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Implementation of IOT based Communication on the Agriculture Field using TCP/IP Protocol

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***Abstract*:- Implementation of iot based communication on the agriculture field using tcp/ip protocol is project in which brain as a arduino microcontroller. We have used in our project humidity sensor, temperature sensor, NPK sensor, soil moisture sensor. In our project we have utilised iot based cloud platform to store and retrieve data of soil communication in which we will be having more scalability. So we can access the cloud data from anywhere in the world.**

Index Terms—IOT; Arduino Microcontroller; Cloud; Communication

I. INTRODUCTION

IOT has capacity to transform the lives of people in the world in an efficient manner. The consistently developing population would contact multiple billions out of not many a long time.. So, to give such an huge population, agriculture industry need to embrace IOT. The demand for more food has to address challenges that include immoderate climate conditions. weather, the change and different environmental affects that results from farming practices.The destiny of Indian agriculture must be worked with understanding and immoderate technologies that can expand production and the regains of attention of farmers in this industry. So, these smart farming techniques would assist farmers to lessen quarrel and enhance capacity. It is basically a high tech and capital in-depth system for growing crops in a supportable manner for masses. This technology can help farmers to monitor field conditions from anywhere in the world with the help of sensors with an automated system. This is the application of Information and communication technology into the agriculture field.

II. LITERATURE REVIEW

This paper presents an IoT based smart stick that empowers live monitoring of the different agricultural parameters. This stick helps farmers to get the live data of temperature, soil moisture.

The agricultural IoT stick gives the idea of plug and calculates in which farmers can immediately constitute smart monitoring system by positioning the stick in the field and obtaining live data feeds on different smart gadgets like smart tablets, phones and the information which is produced through sensors could be simply inspected and proceeded by agricultural experts even in remote areas via cloud computing technologies.

In lots of research papers it is devised that information should be collected from various sensors and live monitoring must be done but in this research paper the pressure is laid on getting things automated. In this paper the authors aims at expands the crop yield by using different technologies.

It also presents a cost efficient wireless sensor networks for getting information from humidity sensor, soil moisture sensor and temperature sensors. This paper suggests an automated system for good crop production. The author suggests a methodology that does sensing of data smartly and also suggest a smart irrigation system. In this model various sensors are interfaced with raspberry pi hence making an systematic wireless sensor network.

III .EXISTING METHOD

Wireless underground sensor networks play an vital role in various applications such as communication through underground such as soil. A new type of communication called magnetic induction(MI) was

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introduced to have more efficiency . In the magnetic induction method there are number of magnetic coils in the wireless underground sensor network(WUSN) transmitter which connects to the universal asynchronous receiver transmitter (UART) module which is used for serial data communication . Using this magnetic induction method attenuation level is too low so that the data can be transmitted more efficiently.

The comparison between MI wave guides and direct MI transmission deployment schemes is being taken and different optimization techniques are proposed .By using this optimal set of system parameters which are used to increase overall channel capacity of the weak link and

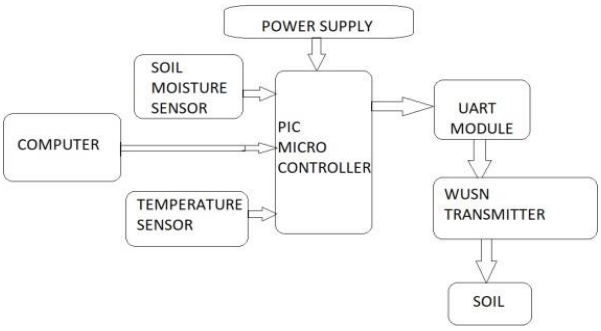

Fig 3.1 block description of existing method

therefore the data rate can be optimized. The transmission distance of the MI waveguide can be increased by applying the optimized system parameters.

Magnetic Induction(MI) base WUSN mainly consists of sensors as the number of sensors increases the accuracy increases as well as from which it could be able to obtain real time data and also encourages to use large number of nodes .A huge number of multiple sensors implemented in the sensor networks can be utilized in the process of reducing the loss in measurements or the channel utilization.

A .Drawback:

In this existing method it uses magnetic induction with UART modules. Only small distance communication is possible.if any soil spilt is occur the all data will not recover.it is quite complex.

The proposed method is simpler as well as affordable.it has a long distance communication is possible. it uses cheap yet technology more advantages in this proposed method.

