

FARM AUTOMATION USING RF MODEM

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Abstract: Automation of a farm irrigation system refers to operation of the system with a no or minimum manual intervention. The introduction of automation in a farm system has increased application efficiency and drastically reduces hard work. This system introduces wireless operation on farm, easy calibration of temperature, soil moisture and humidity in surrounding a farm, and to identify breakage, blockage in the pipeline supplying water. Farm automation system consists of soil moisture sensor, temperature sensor and humidity sensor which gives information about physical quantity in surrounding. Farmer can read the above technical details on control panel and can take immediate decision for crops. In farm irrigation controller takes decision for prevailing condition.

Index Terms - soil moisture sensor, Technical detail on control panel, farm irrigation.

1. INTRODUCTION

There is different weather at different places and weather plays an important role in farming. Humidity, temperature, soil moisture are important factors in farm. All these factors are difficult to monitor manually in farm, so there is need of automation. Considering above factors we thought to design an automation system useful for farmer. So in order to reduce farm irrigation problem along with resource extinction drawbacks, we motivated ourselves to create our project named "FARM AUTOMATION SYSTEM". Even though farmer is at remote place, he can get the information with the help of such system as well as can monitor it. The data will be sensed by sensor and converts physical data into an electrical signal. Collected data will send to the receiver by wireless communication. The data will be read and displayed on a computer. Thus the system is very useful and farmers can do their work timely and require less effort. This system includes farm security.

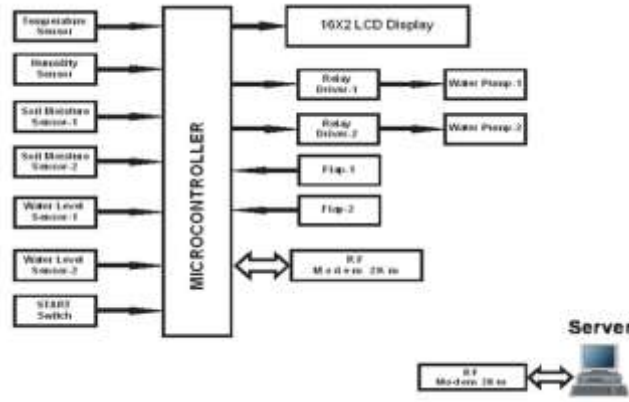
2. LITERATURE REVIEW

Irrigation is the process of artificially supplying water to land where crops are cultivated. Traditionally rainfall, canal water and hand pumps are major sources of water supply for irrigation. Automated irrigation system which automates the Irrigation of land by combining various software and hardware for yield irrigation. Here WSN is used to monitor the environmental condition, wireless sensor network (WSN). Refers to a group of sensors for monitoring and recording the physical conditions of the environments and organizing the collected data at a central location. This paper gives detailed survey of various automated farm irrigation systems. GSM serves as an important part also it is responsible for controlling the irrigation facility and sends them to receiver through coded signal. Farming can be done using various new technologies to yield higher growth of the crops and their more production. The main objective of our project is to work for the same mentioned above. This paper proposes a new architecture for remote control of agriculture devices. The paper here is all about automated control features with latest electronic technology using microcontroller and Bluetooth Devices. The project works automatically and hence reduces the man power. The main idea behind the proposed architecture is to design system, which would be used as a platform which provides the services needed to perform remote control of agricultural devices. The farmer should be able to on/off the Irrigation Device, Cultivation Device, Seeding Device, and decide the pesticides proportion and monitor the farming activities remotely. Many times user misses their farming tasks because he/she is not able to remember all the activities and their correct timing on which it is necessary to perform that activity. This system should provide reminder to the user so that their farming activity will take place on time and also provide all online information about any particular crop.

