Automation In Agriculture

Subham Patra
Ece Department,Jis College Of Engineering , Kalyani

Arnab Samanta
Ece Department,Jis College Of Engineering , Kalyani

Suman Paira
Ece Department,Jis College Of Engineering , Kalyani

Subhajit Mondal
Ece Department,Jis College Of Engineering , Kalyani

Kiran Dandapat
Ece Department,Jis College Of Engineering , Kalyani

Prof. (Dr.) Indranath Sarkar
Ece Department,Jis College Of Engineering , Kalyani

***Abstract*:- The prototype model of Smart Agriculture System Using IoT has been developed so that it can be used for Smart Farming, where cost will be less and therefore the farmers can monitor the sphere conditions from anywhere. Temperature sensor, Moisture sensor, water level sensor is employed to create this technique effective and operative through commands from smart devices such as Mobile Phone. Application software developed and tested for its successful connectivity to the smart Farming system prototype developed.**

Keywords: IoT, Smart Farming, Agriculture, Node-Red, IBM cloud, IBM Watson.

I. INTRODUCTION

The global population is predicted to the touch 9.6 billion by 2050 – this poses a giant problem for the agriculture industry [1]. Despite combating challenges like extreme atmospheric conditions, rising temperature change, and farming's environmental impact, the demand for more food has got to be met. To satisfy these increasing needs, agriculture has should communicate to new technology. New smart farming applications supported on IoT technologies will enable the agriculture industry to cut back waste and enhance productivity from optimizing fertilizer use to increasing the efficiency of farm vehicles' routes [2]. Because the world is trending into new technologies and implementations it's a necessary goal to trend up with agriculture also [3]. IOT plays a awfully important role in smart agriculture. IOT sensors are capable of providing information about agriculture fields. We've proposed an IOT and smart agriculture system using automation [4]. This IOT based Agriculture monitoring system makes use of wireless sensor networks that collects data from different sensors deployed at various nodes and sends it through the wireless protocol [5]. In IoT-based smart farming, a system is made for monitoring the crop field with the assistance of sensors (light, humidity, temperature, soil moisture, etc.) and automating the irrigation system. The farmers can monitor the sphere conditions from anywhere [6]. IoT-based smart farming is very efficient in comparison with the traditional approach. The farmers can monitor the sphere conditions from anywhere.

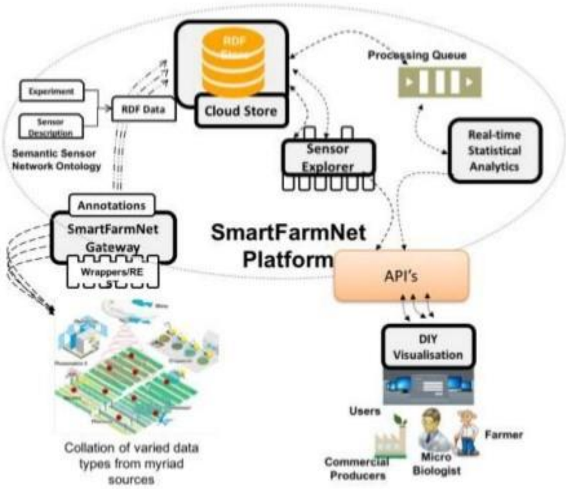

Figure 1: block diagram of proposed system

In this paper a model has been proposed that explores the utilization of IoT (Internet of things) within the agriculture sector. This model aims at increasing the crop yield by helping in predicting better crop sequence for a selected soil. IBM IoT platform helps in real time sampling of the soil and hence the information acquired is further used for analysing the crop. We've also taken many readings of the soil moisture, temperature, and humidity of the environment for various days at different times of the day.