IV.PROPOSED METHOD

Agriculture is done in every country from ages. Agriculture is the science . It is Art of cultivating plants. Agriculture was the key development of the rise of human civilization. Agriculture is manually from ages. The world going into new technologies and it is a necessary goal to grow up with agriculture. so, IOT plays different role in agriculture. Internet Of things sensors are capable of providing information about agriculture fields.IOT based communication on the Agriculture field using TCP/IP protocol wireless sensor networks that collects data from different sensors deployment at various nodes and sends it through the wireless protocol. A system powered by Arduino, it consist of Temperature sensor ,Moisture sensor ,NPK sensor ,Humidity sensor and GPRS module. When IOT based communication on the agriculture field starts it checks the soil temperature level ,moisture and Humidity level, NPK sensor(Nitrogen, phosphorous, Potassium) level. LCD Display displays the all readings. This all is also seen in IOT where it shows information of Humidity ,Moisture level, NPK level, temperature level with date and time based on per minute. Temperature can be set on a particular level ,it is based on type of cultivated crops. fig4.1 the block diagram description given below:

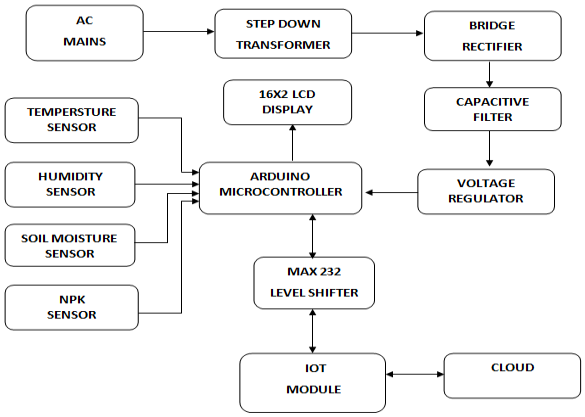

Fig 4.1 Block description of proposed method

A) Arduino :

It is an arduino uno R3 SMD module we use arduino as a controller. Arduino board is a low cost and low power microcontroller series. Arduino is an open-source microcontroller board .

Arduino is a brain of our project. All sensors, display and iot module are connected in arduino board and the codings are dumped in the microcontroller.When the power supply is given to the arduiono board it will be working with that manner.

B) Temperature sensor:

A temperature sensor is used to convert temperature value into electrical value. Temperature Sensor are the key to read

Fig 4.2 Temperature sensor

temperatures correctly . initially Once the board is activated, LCD display will start showing the exact temperature in that particular place. Hence this sensor helps to detecting the temperature accurately.

C) Humidity Sensor:

A humidity sensor or hygrometer sensor senses, measures and reports both moisture and air temperature in particular

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Fig 4.3 Humidity sensor

area. Humidity sensor detecting the changes that alter electrical currents or temperature in the air. There are three basic types of humidity sensors that is Capacitive humidity sensors, Resistive humidity sensors, Thermal conductivity humidity sensors.

D) Soil moisture sensor:

Fig 4.4 soil moisture sensor

The direct measurement of free soil moisture requires removing, drying of a sample, soil moisture sensors consider the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons . As water is used by plants or as the soil moisture decreases, water is drawn from the sensor and resistance increases. Conversely, as soil moisture increases, resistance decreases.

E) NPK sensor:

NPK sensors is based on the interaction between incident light and soil surface properties, such that the characteristics of the reflected light vary due to the soil physical and chemical properties. it measures the soil nutrients value.

Fig 4.5 NPK sensor

It will be inserted into the soil.ewhen the board is activated,LCD shows the soil nutrients value.

F) IOT module:

Fig 4.6 IOT module

The Internet of Things is developing at a rapid pace of small and inexpensive computing hardware. IoT development boards are combine microcontrollers and processors with wireless chips and other components are a pre-built, ready-to-program package. in this iot module is used as a wifi chip with hotspot username and password.
It is directly conneted to the arduino board.it will be gives the cloud data.

G) Cloud storage:

Cloud storage is a cloud computing model. It stores data on the Internet through a cloud computing provider ,who has manages and operates data storage as a service. It is delivered on demand with just-in-time capacity and costs, and it will be eliminates buying and managing your own data storage infrastructure.

V. RESULT

The output is generated from the sensors connected in the arduino.the figure5.1 shows the hardware setup

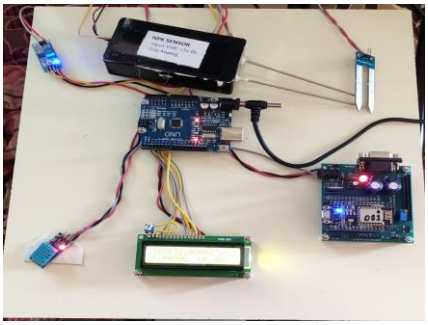

Fig 5.1 hardware setup

the LCD display shows the real time sensors values accurately. the IOT module with wifi is connected and the data will be stored in the IOT cloud storage .the day to day data will be stored with the time and date accurately. The LCD display output is also given in the figure 5.2

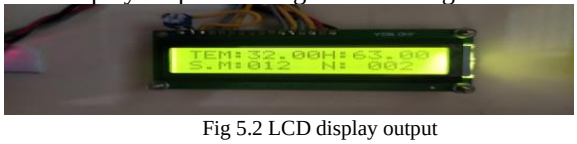

Fig 5.2 LCD display output

Then the iot cloud data is stored in day to day life .it will be stored with the accurate time and date.