3. PROPOSED SYSTEM

The block diagram Of Farm Automation System. It works on 6V DC power supply. To get DC supply Bridge rectifier circuit is used. In bridge circuit four diodes (1N4007) are used, at output of bridge circuit ripple voltage is occurring hence to remove ripples 1000µf is use as filter capacitor. Which gives pure DC line voltage, but here output varies with input. Regulator IC 7806 used to get 6V regulated DC supply, Output of IC7806 is independent of input variations. 6V DC regulated power supply design for operating relay but control circuit requires 5V DC regulated power supply, by getting drop voltage of 0.7 volt using diode in series requirement of control circuit is fulfill. The system has five parts which includes power supply, input peripherals, and CPU, memory and output peripherals. PIC 16F877A is 40 pin controller IC which controls all commands and store data in it. Pin 1 is active low reset pin. Switch S1 is used to

reset microcontroller. It has 8 analog Pins. Output of temp, humidity, soil moisture sensors (1&2) are connected at input side of controller Pin 2, 3, 4, 5 respectively. To know the water level, system used conducting property of water which output given to the pin no 8 & 9. START Push button S2 is used to switch on the pump 1 or 2. When switch is pressed, external Vcc is applied to pin no 17. Same as for valve 1 & valve 2 push button S3 & S4 is used to open & close valves respectively. Crystal oscillator (4 MHz) is connected at Pin 13 & Pin 14 which generates clock frequency. Five number of 10KΩ pull-up resistor makes initial condition high. 16x2 LCD display shows electrical output visually, controller converts analog input into digital form and send to display to visualize and also transmission purpose. D4 to D7 data lines collect information from microcontroller. Four transistors Q1, Q2, Q3, Q4 used as switch to latch the relay and to drive the output. Bluetooth module HC-05 transfer the data from microcontroller to remote station and vice versa. RxD & TxD pin of module connected at Pin no. 25 & 26 of microcontroller.



3.1.1.1.1.

4. COMPONENTS

A. PIC16F877A Microcontroller

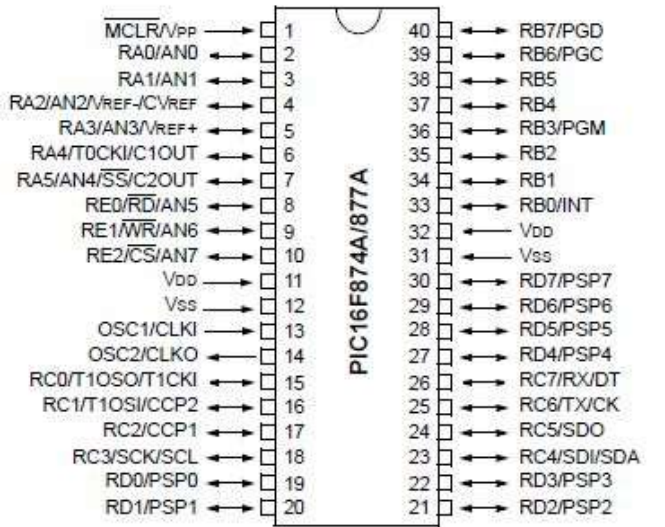


Fig.2 Pin Diagram of PIC16F877A Microcontroller

PIC16F877A was used in a microcontroller circuit for processing unit. PIC microcontroller is used as a central processor because its capability to operate without other external components due to all necessary peripherals is already built into it. Thus it reduce time and space required to construct the device. This PIC works on a 5V DC power supply, with a crystal oscillator and 2 units of 22pF capacitors. PIC microcontroller contains inbuilt ADC so there is no need of external converters. The sensors can be directly interfaced with PIC. The IR sensor is directly interfaced with the PIC. The PIC microcontroller PIC16F877A is one of the most renowned microcontrollers in the industry. This controller is very convenient to use, the coding or programming of this controller is also easier. One of the main advantages is that it can be write-erase as many times as possible because it use FLASH memory technology. It has a total number of 40 pins and there are 33 pins for input and output. PIC16F877A is used in many pic microcontroller projects. PIC16F877A also have many applications in digital electronics circuits. It features all the components which modern microcontrollers normally have.

