© 2020 IJSRST | Volume 5 | Issue 7 | Print ISSN : 2395-6011 | Online ISSN: 2395-602X

4th National Conference on Advances in Engineering and Applied Science
Organized by : Anjuman College of Engineering and Technology (ACET) Nagpur, Maharashtra, India, In association with
International Journal of Scientific Research in Science and Technology

IOT Based Monitoring and Controlling of Agriculture Robot by Using Blynk App

Sarang Wade[1], Sankalp Navdhinge[1], Mayuri Sarad[1], Payal Titarmare[1], Valiya Shifa Ahmed[1], Prof. Nahid Khan[2]

[1]Electrical Engineering Department, Anjuman college of Engineering and Technology, Sadar , Nagpur, Maharashtra, India

[2]Associate Professor, Electrical Engineering Department, Anjuman college of Engineering and Technology, Sadar , Nagpur, Maharashtra, India

ABSTRACT

Automation has given luxury and comfort to humans. In India the agricultural techniques have ameliorated over the years but still the human efforts which can be utilized for productivity are restricted to performing perpetual tasks like switching on/off pumps or monitoring the farm fields to understand the atmospheric conditions or to check the fields for trespassers. The infrastructure of the farms , investment constraints and utilize acceptability do not sanction planarity automated agricultural systems rather it shall be preferable to automate tasks step by step. The proposed work presents a novel design of a robot which can provide the farm sensor data over IOT to user's mobile which can be accessed by Blynk app. The temperature, Humidity readings are exhibited on the app and Moisture sensor readings is withal exhibited along with utilizing it for watering the plants by deciding threshold value of moisture. Another paramount consideration as regarding the intrusion of people in farmlands or for the assistance in moving the robot is the provision of camera which can be of any mobile. The mobiles which are already in utilization or have been discarded can be mounted on the robot chassis and can be interfaced to view the circumventions on laptop. The proposed work Fixates on utilizing IOT as a technique to implement this system and additionally control the robotic forms of kineticism through an app. This shall provide access to the farm land remotely without the need to physically go and check the farm fields.

Keywords : IOT, blynk app, robot, agricultural automation, sensors.

I. INTRODUCTION

Agriculture sector has undergone rapid changes, considering the increase in production and changes in farming tools and technology used. IOT (Internet of Things) is now being integrated with agricultural mechanisms to keep the farm owners updated about the farm lands. Initially all works related to wireless technology was done using Zigbee modules or GSM technology. The farmland needs to be covered with an array of sensors physically placed which provides sensor data to the controllers over WSNs (Wireless sensor Networks) and through GSM or Zigbee modules it is received by the user. Another up gradation which facilitated the users was provision of getting data in mobile app using IOT. IOT has various applications in the field of agriculture owing to its numerous advantages which leads to it success. The main advantage of IOT is that it can provide sensor

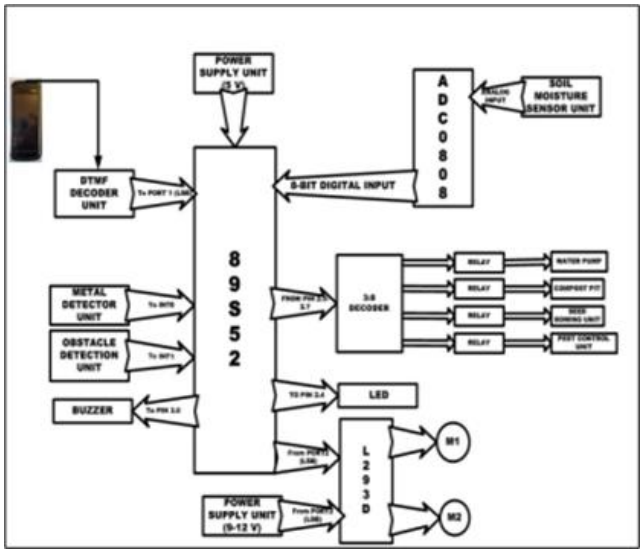
data for monitoring or can send data to the system for controlling its applications. General applications of IOT in agricultural techniques also include providing temperature monitoring of farmlands to observe the crop patterns and effects of temperature on the crops. As the climate change is drastic over these years, integrating farmland owners data over IOT can help agricultural research centers to analyze effects and causes of various crop pattern changes and in cases of crop damage due to sudden climatic changes, it can help monitor and predict behavior of plants and crop over the next year so that precautionary measures are taken to avoid repetition of same conditions.

