AUTOMATIC IRRIGATION SYSTEM USING CHATBOT

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Abstract: ***Nowadays science and technology reach its peak with advancement of automation. Here we pretend to include the science advancement in the field of agriculture. Thus, by providing the agricultural system to automatic with irrigation and monitoring. The irrigation system involves sensors and communication technology to monitor the soil moisture content and transfers data. This communication technology is done by Bluetooth and Lora module where the data from the sensors are collected and transmitted to the Node-MCU. Lora module uses Lora WAN protocol for transmission of data from Arduino nano to Node-MCU. By the data received by the Node-MCU, it transmits the data to the internet using the WI-FI-module which is present in the Node-MCU by the MQTT protocol, thereby using the cloud technology it shows the operation takes place in the field via the monitor. Monitor has a web application which is developed by us. This web application has the dashboard of the farmer who has already signed in. This dashboard consists of the field of the farmer, switch to control the water passage, pH level of the soil and also the moisturization. This web app also includes chatbot, thereby farmers can clear their basic necessity needed for them.***

Keywords – Arduino Nano, Node-MCU, Bluetooth, Lora Transceiver, MQTT Protocol.

I. INTRODUCTION

Irrigation is defined as artificial application of water to the land or soil. Irrigation process can be used for the cultivation of agricultural crops during the span of inadequate rainfall. An automatic irrigation system does the operation of a system without requiring manual involvement of persons. An automatic irrigation system does the work efficiently and with a positive impact on the place where it is installed. Once it is installed in the agricultural field, the water distribution to crops becomes easy and doesn't require any human support to perform the operations.

Our proposed model deals with the involvement of automatic irrigation system along with the user interface dashboard. This dashboard includes chatbot, measurement of Moisture level and pH level of the soil, water pump control and monitoring mechanism of the field. The data from the field is monitored and controlled by the dashboard which is developed by react JS. This transmission takes place by the Bluetooth and Lora communication technology. From the field to near Arduino nano communication takes place by Bluetooth transceiver and from the Arduino nano to node-MCU communication takes place by Lora module. Then it transmits data by WI-FI module integrated with the node-MCU to the internet.

II. COMPONENTES USED

Sensors: Moisture, pH
Controllers: Arduino Nano, Node-MCU
Communication: Bluetooth module, Lora Transceiver
Web app: React JS

III. SETUP

IMPLEMENTATION

1. Sensor Node ⇨ Moisture sensor, pH sensor, controller, Bluetooth transmitter.
2. Arduino nano ⇨ Node MCU (Lora).
3. Node MCU ⇨ Internet (Wi-Fi).
4. Database (Internet) ⇨ Agri Dashboard.

CONTROL UNIT:

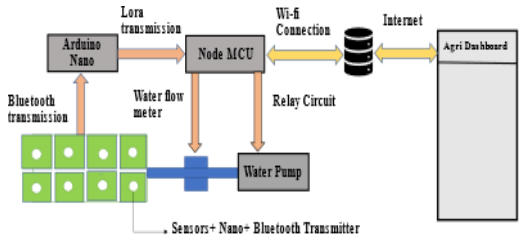
The control of motor pump is programmed in Node-MCU and the operation of ON and OFF is performed by Relay circuit.

MONITORING UNIT:

The monitoring of the field is takes place in the webapp (Agri dashboard) which has moisture level and pH level of the soil in form of Pie chart.

Moisture Sensor: Placed in the field to measure the moisture content.
pH Sensor: measures the pH content of the soil placed along with moisture sensor.
Water flow meter: This indicates the flow of water from pump to field.

IV. BLOCK DIAGRAM



V. WORKING PRINCIPLE

- Moisture and PH sensor placed in the sensor node of the field measures the moisture content and PH level of the soil
- This analog reading is send to the common Arduino nano through the Bluetooth communication via the Bluetooth transmitter
- Thus the data from the Arduino Nano is received by the Node MCU which is placed in the home remotely via the LORA communication
- This LORA communication is achieved by LORA transceiver. The received data from Node MCU is fetched by the google Firebase and can be controlled by the Web app which is designed by Node JS.

- The Web app included with chatbot for user friendly interface. Through the Web app we can monitor the weather condition, Soil Moisture content and also able to control the water pump for irrigation

VI. SOFTWARE STACK

- Web app dashboard is built with ReactJs framework (a fastest single page application of Nodejs)

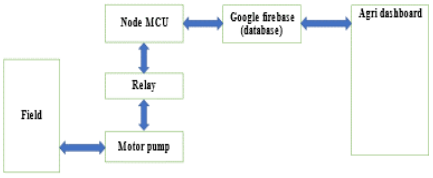
- This dashboard shows the information such as soil moisture, PH value, electricity usage of motor and much more information in the form of graph and pie chart

- It consists of other features such as weather monitoring, chat options for communitysupport, search option for nearby fertilizer shop, agriculture research center and nearby warehouses.

- It also has a weather forecast alert api.

- The weather monitoring gives the report of weather for 7 days so that the farmer can give the irrigation and take care of the crop accordingly.

VII. DASHBOARD CONTROLLING CIRCUIT



Here we used google firebase as the database. Google Firebase is a Google-backed application development software that enables developers to develop iOS, android and webapps. Firebase provides tools for tracking analytics, reporting and fixing app crashes, creating marketing and product experiment.

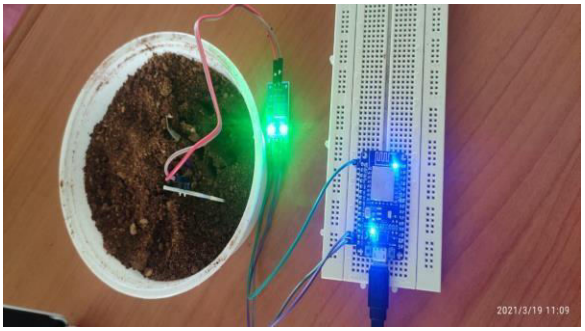
VIII. EXISTING MECHANISM

The existing mechanism of automated irrigation system involves the internet connectivity to the farm field.

Our model overcome this by providing the Bluetooth and Lora communication.

IX. OUTPUT IN THE WEBAPP

X. HARDWARE IMPLEMENTATION



XI. ADVANTAGES

- As the irrigation is completely automated, there is no man power needed for irrigating crops
- This platform helps us to schedule crop irrigation based on user's input
- It provides weather forecasting support.
- This system plays vital role in supplying adequate amount of water necessary for crop yield
- Highly secured data transmission using SSL/TTL protocol
- The main feature of software is NLP enabled chatbot that makes the user to interact with software more comfortably without any knowledge about the software

XII. APPLICATION

- Our project gives the user-friendly communication to the farmer via the chatbot instructions
- Thereby this in turn gives the remote monitor of the field
- Predict the weather and also the locate the nearby warehouses which is useful for the farmers for their products.

XIII. CONCLUSION

Our proposed model of auto irrigation involves dashboard of the farmer where the farmer can get the information and live state about the field and also involves the chatbot for community support about the needs of the farmer to their land. This implementation in the model gives the future prediction about the weather for crop cultivation and also irrigation. The dashboard also gives the reading about the farm land in the form of pie chart and graph.

XIV. REFERENCE

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