B. Soil Moisture Sensor

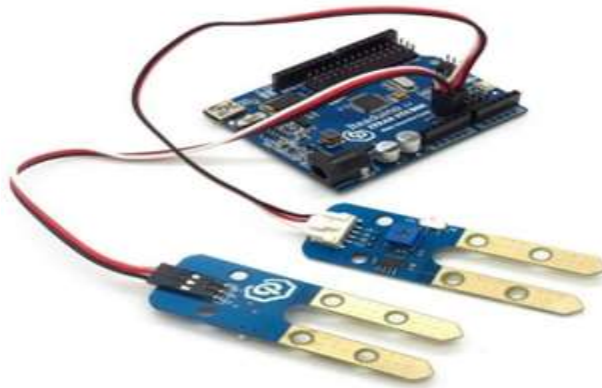


Fig. Soil Moisture Sensor

Measuring soil moisture is important in agriculture to help farmers manage their irrigation systems more efficiently. Not only are farmers able to generally use less water to grow a crop, they are able to increase yields and the quality of the crop by better management of soil moisture during critical plant growth stages. Besides agriculture, there are many other disciplines using soil moisture sensors. Golf courses are now using sensors to increase the efficiency of their irrigation systems to prevent over watering and leaching of fertilizers and other chemicals off site. Landscape irrigation, in urban and suburban areas landscapes and residential lawns are using soil moisture sensors to interface with an irrigation controller. Connecting a soil moisture sensor to a simple irrigation clock will convert it into a "smart" irrigation controller that prevents an irrigation cycle when the soil is wet. In farm automation system soil moisture sensor play an important role.

C. Temperature sensor



Fig. Temperature sensor

This DF Robot DHT11 Temperature Humidity Sensor features a temperature humidity sensor complex with a calibrated digital signal output. By using the exclusive digital-signal-acquisition technique and temperature humidity sensing technology, it ensures high reliability and excellent long-term stability. This sensor includes a resistive-type humidity measurement component and an NTC temperature measurement component, and connects to a high-performance 8-bit microcontroller, offering excellent quality, fast response, anti-interference ability and cost effectiveness. Each DHT11 element is strictly calibrated in the laboratory that is extremely accurate on humidity calibration. The calibration coefficients are stored as programmes in the OTP memory, which are used by the sensor internal signal detecting process. The single-wire serial interface makes system integration quick and easy. Its small size, low power consumption and up-to-20 meter signal transmission making it the best choice for various applications, including those most demanding ones. The component is 4-pin single row pin package.

D.RF modem



Fig. RF modem

Radio modems transfer data wirelessly across a range of up to tens of kilo meters. It having a 2km range. Using radio modems is a modern way to create Private Radio Networks (PRN). Private radio networks are used in critical industrial applications, when real

time data communication is needed. Radio modems enable user to be independent of telecommunication or satellite network operators.

5. RESULTS

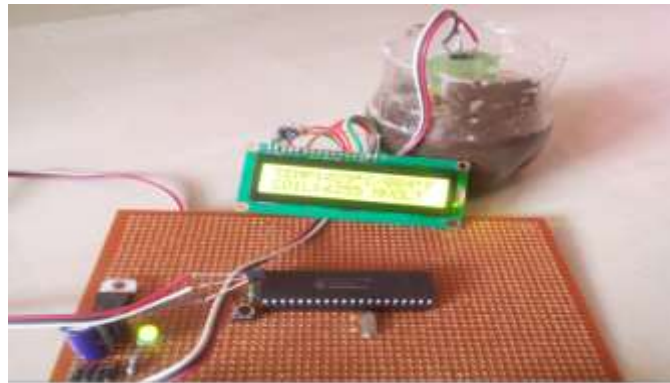


Fig –result of soil sensor

Hours	Soil Moisture 1%	Soil Moisture 2%	Temperature °C, °F	Humidity %RH
8am	60	60	26,78.8	18
10am	40	40	32,89.6	15
1pm	30	30	40,104	13
3pm	25	25	43,109.4	12
6pm	35	35	30,86	12

