Smart Agriculture Using IOT

Sushmitha.S[1], Vinaya.Naik[2], Thirtha. A L[3], Rohan.R[4], Prof. Aneesh Jain[5]

[1, 2, 3, 4]*UG Students, Department of ECE, Alva's Institute of Engineering and Technology, Mangaluru, Karnataka, India*

[5]*Assistant Professor, Dept. of ECE, Alva's Institute of Engineering and Technology, Mangaluru, Karnataka, India*

Abstract: **- Climate changes and rainfall which are rapidly changing over the past few decades are affecting the agriculture along with some of the old cultivate methods of farmers too. Due to this in recent era, climate-smart methods called as smart agriculture is adopted by many Indian farmers. Technology is getting developed faster which could help our farmers. Out of these technologies IOT (internet of things) or in other words can be called as wireless sensor networks (i.e., wireless communication with remote monitoring) is one of the efficient technology growing fast, wide with vast amount of applications. Major objective of the paper is to work with real time applications. The main features of this paper include temperature and humidity detection, soil moisture detection, leaf wetness detection, wind speed/direction and rainfall detection, soil ph detection and efficient irrigation system. All these information are sent to farmers as alerts or through short messaging services and advice them on weather pattern and crops etc.**

I. INTRODUCTION

India is land of agriculture and farmers are called as the backbone of India. Well agriculture is one of the important thing for us nothing survives without agriculture. Food prices are continuously increasing because crop rate is continuously declining. Nearly 50 million people into poverty since 2012. The iot contributes significantly towards innovating farming methods. Farming challenges caused by population growth and climate change have made it one of the first industries to utilize the iot. The integration of wireless sensors with agricultural mobile apps and cloud platforms helps in collecting vital information pertaining to the environmental conditions – temperature, rainfall, humidity, wind speed, pest infestation, soil humus content or nutrients, besides others linked with a farmland, can be used to improve and automate farming techniques, take informed decisions to improve quality and quantity, and minimize risks and wastes. The app-based field or crop monitoring also lowers the hassles of managing crops at multiple locations. For example, farmers can now detect which areas have been fertilized (or mistakenly missed), if the land is too dry and predict future yields.

II. LITERATURE SURVEY

Precision agriculture is one of the most famous applications of iot in the agricultural sector and numerous organizations are leveraging this technique around the world. Crop metrics is a precision agriculture organization focused on ultra-modern agronomic solutions while specializing in the management of precision irrigation. The products and services of crop metrics include VRI optimization, soil moisture probes, and virtual optimizer PRO, and so on. Agriculture drones include crop health imaging, integrated GIS mapping, ease of use, saves time, and the potential to increase yields. Precision hawk is an organization that uses drones for gathering valuable data via a series of sensors that are used for imaging, mapping, and surveying of agricultural land. Livestock monitoring is one of the application which collects data of health of their cattle their by reducing the spreading of diseases. JMB North America is organization that offers cow monitoring solutions to cattle producers. Greenhouse farming is a methodology that helps in enhancing the yield of vegetables, fruits, crops etc. Illuminum Greenhouses is a drip installation and Agri-Tech greenhouse organization and uses new modern technologies for providing services. It builds modern and affordable greenhouses by using solar powered iot sensors. With these sensors, the greenhouse state and water consumption can be monitored via SMS alerts to the farmer with an online portal. These are some of the major applications constantly being used.

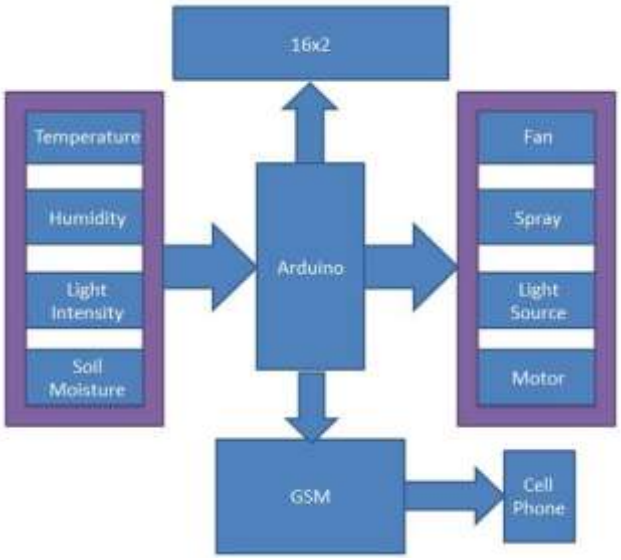
III. PROPOSED PROBLEM STATEMENT

This paper presents model for smart agriculture for real time monitoring of temperature, ph, humidity, livestock monitoring and sending sms alerts to the farmer based on the variations in these parameters

