ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 9, Issue 4, April 2022

Advance Technique Based Automatic Motor Pumping for Agriculture Land Purpose for Soil Moisture Content

S. Srileka[1], P.Subbulakshmi[1], K. Vijayasanthi[1], L.Megala[2]
U.G student[1], Assistant Professor[2]
Department of ECE, V.R.S. College of Engineering & Technology, Arasur, Villupuram, Tamilnadu, India

Abstract: The title itself indicates that the system checks the moisture content in the soil, based on that pumping motor will automatically pumps the water into the field. Here we are using soil moisture sensor. By using this sensor, we can find whether the soil is wet or dry. If it is dry, pumping motor will pump the water. In this system, the main controlling device is microcontroller. Here soil sensor will give the status of the soil to the microcontroller, based on that microcontroller will display the status of the soil on the LCD and switch on or off the pumping motor through relay. The pumping motor will pump the water into the field by using drip water system until the field is wet which is continuously monitor by the microcontroller. In irrigation process, most parameter of monitoring is soil, so we have to monitor the soil condition, whether the soil is dry or Wet. If it is dry, then by using pumping motor, water has to be pumped automatically. The main aim of our system presenting here is to monitor the moisture content in the soil in cultivating field. Based on soil moisture, pumping motor will be automatically switch on or off through relay. This saves the water at the same time and on the other hand the plant can get optimum level of water, so increasing productivity of crop.

Keywords— Microcontroller, LCD, Agriculture Techniques, Soil moisture sensor, Pumping motor, Relay and GSM Modem etc.

I. INTRODUCTION

We consider the problem of monitoring soil moisture evolution using a wireless GSM network. Continuously sampling moisture levels with these soil moisture sensors incurs high-maintenance and energy consumption costs, which are particularly undesirable for wireless networks. Our main hypothesis is that a sparser set of measurements can meet the monitoring objectives in an energy-efficient manner. The underlying idea is that we can trade off some inaccuracy in estimating soil moisture evolution for a significant reduction in energy consumption. We investigate how to dynamically schedule the sensor measurements so as to balance this tradeoff. Unlike many prior studies on sensor scheduling that make generic assumptions on the statistics of the observed phenomenon, we obtain statistics of soil moisture evolution from a physical model. The result is a scalable, implementable technology that we have tested and validated numerically and in the field**.** By using this sensor, we can find whether the soil is wet or dry. If it is dry, pumping motor will pump the water. In this system, the main controlling device is microcontroller. Here soil sensor will give the status of the soil to the sensor Amplifier, based on that microcontroller will display the status of the soil on the LCD and switch on or off the pumping motor through relay. The pumping motor will pump the water into the field by until the field is wet which is continuously monitor by the microcontroller

II. LITERATURE SURVEY

This paper describes an application of a wireless sensor network for low-cost wireless controlled irrigation solution and real time monitoring of water content of soil based on soil moisture sensors[1]. Precision watersaving irrigation automatic control system by plant physiology is discussed in [5] Shock, C.C., J.M. Barnum, and M. Seddigh. The wireless sensor network is used for precision agriculture where real time data of pest control in order to offset the adverse conditions. The environmental properties are sensed and relayed to a central repository [10]. An optimized agricultural production by carefully tailoring soil and crop management to correspond to the unique condition found in each field while maintaining environmental quality [6]. The problem of power distribution provided an overview of wireless sensor network by managing the equal power distribution by using GSM network. The system sets the irrigation time depending on the temperature and humidity reading from sensors and type of crop and can automatically cairrigate the field when unattended.

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 9, Issue 4, April 2022

Information is exchanged between far end and designed system via SMS on GSM network.

GSM operates through SMSes and is the link between ARM processor and centralized unit. The project aims to implement the basic application of atomizing the irrigation field by programming the components and building the necessary hardware. This project is used to find the exact field condition. GSM is used to inform the user about the exact field condition. The information is given on user request in form of SMS [10].