II. LITERATURE REVIEW

Mainly automation techniques have been reviewed in order to check the recent works regarding farming techniques which can help to monitor the farm lands or to ensure some repetitive tasks that can be replaced by automation. DTMF and GSM have been popularly used as the major technologies for this purpose.

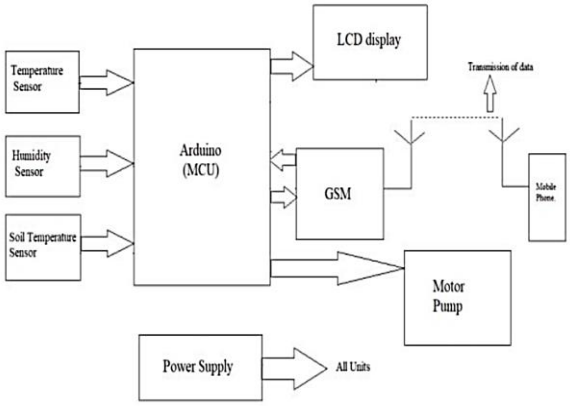
A. DTMF based farming robot vehicle.

In this system, robot movement is controlled through dual tone multi frequencies which are fed by the user and soil moisture is sensed and irrigation motor pump is switched on accordingly. [1]



Fig(iii) DTMF system block diagram

B. GSM based agricultural system



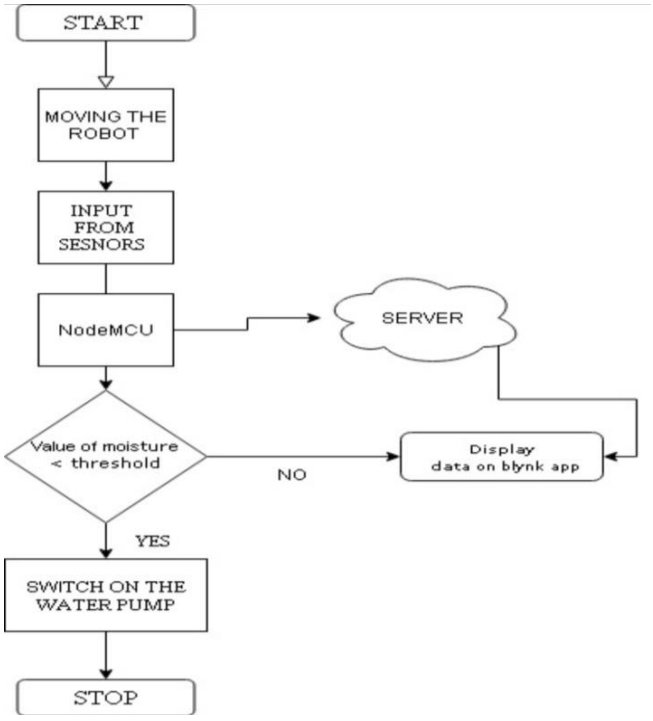
Fig(ii) GSM system block diagram

In this system, sensors are placed on farmland and information of these sensors are sent through GSM and the farmer can take the decision of switching the system's of water pump and pesticides pump. [2]

III. Methodology

In the proposed work, IOT is used as a core technology to implement the design. A robot has been designed for agricultural work. The control of this work is based on IOT, which shall control the movements of robot through Blynk app. In the design

two sensors are used, Resistive moisture sensor and Temperature-humidity sensor (DHT11). These two signals provide the farmland data to the user on Blynk app. Initially, robot movements are controlled and it is allowed to enter the farmland through users control. It utilizes camera of mobile to see the surroundings and check for obstacles or clear path. The sensor provides data to the controller unit which then sends the data to Blynk app. Another important feature added to this project is regarding the moisture sensor, to automate the task of watering the plants, it is necessary to know whether a soil needs water or not. A shaft is attached to the dc motor which moves down by users input on Blynk app and provides the moisture content reading for display on app. If the reading moves below 30%, water pump will switch On and watering of plants shall be done. Temperature and humidity sensor continuously provides the data to the Blynk app. The water pump used is a submersible pump which can be installed in a small portable water tank which is installed on the chassis. Fig (i) shows the flowchart of the project which represents the step by step procedure.



Fig(iv) Flowchart.

Fig (ii) shows the block diagram of project which indicates the connections of different components with each other.

