

Smart Home Automation Based On IoT Using Embedded Structure

K.Bharathikannan, B.Mahesh, S.Aruloli

Nadar Saraswathi College of Engineering and Technology,Theni,
bharathi.run77@gmail.com

Nadar Saraswathi College of Engineering and Technology,Theni,
b.mahesh.me@gmail.com

Nadar Saraswathi College of Engineering and Technology,Theni,
aruloli_14@yahoo.co.in

Abstract: In the advancement of technologies controlling and monitoring electrical appliances using laptop, computer with the help of internet connection is possible. So it gives a more space at a home, university and industrial controlling electrical appliances anywhere in the world. By using Internet of Things we can control many devices such as light, power plug, Fan, computer, security system and etc.It reduces human efforts and power efficiency. The main objective of internet of things is used to help specially challenged people and old age people to control electrical appliances and security purpose. IoT is very useful for these people in crucial situations. There are two ways to access these process WIFI connectivity (or) it is connected to a router. This process is done in low cost & controlling many devices in a simple circuit.

Keywords: soil moisture sensor, pesticide, automated irrigation, LCD display.

I.INTRODUCTION

Agriculture uses 85% of available freshwater resources worldwide, and this percentage will continue to be dominant in water consumption because of population growth and increased food demand[1].There is an urgent need to create strategies based on science and technology for sustainable use of water, including technical, agronomic, managerial, and institutional improvements.Now a days, many new ways are being employed in agriculture for saving water by minimizing its consumption. These ways use a variety of technologies for the purpose of water consumption. For example, a system uses thermal imaging to monitor the temperature distribution of the plant and irrigation is scheduled based on it. The irrigation can also be scheduled by means of crop water stress index(CWSI). The other means of automated irrigation can be by analyzing the water content of the soil, using soil moisture sensors that control the actuators to save water. ATMEL controller is used to spray water using the dc motor. Water is sprayed according to the dryness of the soil detected by the soil moisture sensor. In the case of spraying pesticide manually causes many problems to the farmer. It causes allergy while mixing them manually and carrying the container on their back and spraying.

II.EXISTING SYSTEM

In existing system only traditional methods like manual pesticide spraying and irrigation systems are used till now. In case of pesticide sprayer a tank of 12 liter capacity is filled with a mixture of water and pesticide mixed by rod manually.Otherwise a mechatronics based robot is employed which is not much suited for the agricultural field. It needs a large power supply. It needs a powerful motor to carry the heavy water tank. Like manual spraying system it also needs regular monitoring of the agricultural field.It has the disadvantage, shortage of labor in the field of agriculture. In the proposed system the field is divided into four quadrants and the soil moisture sensor is placed in the four quadrants respectively. The sensor senses the moisture level of the soil.

Based on the sensed value it sends message to the user whether the soil is dry or not. If dryness in the soil is detected then the water is sprayed automatically for that particular region. In the case of pesticide, the switch is turned on so that the pesticide tank opens and it mixes with water in another tank and the mixture is sprayed on the land. Both water and pesticide mixture are sprayed through the same sprayer. Whether the water is to be sprayed or pesticide is to be sprayed is decided by the switching circuit. Since the pesticide is sprayed by this means this system becomes semi automated. The need of pesticide differs from plant to plant.

III.AUTOMATED SPRAYING SYSTEM

The automated spraying system here by reported,consists of two sections,transmitter section and receiver section.The system has two spraying system which automatically sprays the pesticide and water. The moisture level of the soil in these field are sensed and water is sprayed automatically in the deficient areas. The moisture level of the soil is displayed in the LCDdisplay for the user reference.In addition to the water, pesticide is also sprayed whenever needed by means of a switch control. These pesticide is spraying by mixing of raw pest and water.The water and pesticide are sprayed through the same valve.