III. BLOCK DIAGRAM

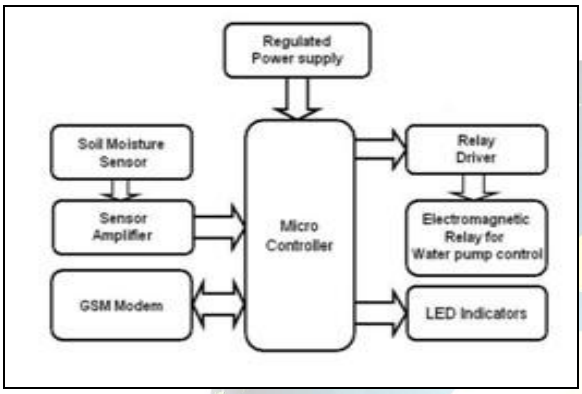

Fig-1 Block Diagram of Soil Moisture Content Based Automatic Motor Starter For Irrigation Purpose

1) GSM Modem

A GSM Modem is a specialized type modem which accepts a SIM card, operates over a subscription to a mobile operator, just like mobile phone.

2) Soil Moisture Sensor

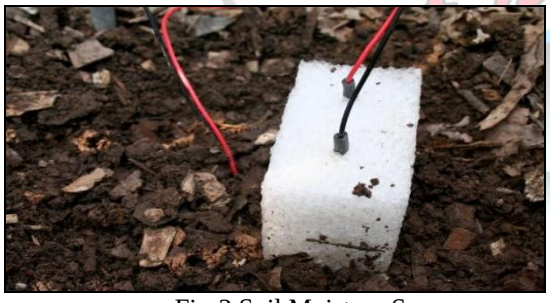

Fig-2 Soil Moisture Sensor

The heart of the sensor module is the Microcontroller to which the soil moisture sensor, temperature sensor and wind sensor modules are interfaced. That the system will checks the moisture conten in th soil, based on that pumping motor will automatically pumps the water into the field. Here we are using soil
moisture sensor. By using this sensor, we can find whether the soil is wet or dry

3)

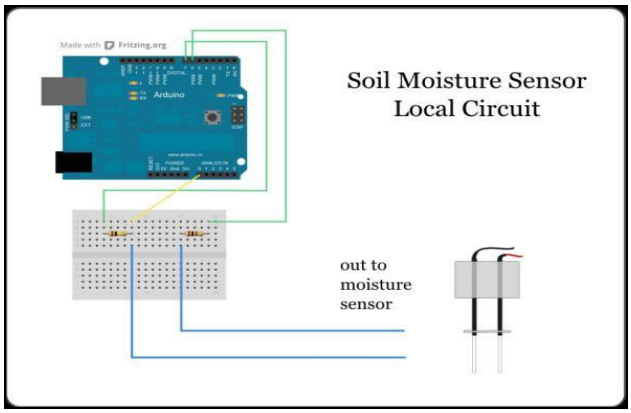

Fig-3 Soil Moisture Sensor Local Circuit **3.3 Microcontroller**

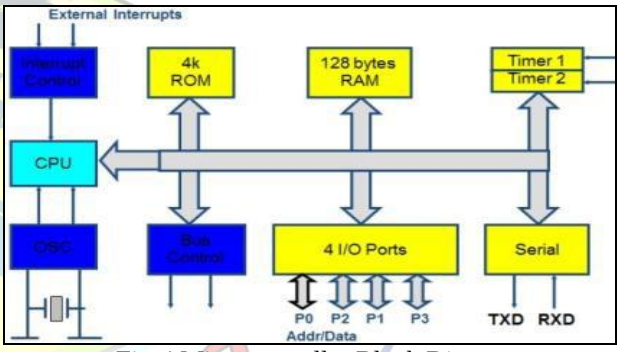

Fig-4 Microcontroller Block Diagram

The Intel MCS-51 commonly referred to as 8051 is a Harvard architecture, CISC instruction set, single chip microcontroller (µC) series which was developed by Intel in 1980 for use in embedded systems. Intel's original versions were popular in the 1980s and early 1990s and enhanced binary compatible derivatives remain popular today. Intel's original MCS-51 family was developed using NMOS technology, but later versions, used CMOS technology and consume less power than their NMOS predecessors. This made them more suitable for batterypowered devices.

