IOT Based Intelligent Farming Using Renesas With WebApp

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ABSTRACT-Agriculture is pivotal in the economy of our country. Major part of our country's population depends on agriculture and one third of its revenue depends on farming. Agricultural issues have proven to be an obstacle for the development of our country. This obstacle is over come by using precision agriculture which is improvised method of conventional agriculture. Hence this project aims at making agriculture smart using automation and IoT technologies. The main objectives of this project include soil moisture, GPRS/GSM and status notification of the system. Using this system, the agriculture factors monitored and controlled correctly because of this system there will be improvement in the productivity.

KEYWORDS- renesas microcontroller, soil moisture sensor, temperature sensor, cubesuite+, GSM\GPRS.

I. INTRODUCTION

Agriculture plays an important role in our lives as it provides basic necessities such as food and raw materials as well as ample employment opportunities. Regrettably, many farmers still use conventional methods of agriculture which results in low produce of crops and fruits. But wherever conventional agriculture is replaced by computerization the yield has been improved. Hence there is need to implement applied science and machinery in the agriculture sector for increasing the yield. Cultivation is most often used to talk about the ways that farmers take care of crops and their farms. However, it consists of various phases that are depends on the environmental factors such as Temperature, Soil moisture and water level. Farmer has to physically check the aforementioned conditions regularly which is tedious and time consuming. To avoid the above conditions automation must be implemented. For easy accessibility of the system from anywhere it needs to be integrated and coupled to Internet. Here, the concept of Cloud Computing comes. Thus, to manage all these functions Cultivation Management System comes into picture. This system allows farmers to view and access the farm information such as sensors values, devices connected and so on, with the help of micro- controller. All the above information can be accessed via Android enabled mobile phone, tabs, etc. by farmers.

II. LITERATURE SURVEY

For crop yield prediction on agriculture, predicting agricultural produce plays a key role. It can help the farmer to decide future plan regarding the production of the crop, its storage, marketing techniques and risk management [2]. To estimate production strategies for a particular type of crop in advance two methods are used. First is statistics method such as autoregressive integrated moving average (ARIMA) and Holt-Winter [2], and second is machine learning method such as Support vector machine and artificial neural network. Two data sets are used to test these methods using support vector machine and ARIMA model. First, data set is Thailand's Pacific white shrimp export data and second is Thailand's produced chicken data [2]. As per the observations mentioned in this paper, it can be said that support vector is more accurate than ARIMA. Furthermore, machine learning methods are easy to implement and faster as compared to static methods.

Agriculture in India depends on climate. The effect of rainfall in summer on the production of agricultural crops is discussed in [3]. In this paper, the past crops data are analysed to examine the crop-climate relationship. From the results mentioned in this paper, it can be stated that three factors can directly make the effect on the growth of agriculture products in India such as monsoon rainfall, the temperature of Pacific and Indian oceans, and pressure of sea level. Furthermore, the results prove production rate and amount of monsoon rainfall all over India is constant, excluding some cases.

One of the machine learning approaches used to accommodate the idea of PA is an UChooBoost [4]. Nowadays, it is required to manipulate a large

amount of digital information collected by sensors deployed on the farm. This information is used for knowledge mining by supervised learning algorithm called as UChooBoost [4]. UChoo classifier is used as a base classifier in the bootstrap ensemble. To evaluate good performance in PA votes are assigned with specific weights and highest weighted votes are combined to check the performance [4]. The extended data set is used to check the results of UChooBoost and it shows better results for agriculture data while used in the experiment. The UChooBoost can be applied for an extended data expression and used to test results for different assumptions which can help to improve algorithm performance.

To select the crop and to predict production rate of the crop artificial neural network use information collected by sensors from the farm. This information includes parameters such as soil, temperature, pressure, rainfall, and humidity. The effect of these parameters on crop growth is discussed, and results are evaluated in the paper [5]. It is observed that the atmospheric parameter, soil type, and soil composition can impact on the production rate of the crop. The technique discussed in this paper also predicts suitable crop production rate in advance. The artificial neural network is used as an

effective tool for modelling and prediction of crop production rate and go

III. PROBLEM DEFINITION (EXISTING SYSTEM)

Many farmers still use the conventional methods of agriculture. They will neither know whether the water pump is ON or OFF nor know the dry run remotely. The solution to this problem is smart agriculture by computerizing the primitive methods of agriculture. They have to physically monitor the animals while grazing and look out for any obstacles in a farm.

The following applications in the project have been implemented using Arduino and Arm Cortex.

IV. PROPOSED SYSTEM

The proposed system a at making agriculture easy and smart using mechanization and IoT technologies. The main traits of this project include controlling the water pump with/without internet through GPRS/GSM and status notification of soil moisture sensors and temperature sensors to the farmer. It also detects dry run condition of water pump and send alert to the farmer. Aims at using e- fencing to control animals while grazing and uses modern technology to detect obstacles.

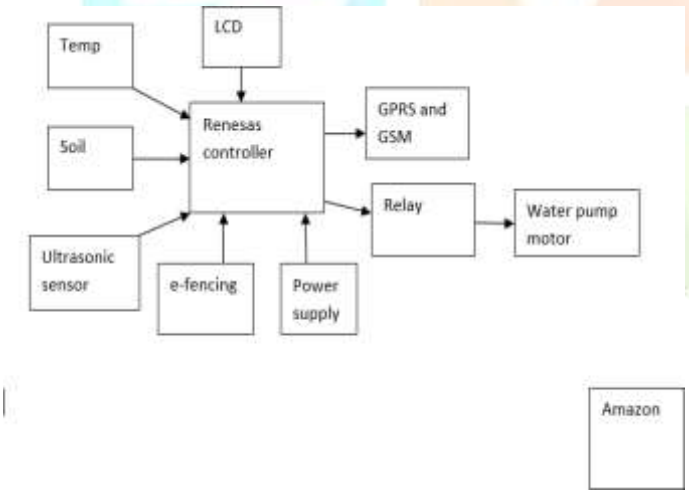


Figure1: Block Diagram.