IV.BLOCK DIAGRAM

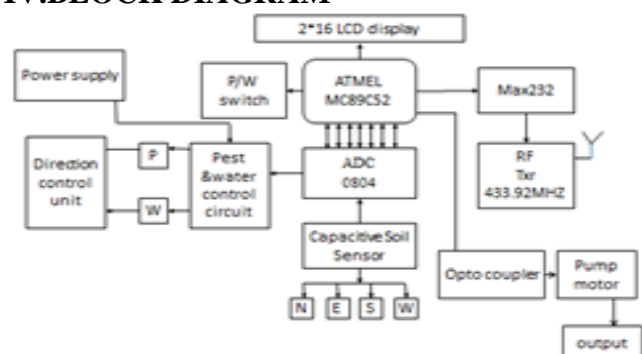


Fig1. Block diagram of transmitter section

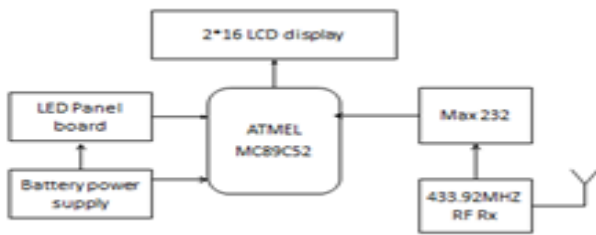


Fig2. Block diagram of receiver section



Fig4. Soil moisture sensor

V.SYSTEM DESCRIPTION

1.MICROCONTROLLER ATME1MCB9C52

The AT89C52 is a low-power, high-performance CMOS 8-bit microcomputer with 8K bytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 and 80C52 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C52 is a powerful microcomputer which provides a highly-flexible and cost-effective solution to many embedded control applications.

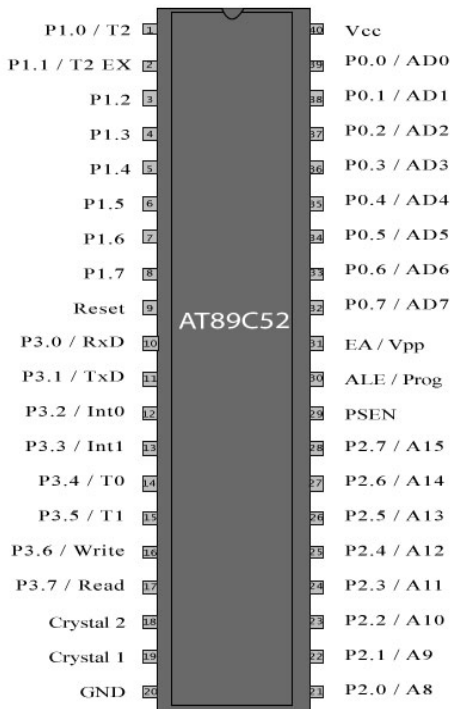


Fig3. Pin diagram of atmel 89c52

2.Soil Moisture Sensor

The volumetric water content of soil is measured with the help of soil moisture sensor. This makes it ideal for performing experiments in courses such as soils science, agricultural science, environmental science, horticulture, botany, and biology. Use the Soil Moisture Sensor to: 1. Measure the loss of moisture over time due to evaporation and plant uptake. 2. Evaluate optimum soil moisture contents for various species of plants. 3. Monitor soil moisture content to control irrigation in greenhouses.

3.Pest and water control circuit

After reads the moisture level of the soil, the pest and water control unit sprays the pesticide and water. The water tank is always connected to the valve, while the other is chosen using an switching control circuit. By switching on the pest switch this operation can be performed.

4.Max 232

Max 232 is working as a amplifier. It should amplify the data in high speed and it should be errorless. It gives the high skew rate. In this system has CMOS to RS232 converter and RS232 to CMOS converter. In CMOS to RS232 converter, electrical signals are converted in to electromagnetic signals. These electromagnetic signals are converted in to analog signal by using RS232 to CMOS converter.