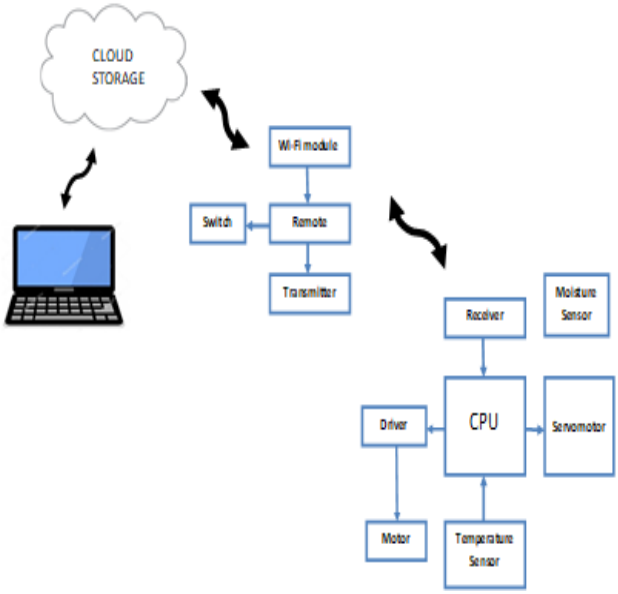


Fig (v) Block Diagram of Smart Agriculture robot

IV. Technology used

1. **IOT (Internet of Things):** It is the most widely used technology owing to the presence of internet services and itscoverage all over the country. As internet usagehas increased and also number of users has increased which makes it a feasible technology for users.
2. **Arduino IDE:** The programming of NodeMcu is generally done on Arduino IDE which is open source software compatible with multiple controller boards.

V. Component Details

1. **Moisture Sensor:** In this project, it is very important to measure the moisture content of soil, which will help to automate the task of watering the plants according to the predefined threshold level set; in this case it shall be 30% of moisture content.

Fig (vi) Resistive Moisture sensor

This moisture sensor works on the principle of changing resistance according to the flow of current; hence the name resistive moisture sensor.

2. **DHT11 (Temperature and Humidity sensor):** Another important aspect for watering the plants or surveying the farm is the knowing and analyzing the temperature and humidity to understand the overall effect of climatic change that is happening and work accordingly with it.

Fig (vii) Resistive Moisture sensor

3. **NodeMcu (Node Microcontroller):**It is a controller which has built-in Wi-Fi module and in the project serves the function of analyzing the sensor data, providing it to the Blynk app screen of user and also receiving commands from user for movements of robot.

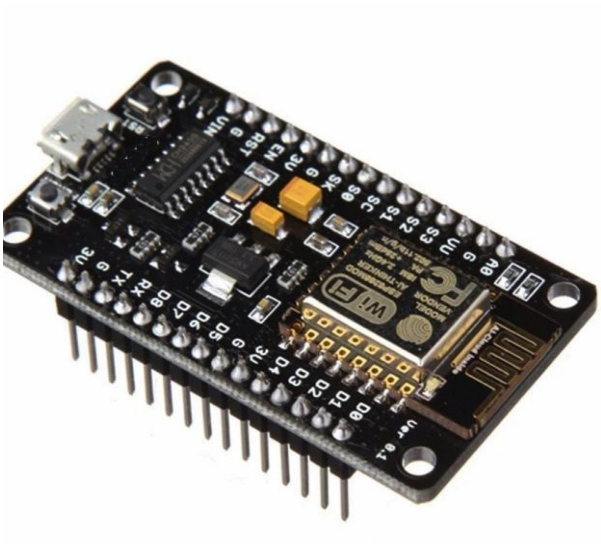


Fig (viii) NodeMcu

4. **DC Motor:** The DC motor can move clockwise and anti-clockwise which can help for robotic movement. (Forward, reverse, right, left). It is also used to move the shaft up and down. Shaft is mounted on the robot chassis.

Fig (ix) DC motor.

VI. Blynk App Design

Blynk app is a third party app development service which works with open source platforms and provide compatibility to IOT based projects. The following figure shows the basic design of projects app functions.

Steps for Blynk app

i. Download the app
ii. Select new project
iii. Drag and drop the buttons
iv. According to the labels, programming in IDE is done to check the functionality.
v. After token is authorized, the Blynk app can now connect and work in synchronization with the hardware module of the project.

VII. Schematic Circuit Diagram of project

The components are connected according to the diagram as shown below which will help to highlight the pins used and functionality of the overall project.

