IMPLEMENTATION OF PRECISION AGRICULTURE THROUGH IOT USING RASPBERRY PI

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ABSTRACT

This paper reflect on the implementation of IOT enabled farming, especially for the people needed a smart way of agriculture. Wireless sensor network application. In the agricultural sector are gaining popularity with the advancement of the IOT technology. Wireless sensor networks are used in agriculture to sense the important agricultural field parameters, such as temperature, humidity and soil moisture level.

The features of this research includes sensor data monitoring using soil moisture sensor which is responsible for measuring moisture of the field, water level sensor which is liable for detecting flooded water, and temperature and humidity sensor which is responsible for tracking out the present temperature and humidity in the atmosphere.

It describes the implementation of precision agriculture to monitor various conditions of crops using Raspberry pi.

This system could be expected to enhance the crop production by giving timely advice to the crop producers so that necessary steps can be taken accordingly.

Keyword: *Soil Moisture Sensor, IOT, Bluetooth, Raspberry Pi, Temperature Sensor, Humidity Sensor.*

1. INTRODUCTION

To implement IOT to carry out precise agriculture by monitoring the various physical parameters such as temperature, humidity and soil moisture level with better irrigation and automatic nutrition supplement system.

In the world of rapid technological advancement, the role of IOT has become the most prominent and significant. Various physical parameters such as humidity, temperature, soil moisture content in the agricultural field through Raspberry Pi. The Raspberry Pi is used to receive the data from the sensors.

2. LITERATURESURVEY

Tanmay Baranwal et al. (2016) proposed a wise agriculture models based on IOT to solve such problems like identification of rodents, threats to crops and delivering real time notification based on information analysis and processing without human intervention.
PAPER:-Development of IOT based smart security and monitoring devices for agriculture.
TECHNIQUES:-IOT, Sensors, Linux based Raspbian Pi OS, Raspberry Pi2.
RESULT:-System is designed for Identification of rodents in grain stores.
ISSUES:-Failture of any particular part or device is not informed and has to be tested manually.

Joaquin Gutierrez et al. (2014), The paper aims at optimizing usage of water in a agricultural crops. The system was powered by photovoltaic panels and had a duplex communication link based on cellular-Internet interface.
PAPER: - Automated irrigation system using a WSn and GPRS module.
TECHNIQUES:-WSU's and WIU, based on microcontroller, ZigBee and GPRS technologies.
RESULTS:-Feasible and cost effective for optimizing water resources for agricultural production.
ISSUES:-The investment in electric power supply is expensive.

Rajeev R .Ketu et al (2015), proposed wireless sensor networks and Ethernet protocols. It mainly concerns its application towards Irrigational Activities such as soil moisture and water, pressure monitoring along with protection against trespassing with motion detection and conservation of energy.
PAPER:-Implementation of IOT in monitoring and control of agricultural activities.
TECHNIQUES:-ZigBee and Ethernet protocol.
RESULT:-Remote access is being provided to the user in knowing the deployed sensor status.
ISSUES:-The technique is inconvenient in smart boarder security, Industrial automation and very low cost home automation devices.

G. Meena Kumari et al (2014), proposes technological development in Wireless Sensor Networks.
PAPER:- A web based IOT solution for Monitoring data using MQTT Protocol.
TECHNIQUES:-Bus concept, ZigBee protocols based on IEEE 802.15.4, Hybrid network.
RESULTS:- Monitoring and control of greenhouse parameter in precision agriculture.
ISSUES:- Not energy saving and data fusion, direction are left for future research.

3. System Architecture

The project consist of major components:- Raspberry Pi, Soil Moisture Sensor, Bluetooth, Humidity Sensor, Temperature Sensor.