II. LITERATURE SURVEY

The Internet of things (IOT) are being revamping the agribusiness engaging the farmers by the expansive compilation of techniques, as an example, accuracy and conservative cultivation to go up against challenges within the field.[7] Researchers have proposed different modalities for the agriculture sector with one or multiple technologies mentioned, e.g., irrigation system supported soil water measurement to choose irrigation amount of the water is described in [8]. Which uses the Bluetooth model for the communication which has its own limitations like limited range and device accommodation? [9]In the year of 2016, an author suggested scheduling within the power supply to the sensors which can help in improve energy efficiency [10]. Use of IoT in agriculture is mentioned by an author in paper [11]. However, it shows lack of interoperability which is important after we discuss about large agricultural fields.[12] For comparison of energy consumption between two appliances, Jinsoohan has provided an approach in paper [13] published in 2017. N.K. Suryadevara, S.C. Mukhopadhyay has used concepts of pervasive computing, data aggregation etc. to observe the environmental factors using Zigbee [14] in their paper. However, it would raise the difficulty of more power consumption, automation of agriculture as more nodes are deployed [15]. Approach to supply the important time information to the farmers about the land and crops is defined within the paper [16], which provides the mandatory information yet it is a standalone system. Within the year of 2015 concepts of IoT,[17] cloud-computing, Mobile computing are employed in smart agriculture in paper [18], where by Prem Prakash Jayaraman, Doug Palmer, ArkadyZaslavsky the concept of phononet was introduced [19], which is network of smart wireless sensor nodes who shares the knowledge with one another furthermore as central system [20]

III. METHODOLOGY

The Internet of things (IOT) is revamping the agribusiness engaging the farmers by the broad assortment of techniques, for example, accuracy and conservative cultivation to travel up against challenges within the field. IOT advancement aids in assemblage information on conditions like atmosphere, temperature and productivity of soil, harvest web watching engages area of weed, level of water, bug acknowledgment, animal interference in to the field, alter improvement, cultivation. IOT utilize farmers to urge related along with his residence from wherever and at whatever point. Remote sensor frameworks are used for checking the farm conditions and small scale controllers are wont to control and robotize the property shapes.

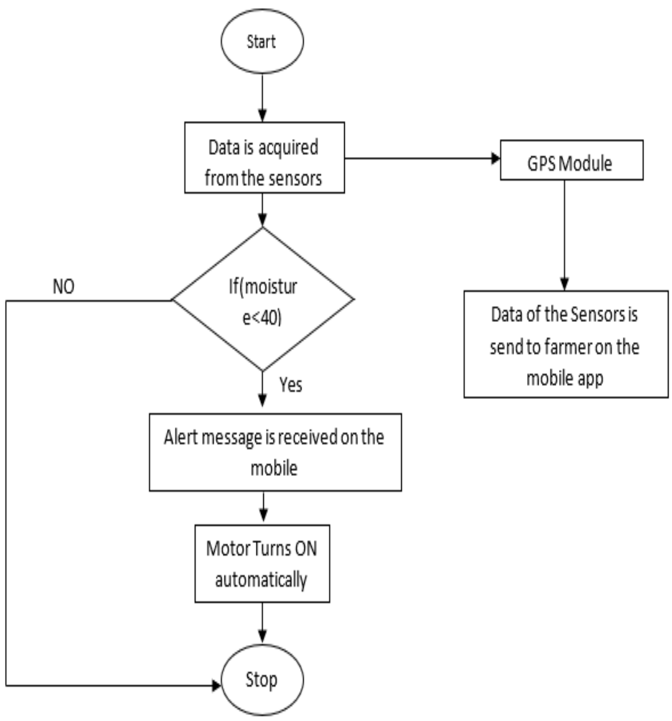

Figure 2: flow chart of the system

We used IBM platform (Fig. 1) as our local host, though we will know exact situation in our field. With the assistance of temperature sensor, humidity sensor we are able to know all the needed things.
Fig. 2 shows the flowchart that describes the answer process.