5.LED panel board

The LED panel board is used to identify, which direction the water and pesticides are spraying. The panel board has 4 LEDs, each of the LEDs are represents the direction of spraying. That is, if the water is spraying in the south direction, at that time south LED is ON etc.

6.LCD display

A 2*16 LCD display is used to display the current functioning of the controller and displays the direction in which dryness is detected. An 2*16 LCD display has two types of register.



Fig6. 2*16 LCD display

6.1.COMMAND REGISTER

It stores the instruction set given to the display unit. The instruction are the predefined task assigned to the unit.

6.2 DATA REGISTER

It Stores the ASCII data's to be displayed that is here it displays the direction of the output.

7. Optocoupler

The optocoupler is used to open or close the output valve of the pump motor. when it receives the input data the led starts burning and the light sensor inside the chip detects the light and connects the switch inside the chip to the output pin.

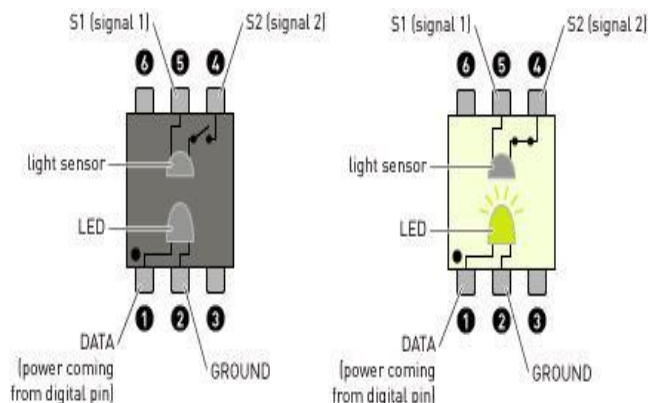


Fig7. Optocoupler

8. ADC

ADC is used to convert the analog value of dryness measured from the soil sensor placed in the field to digital value and gives the digitally converted output to display section through the controller.

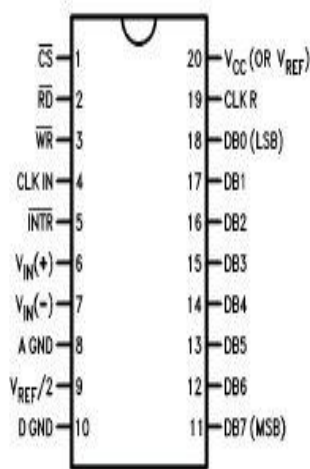
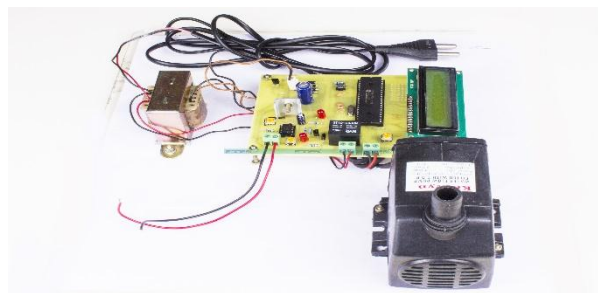


Fig8. Pin diagram of ADC

V. EXPERIMENTAL RESULT

The idea of project aims at taking agriculture to next level of automation and reducing the complexity of those automation. Soil moisture sensor plays a vital role in delivering the output. Sensor placed in the field detects the dryness of the field and gives the reading to controller through converter, which is compared with the predefined thresholds and based on these the output is delivered. On the otherhand by switching on/off of the pesticide circuit, it automatically mixes the pest and water and delivers the output through same sprayer.



VI. CONCLUSION

The automated spraying system implemented was found to be feasible and cost effective for optimizing water resources for agricultural production. This irrigation system allows cultivation in places with water scarcity thereby improving sustainability. The irrigation system can be adjusted to a variety of specific crop needs and requires minimum maintenance. The modular configuration of the automated irrigation system allows it to be scaled up for larger greenhouses or open fields. Besides the monetary savings in water use, the importance of the preservation of this natural resource justify the use of this kind of irrigation systems.