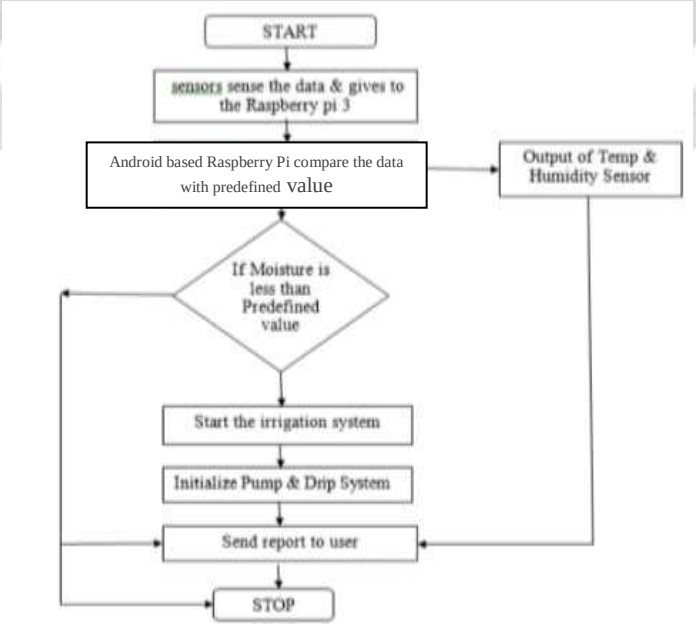

Fig- 1: System Architecture

Hardware Used:-

a) Raspberry Pi:-

The Raspberry Pi is small pocket size computer used to do small computing and networking operations. It is the main element in the field of internet of things. It provides access to the internet and hence the connection of automation system with remote location controlling device becomes possible.

b) Soil Moisture Sensor:-

Soil Moisture sensor measures the water content in soil. It uses the property of the electrical resistance of the soil. The relationship among the measured property and soil moisture is calibrated and it varies depending on environmental factors such as temperature ,soil type, or electric conductivity. Here, It is used to sense the moisture I field and transfer it to raspberry pi in order to take controlling action of switching water pump ON/OFF

c) Bluetooth:-

Raspberry Pi has on-board Bluetooth which can be used for communication or sending /receiving files. Before establishing communication between Raspberry Pi and Bluetooth enabled device we need to pair them. Pairing a Bluetooth device on Raspberry Pi is same as that on a mobile or laptop. Then make it discoverable.

d) Humidity Sensor:-

Humidity sensors are used for determining the moisture content. Therefore, an accurate and precise means of testing moisture content in grain will help farmers monitor their crops. With the aid of monitoring, farmers may dry their grain until the preferred moisture content is achieved

e) Temperature Sensor:-

Temperature Sensor are crucial in two key categories of smart agriculture- 1) Ambient condition monitoring 2) Mechanical asset Monitoring. Highly accurate temperature and humidity sensors and precise predictive temperature forecasts are imperative to the ice wine industry.

4. CONCLUSION

It is evident from the various research and reports that global food demand would increase at least by 50% by 2050 which needs to be fulfilled with existing or rather reducing size of farmland. Also, we have to be very lean while utilizing the natural resources while doing so. Work population index shows that as India is moving to words the largest population country, precision farming will be the right direction to support local as well global food needs. Majority of Indian farm in most states are extremely dependent on government and subsides. To make precision farming successful agricultural universities and farming equipment manufactures would have to play a key role by evaluating the technology and providing cost effective solutions and we see the need to pilot the adoption model proposed in the paper. This model can also be simulated and validated to see the feasibility.

We also see a large need of scientific approach and help needed to optimizing farming process, precisely measuring parameters yield, fertilizer/Seed/Pesticide utilization, electronically recording this data for analysis and recommending products to improve the farming in large in Asian countries like India.

To get to successful implementation of precious farming in India we think three major challenges.

- Education and awareness about precision farming and the technology.
- Cost effective solution and a better farming model ecosystem considering average farm land size.
- Clear definition and policy for data security and privacy.

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6. REFERENCES

[1] Annual Report: Indian Ministry of Agriculture and Farmers Welfare
http://agricoop.nic.in/sites/default/files/Annual_rpt_201617_E.pdf

[2] Ground water scenarios in India
http://cgwb.gov.in/Ground-Water/GW%20Monitoring%20Report_PREMONSOON%202017.pdf

[3] National Mission for Sustainable Agriculture
https://nmsa.dac.gov.in

[4] Pradhan Mantri Krishi Sinchan Yojana
https://pmksy.gov.in/mis/frmDashboard.aspx

[5] Pest Control System in Maharashtra
https://rkvy.nic.in/static/download/RKVY_Sucess_Story/Maharashtra/Pest_Serveillance-Maharastra.pdf

[6] Soil Health Data
https://soilhealth.dac.gov.in/NewHomePage/SoilMap

[7] United States Department of Agriculture
https://www.usda.gov/nass/PUBS/TODAYRPT/crop0917.pdf

[8] World Bank Group: Farming for the Future
http://pubdocs.worldbank.org/en/862271433768092396/Holger-Kray-RO-SustainableAg-hkray-ENG.pdf

[9] United States Department of Agriculture (USDA)
https://www.nass.usda.gov/Charts_and_Maps/Field_Crops/index.php