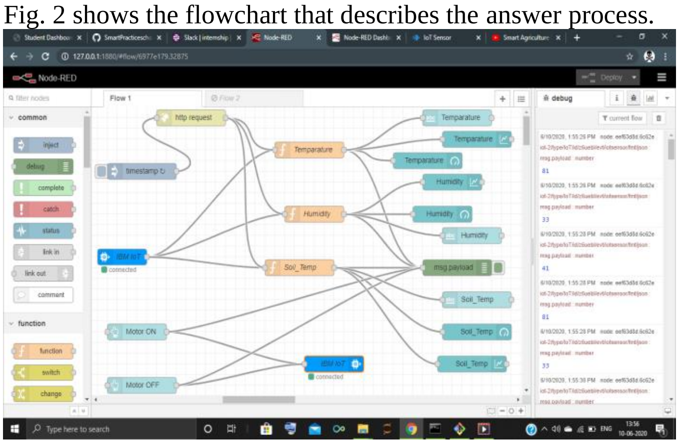

Figure 3: Circuit Diagram

IV. EXPERIMENTATION

For prototype implementation of the Smart Agriculture System, we wrote the program. Also, we used Other components like temperature Sensor, Humidity sensor, API key (To get real time weather condition).

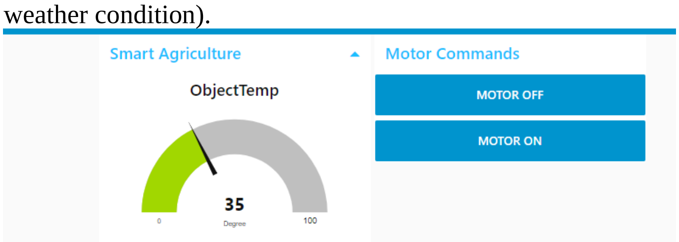

Figure 4: result interface

objective of this paper is to make a prototype model, which may be easily installable within the field and is additionally easy to use as farmers won't have the technical knowledge. With the employment of IoT the system is automated, so everyone can understand that.
Here we use NodeRed as circuit-maker platform. Here we use IBM IoT sensor which is connected with temperature sensor, humidity sensor, soil temperature sensor and it also control motor command.
We have used the Weather API (Fig. 3) to induce real time atmospheric phenomenon and forecast of tomorrow's weather, so we are able to steel on self for worst case in ahead.

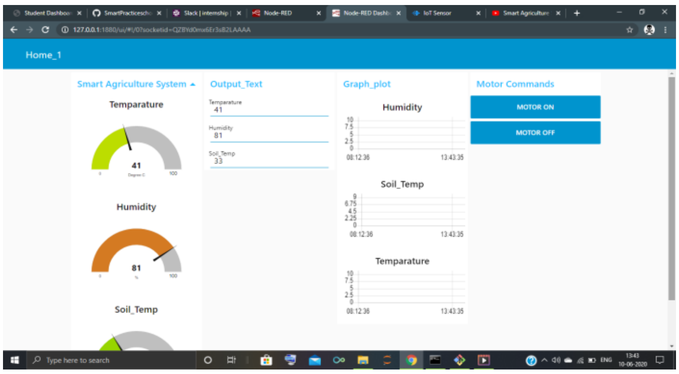

Figure 5: output interface

Object Temp defines ground temperature and if its cross 40®C then automatically Motor will be ON (Fig. 4).

V. RESULT & DISCUSSION

In the proposed model of Smart Agriculture System, we've followed the subsequent procedure for motor command turn on/off.

1. Set threshold values for all the sensors.
2. Fetch Current Value (Fig. 5).
3. If current value is larger than threshold values, then motor are going to be automatically on.
4. Send all the information to cloud continuously

This is output interface of our prototype model. It will continuously be updated by own, and it'll be showing real time data. For the programming part we use python as programming language. (For source code https://github.com/SubhamPatra007/smart-agriculture-system-based-on-iot-course)

VI. CONCLUSION

The proposed model explores the utilization of IoT (Internet of things) within the agriculture sector. This model aims at increasing the crop yield by helping in predicting better crop sequence for a selected soil. IBM IoT platform helps in real time sampling of the soil and hence the information acquired are often further used for analysing the crop. We've got also taken many readings of the soil moisture, temperature and humidity of the environment for various days at different times of the day. Data on the cloud also helps the agriculturists in improving the yield, evaluating the manures, illness within the fields. This proposed system is cost effective and feasible. It also focuses on optimizing the employment of water resources which combat issues like water scarcity and ensures sustainability. This model focuses on the employment of IoT in agriculture and also the solutions proposed during this paper will improve farming methods.

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