V. RENESAS MICROCONTROLLER

Renesas (RL78) is 16bit architecture, it has 64 I/O pin (R5F100LE). It has power, controller and communication section. It has 11 I/O ports, 64kB ROM, 4kB RAM, 3 UART's, 10 bit ADC.

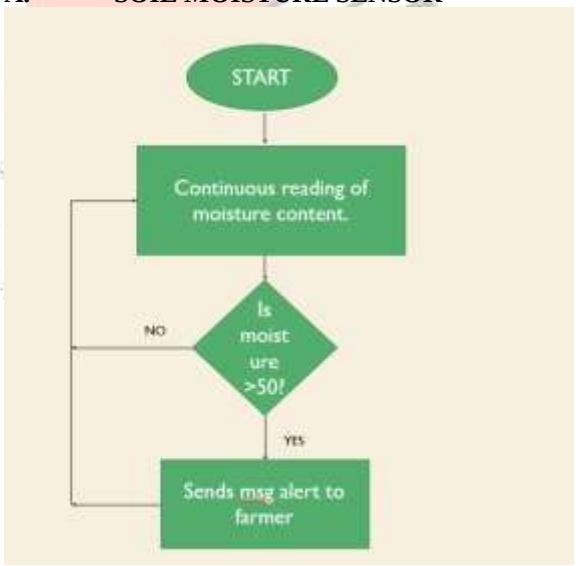
Figure2: Renesas Microcontroller.

VI. CUBESUITE+(CS+)

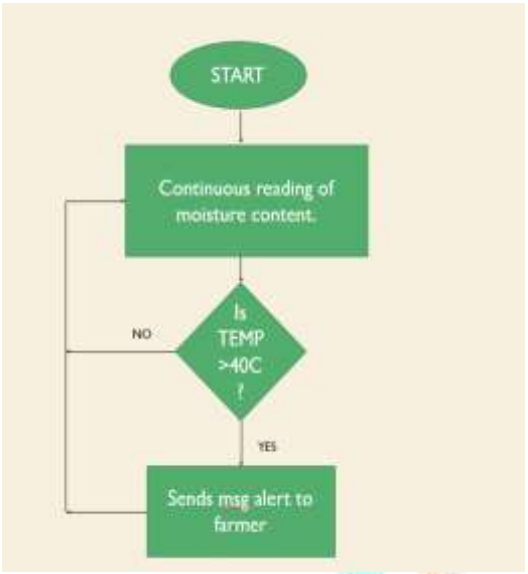
The CS+ integrated development environment provides simplicity, security and usability in developing software through recurring cycles of editing, building, and debugging.

The standard software tools can be used for developing software for Renesas microcontrollers after immediate installation. CS+ is also compatible with Renesas hardware tools including the E2 and E1 on-chip debugging emulators, which facilitates advanced debugging. Ample extensions and functions for user support ensures to be highly user friendly.

A. SOIL MOISTURE SENSOR



B. TEMPERATURE SENSOR



C. GPRS\GSM

ALGORITHM

1. Start the program, include user defined LCD, GSM\GPRS header files.
2. Display intelligent farming to indicate program activation.
3. Activate GSM.
4. Initialize GSM.
5. Farmer receives a message indicating the start of the system.
6. System keeps updating the farmer if there is any anomaly in the sensors' readings.

VII. EXPECTED OUTCOME

Automatic update of soil moisture and temperature sensors through GSM. Automatic switching ON and OFF of the motor for irrigation, obstacle detection and e-fencing.

VIII. FUTURE SCOPE

For the demonstration of this project, we have developed a prototype. This project is compact and cost effective which makes it handy and reliable. For future development in this project, a number units can be embedded along with the controller on a single board with change in technology, that reduces the size of the system.

IX. CONCLUSION

The project is designed using well-regulated modelling and is able to provide the required results.

To make the system applicable for real time purposes components with greater range should be implemented.

This project provides various benefits for the government and the farmers. By using the automatic irrigation and smart farming system framers are able regulate the usage of water by reducing wastage and reduces manual labor.

Though there is a high capital investment for this system, the overall benefits are high and economical in the long run.

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XI. REFERENCES

1. S. R. Nandurkar, V. R. Thool, R. C. Thool, "Design and Development of Precision Agriculture System Using Wireless Sensor Network", IEEE International Conference on Automation, Control, Energy and Systems (ACES), 2014

2. Joaquín Gutiérrez, Juan Francisco Villa-Medina, Alejandra Nieto-Garibay, and Miguel Ángel Porta- Gándara, "Automated Irrigation System Using a Wireless Sensor Network and GPRS Module

3. Dr. V. Vidya Devi ,G. Meena Kumari, "Real- Time Automation and Monitoring System for Modernized Agriculture" ,International Journal of Review and Research in Applied Sciences and Engineering (IJRRASE) Vol3 No.1. PP 7-12, 2013

4. Y. Kim, R. Evans and W. Iversen, "Remote Sensing and Control of an Irrigation System Using a Distributed Wireless Sensor Network", IEEE Transactions on Instrumentation and Measurement, pp. 1379–1387, 2008.

5. Q. Wang, A. Terzis and A. Szalay, "A Novel Soil Measuring Wireless Sensor Network", IEEE Transactions on Instrumentation and Measurement, pp. 412–415, 2010