Smart Monitoring of Agricultural Field And Controlling of Water Pump Using Internet of Things

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Abstract- In present days, we preferred automation in every sector .Automated systems are bendy to use. It offers with large precision and consistency with high term operation as fair the manual operated systems. The tribulations faced by the farmers in the agriculture method are anxiety in these days. Our effort is to make an achieve the mechanization implementation to manage electrical motor which is used in agricultural domain. It is a nature work hence the use of devices distributed sparely. In real time it is very complex for farmers to run and operate these devices .Our proposed system that enables us to power the devices over GSM base and can translate the signals from the associated sensors in the ground and electrical parameters that can send to the user. As GUI were elaborate for android devices and perform testing to switch ON and OFF of the motor propel and data collected from the sensors that can store in the user database.
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Keywords— GSM; SMS ;database ; mobile.

I. INTRODUCTION

Internet of Things is a system where the physical devices communicate among themselves where the devices are connected together in addition internet is enabled. IoT is a large network where physical devices and the people interact with each other and also data is shared among them. The interrelated connection can also be at distant places . This IOT provides high security and makes more comfort for human life. This system can be used wherever needed. The devices which are implanted need to be exposed to internet impact. Some of the real time objects used under IOT are MRI, traffic lights, microwave ovens, washing machinery. Iot is said to be used as in our project for reducing the work of human in the field of agriculture. Here we are said to introducing the technique of which the motor which showers the water in to the field is said to be automatically controlled by fixing a moisture level in the sensor by feeding some code in to it and based on the moisture level fixed as it reaches to that level the motor is said to be switched off automatically and also the message is said to be intimated to the user in his mobile.

II. LITERATURE REVIEW

This supported system was based on the arrangement of the sensors and impel network knowledge. Here fuzzy judgment is used to hold irrigation executive in agriculture. Farmers practice and apply are modeled through via fuzzy law sets and the result of arithmetic soil and crop model are provided a resource irrigation schedule. Some of measures which are followed to reduced the misuse of water and exploit the give up according the weather situation .The methodology is embedded in gate way network making scheme, a smart and self-governing wireless decision system support. Some of notable number justification and experiments perform the north Italy point. Water economy methods which are based on the threshold parameters were improved utilization of the irrigated stream to reduced the percoliation phenomenon without effecting quality of crop.[1]

The sensors nodes that available energy and enables features where estimate the lingering life time of each sensor the sensor nodes structure for a acquirement for a long range. It is the theoretical model for a sensor node and life time network. These nodes are used to observe soil and thus SOUL mainframe system replica were implemented in meadow conditions. Life time of sensor nodes was bigger by 5.7 times when balanced with predictable use.[2]

IOT is used to play a critical position in the elegant agriculture. This technique is emerging model ,since IOT sensors that are able to provided that information about

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agricultural field. This paper goal is making of evolving technology. Smart agriculture and Iot are used by automation .Environmental monitiring factors are to improve the yield.The features of the model that includes monitor humidity in farming via sensors using CC3200 only chip.where camera has been interfaced with CC3200 for taking images and sent pictures throughout MMS to users mobile phone.[3]

The traditional agriculture is transform to smart agriculture due to IOT. The efficiency and power consumptions are key factor to make IOT system useful and suitable to farmers. This model ,said to be a less power ,low cost of iot networks for cultivation system.The dampness content have used in the house urban sensor and system of IITH mote power communication.The cost and power are di metrics which used to evaluate the networks.The Output show planned network consumes lesspower and has standard 83% life span at small rate compared to previously proposed set-up in the field.[4]

The paper presents,precision agriculture that is used to get gaint productivity and good use of resources .when balance the traditional methods that sets output in lower costs with good yields.One of this activity in the crop farming is irrigation while the farming vis monitoring of health. The paper is detailed about di feasibility studies on IOT solutions for automated irrigation and study monitoring animals.Each of these concepts are verifies to operate field conditions.[5]

III. EXISTING SYSTEM

The smart mobile which works on Android is said to communicate with the microcontroller. The primary work of the farmer is to control the motor device and get the Specifications on the mobile device. An app named "GSM Control " which runs in the smart mobile sends a data to the GSM module depends on the data of remote devices.

The GSM based SIM 900 module interacts between thesmart mobile and the microcontroller . The mobile communicates with the arduino wireless microcontroller using GSM . The GSM module will send and receive the voice calls through a microcontroller . The commands are used to transfer the data . specifications . The module is integrated with Transmission control protocol .

