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A Control System in an Intelligent Farming

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***Abstract*— Intelligent Farming (IF) is a method which is used to improve the production of crop. IF mainly consist of two parts they are sensor system and a control system. In this paper we focus on the both parts of the IF i.e. sensor system which is used to sense the data through the sensor or through predicted values and the other control system which will work on the sensed data of the sensors i.e. roofing and watering. The other application is controlling the motor through the distant place by GSM module.**

***Index Terms*— Intelligent Farming; Sensors.**

I. INTRODUCTION

Agriculture is one of the important occupations in most countries so implementing new things in this field will improve the lifestyle of people and leads to growth in nation economy.
Already farming has improved by many technologies by supporting cropping system, apart from these many technologies have been evolved in agriculture revolutionary era, they are harvesting machine, seed drill machine and others that will reduce time and man power.
Now a day's internet has involved in people's life and their daily activities. Internet which is widely used to connect people together, devices with people, or devices with devices. In an electronics device, it is embedded by sensors and software for using to exchange data and to communicate with other people and devices. When many devices are connected together through the internet is called Internet of Things (IoT). This method can also be used but here we are implementing through sensed data from the sensors not a predicted value from web service.
Recently there are few research works on smart farming [1] [2] [3]. In [1], a wireless sensor network is used in potato fields in Egypt. The proposed system is used to monitor the potato such as water and soil. In Thailand, agriculture is also massively important for Thailand's economy. Particularly, the agriculture section has contributed 8.4 percent to Thailand's GDP. Then, to increase the crop yield, the smart farming technology would help.
In this paper, we have proposed an Intelligent Farming (IF) system. Intelligent Farming is the technology that uses the concept of smart farming to help users (farmers) to sense and monitor useful information from their farms. Our Intelligent Farming system consists of two main parts they are sensor system and control system. The first one is sensor system, which includes moisture sensor, temperature sensor and water level sensor. The second system is control system which includes two main functionality's roofing and watering the farm. The system uses the data sensed from the sensor system or we can go for the predicted data through web service.

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Predicted values means here we generate a decision tree model to predict the weather condition (either “rain”, “no rain”, “storm”) by using historical weather data. Finally our control system will on and off depending on the smooth sensed data this information is obtained via GSM module.

II. Proposed System

The below shown fig.1 is a block diagram of the proposed system, which consist of mainly four applications. The technology used in this paper is arduino technology.
This paper mainly involves four applications or sections of proposed system. This paper organized as fallows. First application is Roofing system, second application is Watering system, third application is Fire detection, and fourth application is Motor control through the GSM module (via message).
One of the first applications is Roof monitoring i.e. in this application the sensed data from the water level sensor that is raw data from the sensor is given to the processor which will sense the data and decide the closing and open of roof top.
Second application is Watering i.e. the data from the moisture sensor probe is taken and given to the arduino board which will decide whether sprinkler should be ON or OFF, here the predefined sensor value is stored according to that sprinkler will operate.

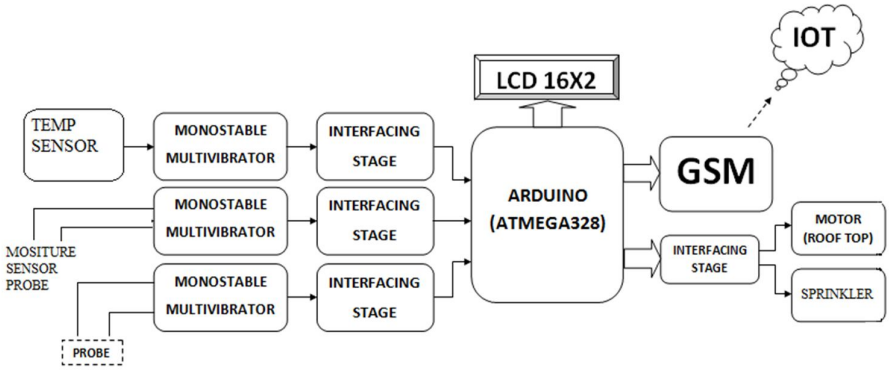

Fig 1. Block Diagram of Proposed System

Third application is Fire detection i.e. in this application the temperature (thermistor) depending on the predefined value which is set, the Buzzer and water sprinkler will operate. In this particular temperature value is set according to the thermistor used they have predefined value, when the sensed the value is crossed the buzzer is ON.
Fourth application is Motor control i.e. here the Motor is controlled through GSM module (via sending message). In this application the message is sent from the distant place from any number to the number which is inserted in the GSM module, here the codes to be sent are “MON” for Motor ON and “MOFF” for Motor OFF through these messages Motor is controlled from distant place. In this application we will avoid the dry running of motor.