3.4 The Relay Module

A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

3.5 LCD Module

A liquid-crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images, such as preset words, digits, and 7-segment displays as in a digital clock.

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 9, Issue 4, April 2022

IV. FRAMEWORK FOR PROPOSED SYSTEM

The technical questions arising in precision agriculture are all focusing upon increasing the efficiency of the field which results from networking sensors to monitor important spatiotemporal patterns in the field and integrating the data to display or record information, and also to actuate further human or automatic responses. The

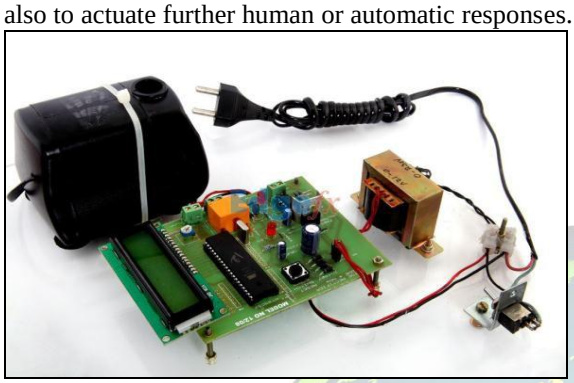

Fig-5 Proposed System

sensors that can be used in agricultural field are temperature, soil makeup, humidity, mechanical stress level monitoring.

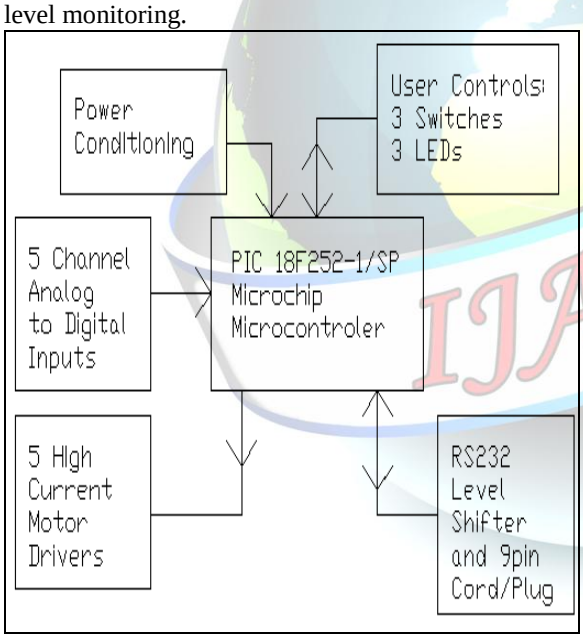

Fig-6 Hardware Module

In the field of agriculture the most important part is: firstly, to get the information about the fertility of soil and secondly moisture content of soil. After measuring these two factors a farmer can start sowing of seeds. Here a system is developed based on GSM network. The sensor nodes can obtain the soil moisture, temperature, humidity information in real time, and then transferred to the remote monitoring centre by the gateway via the transmission network. This intelligent agriculture monitoring system has the useful characteristics of low power consumption, low cost, large network capacity, flexible disposition, and minor influence on the natural environment. In irrigation process the water level is sensed by the sensors and the information are processed by the controller and transmitted over the GSM module. At the base station the data is received by the Receiver module and transferred to PC through RS232 interface. The data will be processed by the microcontroller and then can be transmitted to farmer's mobile phone using GSM module. Then these commands can be further given by the farmer through GSM which will initiate or terminate the irrigation process via relay controlled motor in the field depending on the moisture conditions of the soil.