Fig- all parameter result



6. CONCLUSION

- This system is economical, technically improved, real time management and requires less man power.
- Generally human beings are secure at home and farm is long distance from residence so by using advance communication system distance is reduced.
- In 21st century whole world becomes faster and faster time is vital factor in daily routing this system gives time management to all.
- To handle any farm labor is key factor as we use more labor the work done satisfied, but with the system we reduce the labor.
- Generally in farm water pumps and valves are open even when the soil moisture level completed but system automatically operate and stop pumps therefore it saves water and energy.
- Farmer will get feedback on home base station and less maintenance by which he feels secureness.
- As the system itself provides security, energy saving, reduced labour, less maintenance automatically system becomes economical.

7. FUTURE SCOPE

This system can operate from remote station hence require less time to operate a farm. No need to go physically in the farm. Farmer will have updated with change in environment. Hence farmer can work technically and get more earning with less hard work. In future, this system will be very beneficial for farmers industries and widely used. In irrigation system water distribution and management required. By using automation system we can easily distribute and manage water. For this required less man power and it is very fast. Calculation of water distribution made easy. This automation system not also useful in agriculture field but also useful in industry where liquid flow management and distribution is required. Farm automation system is more useful for agriculture field.

Even though farmer is at remote place, he can get the information with the help of such system as well as can monitor it. Farmer can get total information in farm surrounding like temperature, humidity, soil moisture. Therefore farmer can earn more in less hard work. It is money saving.

8. REFERENCES

1. G. VILLAN AND J. J. ESTEVE," REMOTE CONTROL OF MOBILE DEVICES IN ANDROID PLATFORM", " STUDENT MEMBER, IEEE AND MEMBER, IEEE. J. U. DUNCOMBE", INFRARED NAVIGATION PART I: AN ASSESSMENT OF FEASIBILITY, IEEE TRANS ELECTRON
2. AUTOMATION IN FARMING USING ANDROID Sushil S.Patil¹, Varsha D. Nikam² ^{1,2}Computer Science and Engineering Department,DMGOI, Vikaswadi (Kagal)
3. GSM based Remote Sensing and Control of an Irrigation System using WSN:a Survey Nilesh S. Bhaltadak¹, Hemant T. Ingale², S.K. Chaudhari³ P.G. Student,Department of ETC, Godavari College of Engineering, Jalgaon, India¹ Asst. Professor, Department of ETC, Godavari College of Engineering, Jalgaon,India² Asst. Professor, Department of ETC, SSGB COE, Bhusawal
4. Neelam R. Prakash, Dilip Kumar, Tejender Sheoran,.Microcontroller Based Closed Loop Automatic Irrigation System, International Journal of Innovative Technology and Exploring Engineering (IJITEE), ISSN: 2278-3075,Volume-1, Issue-1, June 2012.
5. IMPLEMENTATION OF AGRICULTURAL AUTOMATION SYSTEM USING WEB GSM TECHNOLOGIES Vidadala Srija¹, P.Bala Murali Krishna².
6. Joaquin Gutierrez, Juan Francisco Villa-Medina, Alejandra Nieto- Garibay, And Miguelngel Porta-Gndara, Automated Irrigation System Using A Wireless Sensor Network And GPRS Module Transactions On Instrumentation And Measurement, Vol. 63, No. 1, January 2014.
7. Wireless Monitoring of Soil Moisture, Temperature Humidity Using Zigbee in Agriculture Prof C. H. Chavan, Mr.P. V.Karande.International Journal of Engineering Trends and Technology (IJETT) Volume 11 Number 10 - May2014
8. International Journal of Engineering and Innovative Technology (IJEIT) Volume 2, Issue 8, February 2013 72 A Wireless Remote Monitoring Of Agriculture Using Zigbee Gopal Krishna Moorthy .K, Dr.C.Yaashuwanth, Venkatesh.K