Atmel's Duemilanove is a 8 bit microcontroller board which uses a flash memory of about 32 KB.

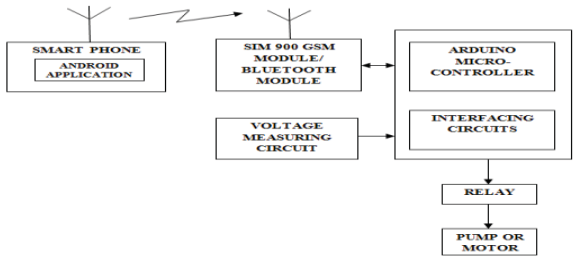

Fig. 1. Existing System Agriculture Architecture

IV. SYSTEM DESIGN

A. *Node MCU ESP 8266*

This is an IOT based open platform which is designed on the basis of ESP-12 module. Here "Node MCU" is termed as firmware. The language used in this component is Lua script.It is built on Espressif Non-OS SDK for ESP8266.

Fig. 2. Node MCU ESP 8266

B. *GSM module sim 900 a*

This is an wild substantial and authenticated wireless component. The SIM900A is a whole Dual-band GSM/GPRS elucidation in a SMT component which can be implanted in the client application allowing you to benefit from small extent and money-spinning solutions. Featuring an industry-standard interface, the SIM900A deliver GSM/GPRS 900/1800MHz act for voice, SMS, Data, and Fax in a small form feature and with low power deployment. With a minute pattern of 24mm x 24mm x 3 mm, SIM900A can fit almost all the space necessities in your application, especially for slight and compressed stipulate of blueprint.

Fig. 3. GSM module sim 900

C. Mobile

A mobile is a device which is lightweighted one in which so much of technologies are used under in this single device.They are shortly known as handheld computers

Fig .4. Mobile Device

D. Relay Module

Relay is none other than simply said as switch . Here no connection is established between low voltage circuit and high voltage

Fig. 5. Relay module

E. Soil Moisture Sensor

.When there is more water, the soil will conduct more electricity which means that there will be less conflict. Therefore, the dampness level will be elevated.

Fig .6 .Soil Moisture Sensor

F. Firebase

Firebase is a mobile phone and web app enlargement proposal that provides developers with a excess of tools and services to help them extend high-quality apps, growth their user base, and earn more profit. Firebase include an easy-to-use hosting service for all of your static files.

Fig.6. Firebase in IOT

Firebase Hosting is production-grade web content hosting for developers. With this single control, you can install web apps and provide both static and dynamic substance to a large-scale CDN. With a single rule, you can quickly organize web apps and serve both static and dynamic content to a global Content Delivery Network.

In our project, Firebase is used for the following below benefits:

- **Real time database:**
  Database is stored in the devise of JSON and to be synchronized with clients in real-time. Here in our project real time values are stored in the firebase.
- **Offline works:**
  The purpose on Firebase is maintained even the interruption of internet connection. Once the data are write to the cloud, it will be store at the local database of Firebase.
- **User Authentication :**
  Firebase Authentication provides backend services, easy-to-use SDKs, and ready-made UI libraries to authenticate users to your app.

F. Overall Architecture

The structure uses a basic, low cost 8-bit microcontroller; a GSM component and smart phone. The system architecture is shown in Figure .