III. Flow Chart of the Proposed System

The flow diagram is for the proposed system. In this proposed system four applications are present. One of application is Motor control through GSM module via message sending from distant place.
In this system other application is sensing the data from the Moisture sensor, if the value matches sprinkler will be ON, otherwise it will be OFF stage only if the moisture will be high.
The other application is water level is sensed from the field through the water level sensor probe placed in the field for the required value, when the water level is above the set value then the roof will be closed if it is below the water level set roof will be open.
The last application is sensing the data from the Temperature sensor and giving to the processor if the temperature is above the set value, then the buzzer will be ON and sprinkler will start, otherwise it will move to STOP block.
Above is the explanation of the flow diagram of the proposed system.

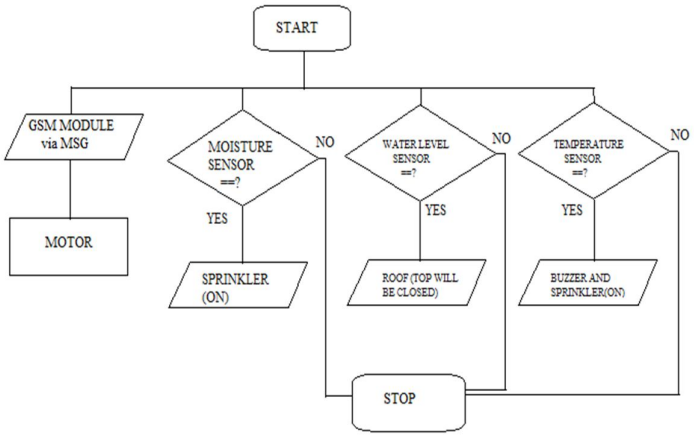

Fig 2. Flow Chart

IV. Experimental Hardware

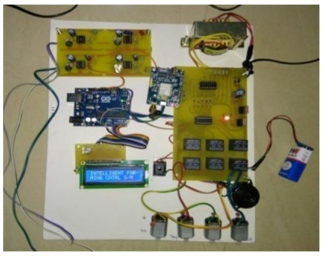

Fig 3. Experimental Hardware

V. Results

A. Motor Control through GSM

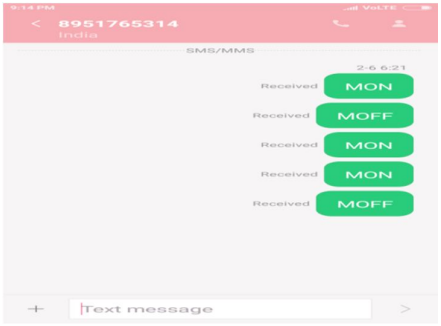

Fig 4. Message controlled Motor through message

The above shown fig.4 indicates through sending message from any number from the distant place we can control the ON and OFF of the Motor. The codes used are “MON” for ON the motor and “MOFF” for OFF the motor.

B. Sprinkling

Below shown fig.5 is the output result of moisture sensor i.e. moisture is low then the sprinkler will ON, if moisture is high then sprinkler will OFF, this all be updated to your given number through message.

Fig 5.Sprinler control through Moisture sensor probe

C. Roof Top Controlling

Fig 6. Water level detected output

Above shown fig.6 is the LCD display output for water level sensor, if water level is detected Roof top is closed otherwise it will be open while raining.

D. Fire Detection

Fig 7. LCD display for Temperature varied

Above shown fig indicates that temperature is varied, when the temperature increases it is displayed temperature varied and buzzer and sprinkler will ON, This information is updated to the given number.

VI. Conclusion

Intelligent Farming which is used to make smart farming in field, in this paper we proposed a Motor control through GSM module and through sensed data from the Moisture sensor, Temperature sensor and Water level sensor we control the Sprinkler, Fire detection (Buzzer ON and OFF) and Roof top (closing and opening).

References

[1] Narayut Putjaikal, Sasimanee Phusael, Anupong Chen-Iml,Dr.Phond Phunchongharnl.2, and DrKhajonpong Akkarajitsakup," A Control system in an intelligent farming by using an arduino technolgy ", ICT International Student Project Conference (ICT-ISPC). 2015

[2] Sherine M. Abd EI-kader, Basma M. Mohammad EI-Basioni, "Precision fanning solution in Egypt using the wireless sensor network technology", Egyptian Infonnatics Journal, 14, 3 , 221-233.

[3] Ilan H, "International Dairy Nutrition Symposium, Smart Fanning", International conference, (2014).

[4] Qin Z," Precision agriculture technology for crop farming", Taylor & Francis Group, LLC, (2016).

[5] Vasif Ahmed, Siddharth A. Ladhake," Innovative Cost Effective Approach for Cell Phone based Remote Controlled Embedded System for Irrigation", International Conference on Communication Systems and Network Technologies, (2011)

[6] Sun Zhiguo, Xia Hui, and Wang Wensheng," An Architecture for the Agricultural Machinery Intelligent Scheduling in Cross-Regional Work Based on Cloud Computing and Internet of Things", international conference (2011).

[7] Xinjian Xiang," Design of Fuzzy Drip Irrigation Control System Based on ZigBee Wireless Sensor Network", International Federation for Information Processing (2011).