IoT for Smart Small Irrigation System

Pitchaya Jamjuntr
Siam Technology College, Thailand
pitchayajam@yahoo.com

***Abstract* - This paper focuses on measuring the water content in soil and crop growth monitoring using Raspberry Pi. The water level required for agriculture purpose is analyzed using soil moisture sensor. The system control the pump automatically when the moisture level is lower than the suitable level.**

***Keywords* - IoT, Automation**

I. INTRODUCTION

Agriculture is a basis of living for the human because it creates food for people and natural materials. It is very important for every country because it provides employment opportunities to the people. We will see more automation had been implemented and human beings had been replaced by automatic machineries. This paper therefore proposes a system which is useful in monitoring the field data as well as controlling the moisture soil. The paper aims at making agriculture smart using automation and IOT technologies which is Raspberry Pi.

II. LITERATURE REVIEW

There are many systems to give water for crops effectively which include monitoring the status of water and irrigation is scheduled based on scheduling. Every single drop of water is important and should be used effectively. The farm irrigation systems in the past used simple timers and switches to control the irrigation system based on the weather conditions or soil moisture content automatically in order to reduce the labor requirement in the irrigation. However, the major problem is the system cost is expensive so the challenge is to develop an affordable and simplified irrigation automation system. This project presents the affordable automated system to make effective utilization of water for small farm. The moisture sensor is used to detect the moisture content of the soil and the system control the pump automatically [1-3].

III. THE PROPOSED SYSTEM

The Fig. 1 shows, our system which deals with controlling and continuous monitoring of crop field by the use of moisture sensors. Humidity value is measured by the analog soil moisture sensor. The sensed humidity value can be monitored by remote server. If the amount of moisture content in the soil is reduced or insufficient, the water pump will be turn on. Our system consist of Raspberry P, Soil moisture sensor, and pump.

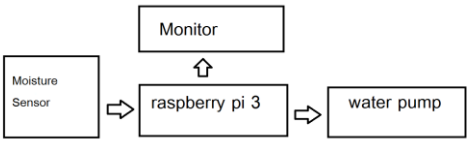

Fig. 1 Our System

A. Raspberry Pi

The Raspberry Pi is a progression of little single-board PCs created in the United Kingdom by the Raspberry Pi Foundation to advance the instructing of fundamental software engineering in schools and in creating nations. The first model wound up noticeably much more mainstream than foreseen, offering outside of its objective market for utilizations, for example, mechanical autonomy. Peripherals (counting consoles, mice, and cases) are excluded with the Raspberry Pi. A few frill however have been incorporated into a few official and informal groups [4].

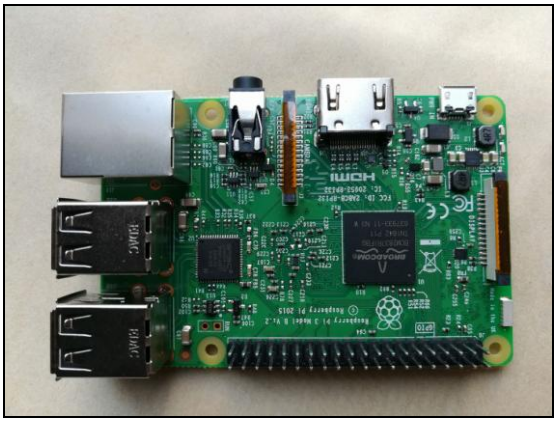

Fig. 2 Raspberry Pi

B. Soil Moisture Sensor

Soil moisture sensors measure the water in soil. The estimation of free soil moisture requires emptying, drying, and weighting of an illustration, soil moisture sensors measure the volumetric water content roundaboutly by using some other property of the earth, for instance, electrical resistance, dielectric unfaltering, or association with neutrons, as a delegate for the moisture content. The association between the think property and soil moisture must be adjusted and may move dependent upon common segments, for instance, soil sort, temperature, or electric conductivity. The soil moisture affects microwave radiation that is used for remote identifying water in soil. Adaptable test instruments can be used by farmers or nursery specialists. Soil moisture sensors usually imply sensors that gage volumetric water content. Another class of sensors measure another property of moisture in soils called water potential; these sensors are ordinarily implied as soil water potential sensors and consolidate tensiometers and gypsum pieces [5].

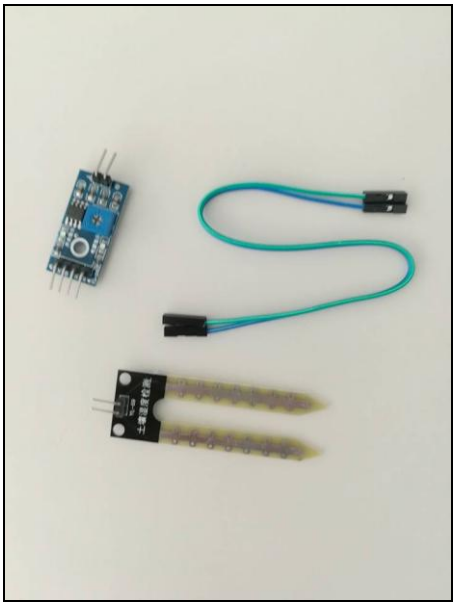

Fig. 3 Soil Moisture Sensor

C. Pump

A pump is a gadget that moves water, or once in a while slurries, by mechanical activity. Pumps can be arranged into three noteworthy gatherings as per the strategy they use to move the liquid: coordinate lift, relocation, and gravity pumps. Pumps work by some component (commonly responding or revolving), and devour vitality to perform mechanical work by moving the liquid. Pumps work through numerous vitality sources, including manual operation, power, motors, or wind control, come in many sizes, from infinitesimal for use in medicinal applications to vast mechanical pumps [6].

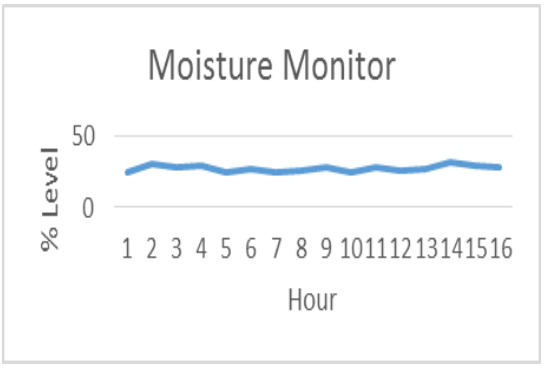

Fig. 4 Monitoring Panel

IV. CONCLUSIONS

The following are the results obtained using web camera and sensors. Fig. 4 shows, the status of the moisture level. It was monitored by our system. The prototype of the proposed systems was implemented and it proved to be efficient to control the flow of water. By using Raspberry Pi, we can monitor the moisture of soil. It could be enhanced in the future work by using optimization technique for better performance. It can sustain the market among all the competitors until other products gets over it. Nevertheless our product can be improvised by adding other sensors. Finally, our system is a very useful tool for farmers and it can be called as a part of the agricultural revolution.

V. ACKNOWLEDGMENT

I have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals and Siam Technology College. I would like to extend my sincere thanks to all of them.

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(Arranged in the order of citation in the same fashion as the case of Footnotes.)

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