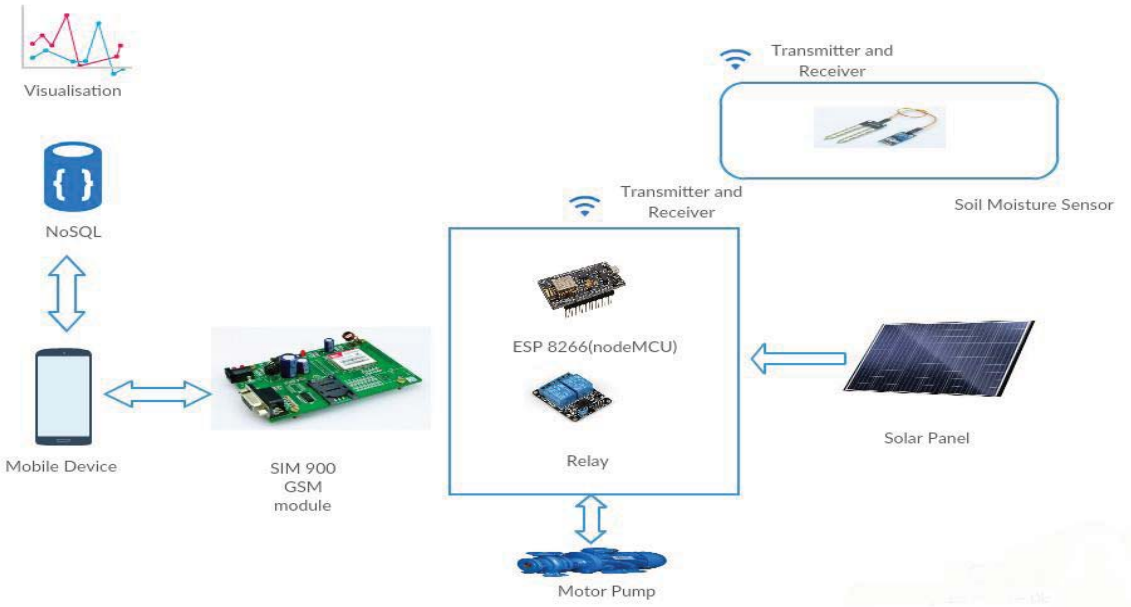

Fig .7. SAA Smart Agriculture Architecture

Our suggestion is based on accumulation of soil moisture sensor in the farms, which is used to find the existing moisture level of the soil .A particular sensor level is fixed originally, during the setup of the sensors. When the particular level has been reached, a text message is sent to the user mechanically. From this message the user gets alerted and stops the motor using mobile , which is

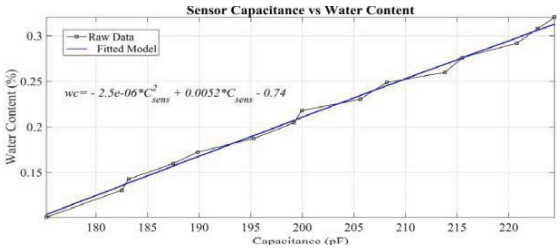

Fig. 8. Graphical representation of moisture level

connected to the motor via IOT. In addition, a relay is used to monitor the presence of current for operation of the motor. This helps to know if the motor is running or stopped

The solar panel provides power supply to the sensors for the purpose of charging the server system which are fixed at the outdoors, so that the system is relevant to an agricultural surroundings even there is no external power supplied. IOT serve the farm field through sensing local agricultural parameters, dependable transfer of data and intelligent decision support and early warning", which corresponds to the three layers of IOT, namely, perception layer, network layer and application layer. The perception layer mainly consists of Ubi-Sense mote. The network layer is the third level of the Open Systems Interconnection Model and the layer that provide data steering paths for network contact. Application layer is highest layer in the architecture extending from the client ends. It is the interface between the end devices and the network. This layer is implemented through a dedicated application at the device end.

Apparent Density	2.65 mg/cm^3
Global Density	1.4 g/cm^3
Sand	81.29 %
Silt	12.15 %
Clay	6.56 %
Organic Matter	0.5 %
Electrical Conductivity	76 S/cm

Table.1. Soil Sample Parameters

The variation found in soil water content from saturated (32%) to the minimum moisture (10%), resulted in a sensor variation of 49.4 pF. This change of capacitance, when using a 36 pF reference capacitor, setting the V_{ref} to 469 nV and V_{o1} to 360 nV, resulted in a V_{est1} variation of 15 nV. Using these voltage reference limits the experimentally observed moisture variation resulted in a 153 LSB shift in the ADC.

Also, the choice of these voltage limits had to agree with the built-in temperature sensor specifications. The resolution and range limits of measurable temperatures are

dependent of the SFE configuration parameters. Using the specified configuration setup in this work, according to the manufacturer manual, the sensor tag is capable to measuring temperatures in the range of 0.3 ºC to 59.6 ºC with a 0.058 ºC resolution.

The read range observed was 1.1 meters. The divergence between the calculated and observed distances may be due to difference between the considered chip input impedance. This fact can affect the matching coefficient, which previously was considered to be 1.

V. CONCLUSION

This paper depicts the development of smart monitoring of agriculture land.This concept is adopted in this research to conducted the connectivity of the sensors devices in agriculture farm. This prototype model and functions of the sensors are observed on controlling the pump motor.

By using this technique it reduces work load of the farmers and also power consumption is reduced .In addition to that data stored in the firebase can be referred in future for the intelligent control action better than the existing. This papers aim to active the implementation of smart IOT farming and monitor the smart farm conditions through mobile device.

VI. REFERENCES

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