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SMART SYSTEM MONITORING ON SOIL USING INTERNET OF THINGS (IOT)

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Abstract - *The cultivation in our nation is much reduced due to lack of interest, scarcity of agriculture land and water and some farmers with their own interest they have been doing the cultivation at the present. But that also yields to very less production due to lack of awareness about the land dryness, no timely pesticide usage and suitable crops for the land. Hence the smart agriculture plays a vital role in promoting cultivation. It gives the solution by means of placing the sensor in the cultivation land to measure the soil efficiency. In this paper it describes how the sensed data will be processed and stored in cloud and from cloud the data will be relayed to the registered farm owners through their pH one or device in user understandable form. Also if pH rate of the soil is low the application suggests the pesticides to be used to improve cultivation .This will be very helpful to the farmers who are away from the land, and improves the crop cultivation.*

Key Words: **Agriculture, Soil, pH rate, Moisture level, Sensors**

1. INTRODUCTION

The Internet of Things (IoT) is playing vital role in present world specially, the Internet of Things (IoT) is transforming the agriculture industry and enabling farmers to contend with the enormous challenges they face.

The industry must overcome increasing water shortages, limited availability of lands, difficult to manage costs, while meeting the increasing consumption needs of a global population that is expected to grow by 70% by 2050.

New innovative IoT applications are addressing these issues and increasing the quality, quantity, sustainability and cost effectiveness of agricultural production. Today's large and local farms can, for example, leverage IoT to remotely monitor sensors that can detect soil moisture, crop growth and livestock feed levels, remotely manage and control their smart connected harvesters and irrigation equipment, and utilize artificial intelligence based analytics to quickly analyze operational data combined with 3rd party information, such as weather services, to provide new insights and improve decision making. solution providers looking to build and sell new smart agriculture IoT applications, agriculture equipment providers looking to add additional value with IoT to their customers, and farmers themselves are recognizing that they can capitalize on the opportunity IoT presents to capture real economic value. In the end, it's about making the right strategic choices, selecting the right partners, and quickly delivering to market the right capabilities to create and sustain your leadership position. Sensors provide the first purpose built IoT platform designed to meet the unique needs of today's connected world. As the leading IoT platform, It delivers the security and scalability to handle millions of daily transactions. With Sensors you can deliver powerful, new smart agriculture IoT solutions in a fraction of the time of other approaches.

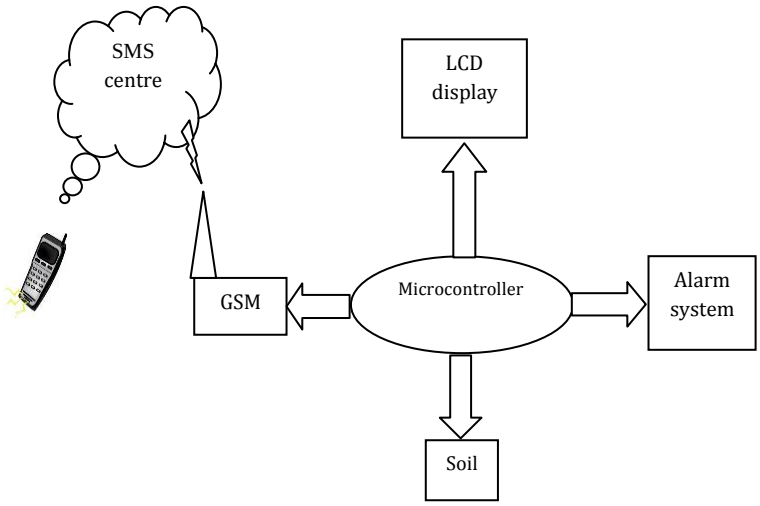

Fig -1: Empirical view of Smart Farm

1.1 Working Nature of Sensors

The Sensors can help you:

- Easily collect and manage the explosion of data from sensors, cloud services such as weather or maps, connected equipment and existing systems.
- Quickly build and bring to market new innovative IoT applications at 10 times the speed of other approaches with our rapid application development environment and drag and drop mash up builder.
- Leverage big data and analytics to provide new insights and recommendations to aid in better decision-making. Enable farmers to easily visualize

data and take action on insights and recommendations.

2. EXISTING METHOD

Traditionally, it was a custom to get these vital signs measured during a visit to the doctor. With advances in medicine and technology this concept has adapted. There are many device available in the market today that allow patients to monitor their own health on a regular basis from the comfort of their home. These devices are having a huge impact on healthcare costs as they are reducing the time and resources of medical Physicians and facilities required by patients.