This flow chart gives an outline of the systems general operation. The main loop runs 10 times a second, each time servicing the next channel. When it's done with the fifth channel, it does the first channel. "ML" in the flowchart refers to the variable into which the 10 bit result of the ADC is read into. ML, in this case, stands for moisture-level. Each of the five channels have their own set of Presets The minimum moisture maximum moisture, minimum time between water, and maximum time between water.

The ADC returns a value from 0 to 1023, depending on resistance of the soil. All Presets can be set with any number from 0 to 4095, although setting a moisture level preset above 1023 is of no use. As for min./max. Time, valid and useful setting range is from 0 to 4095 hours. This allows up to about 170 day periods. When the learn button is pressed, each channel only updates its own set of presets.

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 9, Issue 4, April 2022

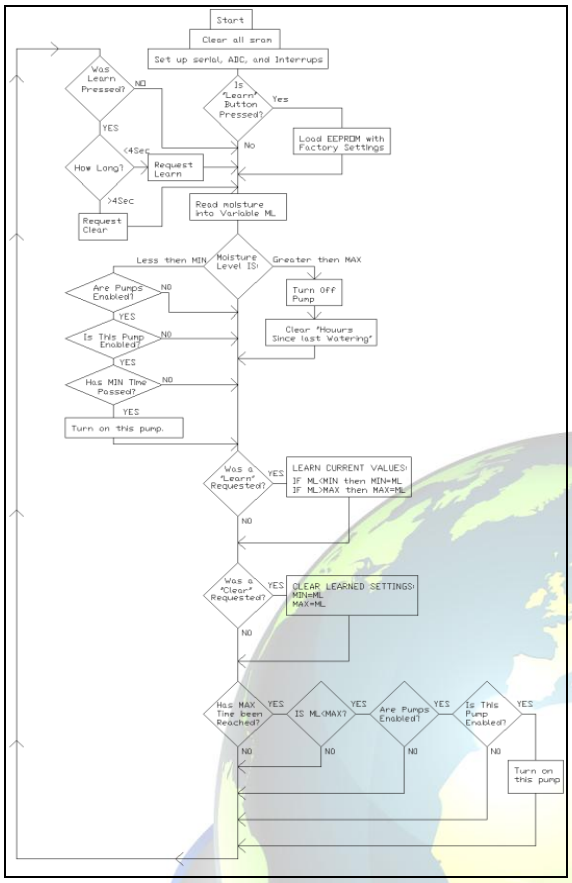

Fig- 7 Flow Chart

The "Clear" feature causes the system to read the moisture of each plant's soil, and set each channel's min. and max. presets to equal the current moisture reading. This causes any change in soil conductivity to be seen as a "new high" or a "new low", which can be learned with subsequent presses of the "Learn" button.

V. ADVANTAGES OF PROPOSED SYSTEM

By this project we can control the moisture content of the soil in the cultivating field. Based on soil moisture, pumping motor will be automatically switch on or off through relay. This saves the water at the same time and on the other hand the plant can get optimum level of water, so increasing productivity of crop.

VI. RESULT

The result is a scalable, implementable technology that we have tested and validated numerically and in the field**.** By using this sensor, we can find whether the soil is wet or dry. If it is dry, pumping motor will pump the water automatically**.**

VII. CONCLUSION

The Soil moisture content based irrigation system was developed and successfully implemented along with flow sensor. Salient features of the system are: Closed loop automatic irrigation system, temperature and water usage monitoring. User can easily preset the levels of the Moisture and is regularly updated about current value of all Parameters on LCD display. In future, other important soil parameters namely soil pH, soil electrical conductivity will also be incorporated in the system.