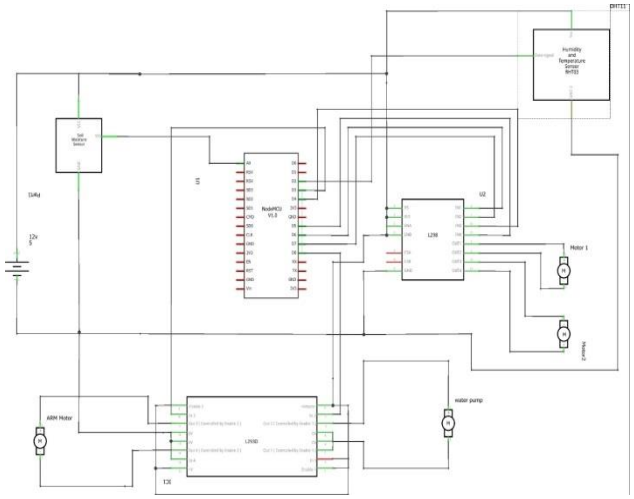
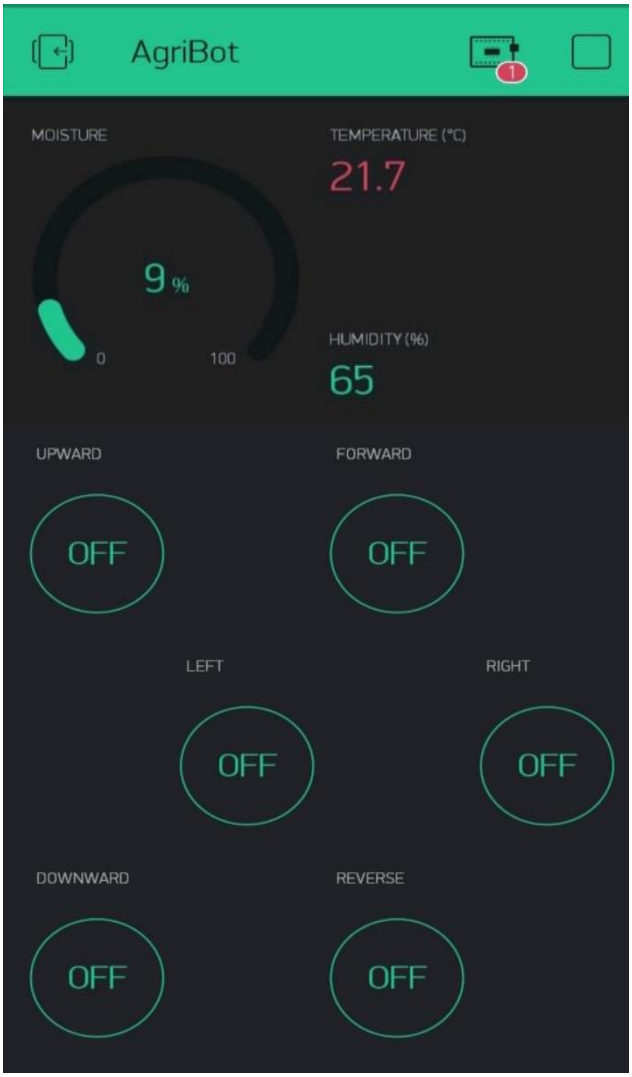


Fig (x) Schematic Diagram

VIII. Result and Conclusion

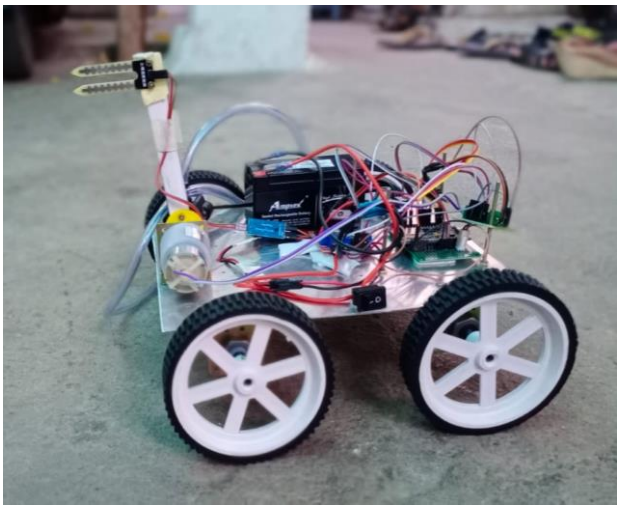
The robot designed helps to complete different agricultural task like watering the plants, monitoring the farms etc. The prototype design is an endeavor to promote the automation of agricultural tasks and remove the hardships associated to farming techniques used by our Indian farmers. It is also very important to monitor the temperature and humidity of farm lands in order to understand the requirements of water or crop growing patterns. As it is not feasible to have an infrastructure of using sensor arrays on farmlands hence our proposed system is economically feasible and also helps to automate the task of watering the plants according to different crop requirements. Figure below shows the gui of our app which can control the movements of robot through this app.