IV. PROPOSED ARCHITECTURE

The proposed architecture can be done in two methods the first method mainly consist of three modules – data side, server side and user side. It consists of five methods as follows.

1. Sensing of agricultural parameters.
2. Data collection.
3. Transferring data from crop fields for decision making.
4. Decision support and early warning based on data analysis.
5. Measures to be taken after warnings.



1. Data side

Here the data is collected from various sensors which are interfaced in the system such as

- Temperature sensor
- Humidity sensor
- Light sensor
- Soil moisture sensor

Based on the data provided from these sensor helps the user to monitor the system. In data side only the data are taken into the system

2. Server side

Here server receives the data provided by the sensors and based on some conditions provided by the user. It takes some decisions to monitor the system. If the temperature is too high then it will tend to initiate the fan inside green house or produce some coolant to cool down the temperature. And similarly the humidity sensor too. If the soil ph is less then the system understands that the crops need to be fed with water and provides water for the system. Light sensor provides light if light is needed.

3. User side

In the user side the real time data will be sent to the user mobile phone based on the variations. Each variation in data will be updated to the user through the GSM module.

In case of if any measures should be taken like if the water need to be provided to the plants then he can only monitor it through his mobile only.

V. CROP MONITORING USING DRONES

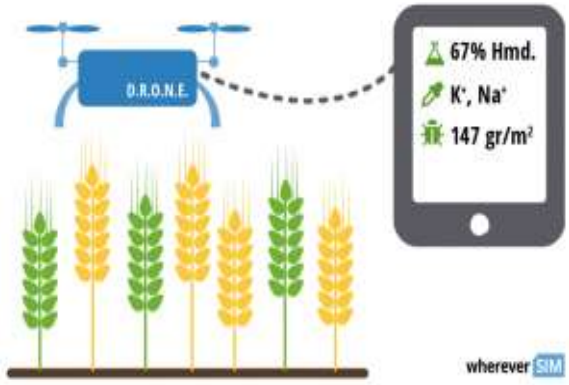
This is the second method which can be followed.

Nowadays drones can also be used to monitor the crops as shown in below figure as they have inbuilt monitoring system inside them. Real-time monitoring of connected devices is fundamental for collecting data. It also includes monitoring on the farmers side, which may help control measures like changing parameters for suitable precision farming, such as if too many or too few data has been collected, or if a specific sub-area on the field must be covered better. Observations may also lead to the creation of new data collection tasks for sensors.

Farmers could follow a drone's journey in real time since it has a tracker that can transmit its position via a mobile network to the special software or even website every few second. Being on the field the whole day, it is essential for farmers to have a tracking solution that would also work in remote areas and across borders. Hence, choosing a SIM card that could use every network is a critical component of the whole project.

SMS can play a role as an intermediate solution in large areas, helping with device distribution or middleware. However, a GSM network always can be used, even if an internet option is not available. This makes cellular a reliable and persistent channel for loT connectivity in agriculture. Consider the opportunity of direct control over all SIM cards as one of the most important features, where a farmer can manage data in real time and check and adjust data usage, location and status of the devices in the precision farming portal or via an API.

In the same way the green house and livestock monitoring can be done.



VI. CONCLUSION

Thus, the IoT agricultural applications are making it possible for ranchers and farmers to collect meaningful data. Large landowners and small farmers must understand the potential of IoT market for agriculture by installing smart technologies to increase competitiveness and sustainability in their productions. The demand for growing population can be successfully met if the ranchers as well as small farmers implement agricultural IoT solutions in a successful manner.

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