REFERENCES

1. Shen Jin, Song Jingling, Han Qiuyan, Wang Shengde, YangYan, School of Electric and Electronic Engineering, "A Remote Measurement and Control System for Greenhouse Based on GSM-SMS" IEEE 8th International Conference on Electronic Measurement and Instrument, 2007
2. "Irrigation System Controllers", SSAGE22, Agricultural and Biological Engineering Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Available: http://edis.ifas.ufl.edu
3. Jeng-Nan Juang, R. Radharamanan; "Low Cost Soil Moisture System Brad Rodriguez."Moving Forth Part 7: Camel Forth for the 8051".
4. "Measurement Scheduling for Soil Moisture Sensing: From Physical Models to Optimal Control," Proceedings of the IEEE, vol.98, no.11, pp.1918, 1933, Nov. 2010
5. Shock, C.C., J.M. Barnum, and M. Seddigh (1998). "Calibration of Watermark Soil Moisture Sensors for irrigation management", pp.139-146 in Proceedings of the International Irrigation Show, Irrigation Association, San Diego, CA.
6. Watermark 200SS soil moisture sensor specification manual. Available: http://www.irrometer.com/sensors.html
7. Gsmworld.com. GSM Association. 2001. Archived from the original on 5 May 2011. Retrieved 5 May 2011. "1982 Groupe Speciale Mobile (GSM) is formed by the Confederation of European Posts and Telecommunications (CEPT) to design a pan-European mobile technology."
8. "GSM World statistics". gsmworld.com. GSM Association. 2010. Retrieved 8 June 2010.
9. G.K. Banerjee and Rahul Singhal (2010). "Microcontroller based Polyhouse Automation Controller", 2010International Symposium on Electronic System Design, IEEE 2010.
10. GSM based automatic irrigation system (www.gsm-auto.com/application)Mason, C. R. "Art & Science of Protective Relaying, Chapter 2, GE Consumer & Electrical". Retrieved October 9, 2011
11. McCann, I.R., D.C. Kincaid, and D.Wang. 1992. Operational Characteristics of the Watermark Model 200 soil water potential sensor for irrigation management. Appl. Eng. Agric. 8:603-609.
12. Cha´vez, J. L., Pierce, F. J., Elliott, T. V., Evans, R. G., Kim, Y., & Iversen,W. M. (2009). "A remote irrigation monitoring and control System (RIMCS) for continuous move systems. Part A: Field testing

and Results", Precision agriculture Precision Agriculture, 11, 1–10. doi: 10.1007/s11119-009-9109-1.

13. Shen Jin, Song Jingling, Han Qiuyan, Wang Shengde, Yang Yan, School of Electric and ElectronicEngineering, Remote Measurement and Control System for Greenhouse Based on GSM-SMS" IEEE 8th International Conference on Electronic Measurement and Instrument, 2007.
14. Yuksekkaya, B.; Kayalar, A.A.; Tosun, M.B.; Ozcan, M.K.; Alkar, A.Z.; "Research of Wireless Sensor Networks for an Intelligent Measurement System Based on ARM", IEEE Transactions on Mechatronics and Automation, Volume: 52 , Issue: 3, 2006, pp. 837 – 843.
15. Fedro S. Zazueta, Allen G. Smajstrla and Gary A. Clark (1993). "Irrigation System Controllers", SSAGE22, Agricultural and Biological Engineering Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida.
16. Daniel K. Fisher and Hirut Kebede "A low-cost microcontroller-based system to monitor crop temperature and water status", Computers and Electronics in Agriculture, Elsevier B.V. Electronic Measurement and Instrument, 2007.

BIOGRAPHY

Mrs.L.Megala is an Assistant professor of ECE in V.R.S college of Engineering & Technology. She completed her B.E/ECE in Idhaya Engineering College for women, Chinnasalem in the year 2008. She completed her M.E in the field of Applied Electronics in S.K.P Engineering College, Thiruvannamalai the year 2011. She is the life time member of ISTE. She has a teaching experience of 12 years. At present, she is going to have a research work in the field of Image Processing.

Ms.s.srileka is a U.G student in V.R.S college of Engineering & technology, Villupuram. My area of interest is Embedded systems

Ms.P .Subbulakshmi is a U.G student in V.R.S college of Engineering & technology, Villupuram. My area of interest is Electronic devices and circuits

Ms.k vijayashanthi is a U.G student in V.R.S College of Engineering & technology, Villupuram. My area of interest is Embedded Systems.