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TABLE I

Log ID	Data	Log data	Log time
1	S:245_T:35.00_H:62.00_N002	04/19/2021	13:27:13
2	S:245_T:35.00_H:62.00_N002	04/19/2021	13:27:29
3	S:245_T:35.00_H:62.00_N002	04/19/2021	13:27:46
4	S:245_T:35.00_H:61.00_N002	04/19/2021	13:28:02
5	S:245_T:35.00_H:61.00_N002	04/19/2021	13:28:29
6	S:245_T:36.00_H:60.00_N002	04/19/2021	13:29:46
7	S:245_T:36.00_H:60.00_N002	04/19/2021	13:29:54

The data will be stored in day to day if we saw the data through mobile ,personal computer ,tablets etc.in this table I
Shows the stored cloud data.

VI.CONCLUSION

Thus the system is useful to monitor the parameters for agriculture such as temperature, humidity , moisture, Nutrients via iot module. The system reduces the manual work and man power. This set up was carried out to using by arduino uno, temperature and humidity sensor, soil moisture sensor, npk sensor and iot module. The thing can be developed to control the manual work and man power. This set up was carried out to using by arduino uno, temperature and Humidity sensor, Soil Moisture Sensor, npk sensor and iot module. the thing can be developed to control the system through the any internet using gadgets. damage caused by predators is reduced and also be used to increase the productivity and it will be collect information in order to maximize yields . iot sensors capable of providing farmers to the information about crop yields, pest infestation and soil nutrition are valuable to production and offer the precise data.

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REFERENCES

[1] TJTVV prasad reddy,C Sandeep Kumar,K suman,U Avinash,Harisudha Kuresan“Wireless underground sensor network using magnetic induction”july 28-30,2020,india

[2] Xiaoqing Yu1, Pute Wu1, 2, 3, *, Zenglin Zhang1, 3, Ning Wang4,and Wenting Han1, 2, 3“Electromagnetic Wave Propagation In Soil For Wireless Underground Sensor Networks”

[3] A Survey on the Role of IoT in Agriculture for the Implementation of Smart Farming Muhammad Shoaib Farooq1 , Shamyla Riaz1 , Adnan Abid1 , Kamran Abid2 , Muhammad Azhar Naeem2 1Department of Computer Science, University of Management and Technology, Pakistan 2Department of Electrical Engineering, University of the Punjab, Pakistan

[4] C.Kamienski, J.-P. Soininen, M. Taumberger, R. Dantas, A. Toscano, T. S. Cinotti, R. F. Maia, and A. T. Neto, ‘‘Smart water management platform: IoT-based precision irrigation for agriculture,’’ Sensors, vol. 19, no. 2, p. 276, 2019.

[5] X. Zhang, J. Zhang, L. Li, Y. Zhang, and G. Yang, ‘‘Monitoring citrus soil moisture and nutrients using an IoT based system,’’ Sensors, vol. 17, no. 3, p. 447, 2017.

[6] S.Sivachandran, K.Balakrishnan, K.Navin, “Real Time Embedded Based Soil Analyser”, International Research Journal of Engineering and Technology (IRJET). Volume: 3 Issue 3 | March 2014

[7] Anand Nayyar, Er. Vikram Puri, “IoT Based Smart Sensors Agriculture Stick for Live Temperature and Moisture Monitoring using Arduino, Cloud Computing & Solar Technology” May 2015

[8] Chandan kumar sahu, Pramitee Behera, “A Low Cost Smart Irrigation Control System”, IEEE sponsored 2nd International conference on electronics and communication system (ICECS2015)

[9] Apurva C. Pusatkar, Vijay S. Gulhane, “Implementation of Wireless Sensor Network for Real Time Monitoring of Agriculture”, International research journal of engineering and technology (IRJET). Volume: 03 issue: 05 | May-2016

[10] Laxmi C. Gavade, A.D Bhoi , “N, P, K Detection and Control for Agriculture Applications using PIC Controller”, International Research Journal of Engineering and Technology (IRJET). Volume: 6 Issue: 4 | April 2017

[11] Mrs.T.Vineela, J. NagaHarini, Ch.Kiranma, G.Harshitha, B.AdiLaksh, “IoT Based Agriculture Monitoring and Smart Irrigation System Using Raspberry Pi”, International Research Journal of Engineering and Technology (IRJET). Volume: 5 Issue: 1 | Jan 2018

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