This advantageous for both patients and Physicians. Patients can monitor their health regularly and adjust their diet and Physical exercise as needed to keep their vitals in balance. Health care professionals can access this information from their mobiles via wireless network and can check their patient's vitals at their own time .If they notice abnormalities, they can always schedule an appointment with their patients. The project aims in designing a system which is capable of tracking the location of cardiac patients and also monitoring of blood pressure, heart rate and temperature alerts in case of emergency through SMS to predefined numbers.

3. PROPOSED SYSTEM

In an existing system they have focused only on patient monitoring ,In our proposed work it is going to be focused on the agriculture. By using the same existing the soils pH rate, Temperature, water level can be monitored using the wireless sensors. soil can monitor their pH rate, temperature regularly .The monitored report of their land can access this information from their mobiles via wireless network and can check their pH rate at their own time. If they notice abnormalities, they can immediately notice their land and use pesticides to overcome the abnormalities .This project aims in designing a system which is capable of tracking the soil resource level and monitoring PH rate, water level and temperature alerts through SMS to predefined numbers.

Advantages

- Reduces the farmers workload
- Alerts on soil resources to the predefined number
- Works anywhere in the world

4. SYSTEM DESIGN AND IMPLEMENTATION

In this method the sensor are connected to an 8 bit PIC 16F877A micro controller .The reason for choosing PIC It Is of low cost and it consumes low power. It's a 33 pin micro controller where we have ports distributed as 6,8,8,8,3 pins. The data will be displayed on the LCD screen .The program is written in Embedded C language and the software that had been used in MPLAB.

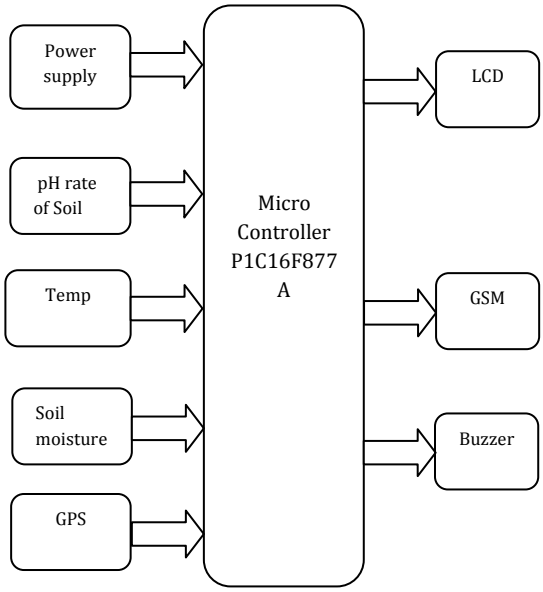

Fig -2: Block diagram of Smart Farm Monitoring System

The vital sign values are displayed on the LCD .From the transmitter the recordings are sent as an SMS to the care taker or the expert which have been given as the recipient. The Temperature is measured by LM35,a precision integrated circuit temperature sensor whose output value is proportional to the Celsius temperature . It's three pin IC where we have supply output and ground connections. pH rate sensor is of clip mode where we can assess the pH rate by placing sensor in soil for one minute.

5. EXPERIMENTATION AND RESULT

By placing the sensor kit into the agriculture land. The sensor will measure the Temperature, pH rate, Water level of that particular soil and sends the information about the abnormalities or low pH rate of the soil. By sensing the soil frequently and suggest the type pesticides to be used .This reduce the farmers workload because the farmer get the intimation about the crop yields and soil .By implementing this smart agriculture it improves the crop yielding and reduce the human workload. The gathered information sends and stored in the cloud environment from there the data will be sending to the registered user to their devices.

Fig -3: Working Device in Farm Land

6. CONCLUSIONS

The remote monitoring of the soil pH rate and its temperature rate has been done with the very minimal cost. The values can be viewed by the farmer's anywhere in the world at any time. Hence this system gives more accurate pH rate and temperature rate of the soil which play vital role in the agriculture. The temperature sensor, Humidity sensor and soil moisture sensor can be interfaced to the microcontroller to assess any further data.

A reliable and continuous vital sign monitoring system targeted towards the each farmer's land has been successfully built. The resulting system was also low in power and cost, non invasive and provisional real time monitoring on the agriculture. It is also easy to use and provide accurate measurements

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