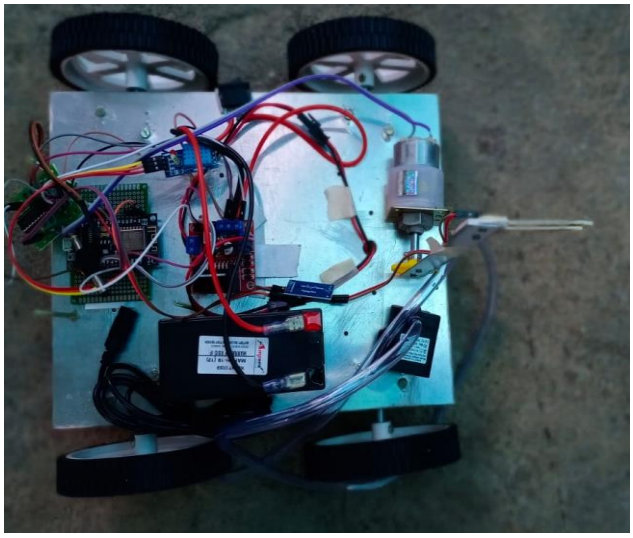


Fig(xi) Blynk app GUI

The moisture sensor is connected to a shaft controlled by the dc motor which can be moved upward and downward. Any other agricultural work can also be carried out by changing the shaft bit. The entire sensor data is displayed on the app. Controlling

function can be carried out b clicking on respective buttons.





Fig(xii) Agricultural robot

IX. Acknowledgements

We would like to thank our guide for all the guidance and knowledge provided during this project work. Apart from we would also thank our guide for the extended support during research paper writing.

X. REFERENCES

[1]. Srivastava, S. Vijay, A. Negi, P. Shrivastava and A. Singh, "DTMF based intelligent farming robotic vehicle: An ease to farmers," 2014 International Conference on Embedded Systems (ICES), Coimbatore, 2014, pp. 206-210.

[2]. A. Mittal, N. N. Sarma, A. Sriram, T. Roy and S. Adhikari, "Advanced Agriculture System Using GSM Technology," 2018 International Conference on Communication and Signal Processing (ICCSP), Chennai, 2018, pp. 0285-0289

[3]. BezaNegashGetu, Hussain A. Attia, “Automatic Controlof Agricultural Pumps Based on Soil Moisture Sensing”, IEEE conference publication, 2015

[4]. Joaquín Gutiérrez, Juan Francisco Villa-Medina, Alejandra Nieto-Garibay, and Miguel Ángel Porta- Gándara “Automated Irrigation System Using a Wireless Sensor Network and GPRSModule ” IEEE 2013

[5]. Samy Sadeky, Ayoub Al-Hamadiy, Bernd Michaelisy, Usama Sayedz,“ An Acoustic Method for Soil Moisture Measurement ”, IEEE 2004

[6]. Thomas J. Jackson, Fellow, IEEE, Michael H. Cosh, Rajat Bindlish, Senior Member, IEEE, Patric J. Starks, David D. Bosch, Mark Seyfried, David C. Goodrich, Mary Susan Moran, Senior Member, IEEE, and Jinyang Du ,“Validation of Advanced Microwave Scanning Radiometer Soil Moisture Products”, IEEE 2010

[7]. Jia Uddin, S.M. Taslim Reza, Qader Newaz, Jamal Uddin, Touhidul Islam, and Jong-Myon Kim,“Automated Irrigation System Using Solar Power” ©2012 IEEE

[8]. Ms. Sweta S. Patil, Prof. Mrs. A.V. Malvijay, “Review for ARM based agriculture field monitoring system”,International Journal of

Scientific and Research Publications, Volume 4, Issue 2, February 2014.

[9]. Zhang Feng Yulin University Yulin University tfnew21@sina.com, " Research on water-saving irrigation automatic control system based on Internet of things Institute of Information Technology", 2011 IEEE

[10]. Patil K. A, N. R. Kale," A Model for Smart Agriculture Using IoT", International Conference on Global Trendsin Signal Processing, Information Computing and Communication,IEEE 2016.