “Voice Controlled Robotic Car Using Arduino for Smart Agriculture”, International Journal of Pure and

 DOI : 10.18231/2454-9150.2019.0541

Applied Mathematics, Volume 118, No.18, 2097-2105, 2018.

[2] Humayun Rashid, Iftekhar Uddin Ahmed, Sayed Bin Osman, Qader Newaz, Md. Rasheduzzaman and S M Taslim Reza, "Design and Implementation of a Voice Controlled Robot with Human Interaction Ability",International Conference on Computer, Communication, Chemical, Materials and Electronic Engineering IC ME -2017, 26-27 January, 2017, pages 148-151.

[3] K. Kannan, Dr. J. Selvakumar, "Arduino Based Voice Control Robot ", International Research Journal of Engineering and Technology (IRJET),Volume: 02 Issue: 01 | Mar-2015, pages 49-55.

[4] Mr. Vedant Chikhale, Mr. Raviraj Gharat, Ms. Shamika Gogate, Mr. Roshan Amireddy, "Voice Controlled Robotic System using Arduino Microcontroller", International Journal of New Technology and Research (IJNTR) ISSN: 2454-4116, Volume-3, Issue-4, April 2017 Pages 92-94.

[5] Prof. Bhuvaneshwari Jolad, Mohnish Arora, Rohan Ganu, Chetan Bhatia, "Voice Controlled Robotic Vehicle", International Research Journal of Engineering and Technology (IRJET),Volume: 04 Issue: 06 | June-2017, 191-193.

[6] Soniya Zope, Preeti Muluk, Rupali Mohite, Aishwarya Lanke, Megha Bamankar, "Voice Control Robot Using Android Application", Imperial Journal of Interdisciplinary Research (IJIR), Vol-3, Issue-2, 2017, pages 1723-1726.

[7] P R Bhole, N L Lokhande, Manoj L Patel, V D Rathod, P R Mahajan, "Voice Command Based Robotic Vehicle Control", International Journal for Research in Applied Science & Engineering Technology (IJRASET),Volume 5 Issue XI November 2017, pages 1079-1083.

[8] Vinayak N. Malavade , Pooja K. Akulwar, "Role of IoT in Agriculture", IOSR Journal of Computer Engineering (IOSR-JCE) e-ISSN: 2278-0661,p-ISSN: 2278-8727 PP 56-57.

 DOI : 10.18231/2454-9150.2019.0541