VII. REFERENCES

- [1] Design and Development of Solar Based Android Controlled Pesticide Dispenser - P Bhargavi, M Madhusudan Reddy -International Journal of Science, Engineering and Technology Research (IJSETR), Volume 4, Issue 8, August-2015
- [2] Mechatronics Based Remote Controlled Agricultural Robot - Vijaykumar N Chalwa1 , Shilpa S Gundagi2 - Volume 2, No.7, July 2014 International Journal of Emerging Trends in Engineering Research
- [3] Irrigation System Using a Wireless Sensor Network and GPRS - Suraj S. Avatade1 , Prof. S. P. Dhanure2 - International Journal of Advanced Research in Computer and Communication Engineering Vol. 4, Issue 5, May 2015
- [4] Micro Controller Based Automatic Plant Irrigation System - Venkata Naga Rohit Gunturi - International Journal of Advancements in Research & Technology, Volume 2, Issue4, April-2013
- [5] ARM- Based Pesticide Spraying Robot Snehal - M. Deshmukh Dr. S. R. Gengaje - International Journal of Engineering Research and General Science Volume 3, Issue 3, Part-2 , May-June, 2015
- [6] Autonomous Pesticide Spraying Robot for use in a Greenhouse Philip - J. Sammons, Tomonari Furukawa and Andrew Bulgin
- [7] Multiple Power Supplied Fertilizer Sprayer - Varikuti Vasantha Rao , Sharanakumar Mathapati , Dr. Basavaraj Amarpur - International Journal of Scientific and Research Publications, Volume 3, Issue 8, August 2013

- [8] Automatic crop irrigation system -Reliability, Infocom Technologies and Optimization (ICRITO) (Trends and Future Directions), 2015 4th International Conference
- [9] Automatic irrigation system on sensing soil moisture content Nagarajapandian M1 , Ram Prasanth U2 , Selva Kumar G3 , Tamil Selvan S4 –International journal of innovative research in electrical,electronics instrumentation and control engineering Vol. 3, Issue 1, January 2015
- [10] Sensor Based Automatic Irrigation Management System - Mehamed Ahmed Abdurrahman ,Gebremedhn Mehari Gebru & Tsigabu Teame Bezabih - International Journal of Computer and Information Technology (ISSN: 2279 – 0764) Volume 04 – Issue 03, May 2015
- [11] Web based Automatic Irrigation System using wireless sensor network and Embedded Linux board - 2015 International Conference on Circuit, Power and Computing Technologies - Pandurang H. Tarange, Rajan G. Mevekari, Prashant A. Shinde
- [12] Review paper based on automatic irrigation system based on RF module - Ms. Deweshvree Rane, P. R. Indurkar Professor, D. M. Khatri - IJAICT Volume 1, Issue 9, January 2015
- [13] Control of Irrigation Automatically By Using Wireless Sensor NetworkInternational Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Volume-3, Issue-1, March 2013- Rashid Hussain, JL Sahgal, Anshulgangwar, Md.Riyaj.
- [14] Wireless Monitoring of Soil Moisture, Temperature & Humidity Using Zigbee in Agriculture- International Journal of Engineering Trends and Technology (IJETT) – Volume 11 Number 10 - May 2014- Prof C. H. Chavan, Mr.P. V.Karande.
- [15] Wireless Automatic Water Level Control using Radio Frequency Communication- International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering Vol. 2, Issue 4, April 2013- Muktha Shankari K1 , Jyothi K2 , Manu E O3 , Naveen I P4 , Harsha Herle5.
- [16] A wireless application of drip irrigation automation supported by soil moisture sensors- Scientific Research and Essays Vol. 6(7), pp. 1573-1582, 4 April, 2011- Mahir Dursun* and Semih Ozden.