



Automatic Pesticides Spraying with Soil Monitoring

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Abstract—Agriculture is the most important part in our human life and it is the backbone of our nation. In earlier days farmers are used natural pesticides to control pests and to cultivate the land efficiently. In recent decades the agriculture dependent on chemical pesticides to control pests, which affects human health and causes toxic disease like skin allergy, rashes and toxic hazards. The proposed system will prevent the human from toxic effects. The system will automatically spray the pesticides over the crops and monitors the soil condition. The whole system will be monitor and control through wireless Human Machine Interface(HMI) through RFX240.

INTRODUCTION:

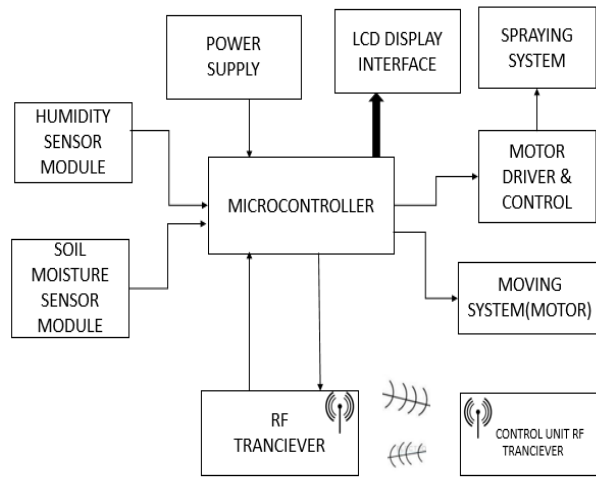
In India about 73% of population is directly or indirectly depends upon the farming. Hence it is said that India is an agricultural based country. But till now our farmers are doing farming in same traditional ways. They are doing seed sowing, fertilizers and pesticides spraying, cultivating by conventional methods. There is need of development in this sector and most commonly on fertilizers pesticides spraying technique, because it requires more efforts and time to spray by traditional way. India is one of the nations who is facing the same problem. This is caused due to low level farms, insufficient power availability to farms and poor level of farm mechanization. In order to meet the requirement of food of growing population and rapid industrialization, there is a need of the modernization of agriculture sector. The automation in agriculture is implemented to overcome this problem. On many farms production suffers because, delay in sowing, improper distribution suffer because delay in sowing, improper distribution of pesticides and fertilizers, harvesting. Mechanization solves all the problems which are responsible for low production. It conserves the input and precision in work and get

better and equal distribution. It reduces quantity needed for better response, prevent the losses and wastage of input applied. It get high productivity so that cost of production will reduced. To reach the requirement of production Agriculture implement and machinery program of the government take steps to increase availability of implement, pumps, tractors, power tillers, harvester and other power operated machines. Special emphasis was laid on the later as more than 65% of the farmers fall in small and marginal category. Generally mechanization of small forms are very difficult, so the automation is implemented in that field. So our proposed system is implement in the agriculture to overcome this problem.



Methodology for pesticides spraying

BLOCK DIAGRAM



This proposed system, Micro controller plays a major role in this process, it will receives the data and transmits the signal. The motor drives the spraying system to spray the pesticides liquid and it will adjust its height based on the crops growth. The stepper motor is used for the movement of the system. In this spraying system, sprinkler motor is used to spray the liquid using pressure sensor and also it consist of blower for spraying. It will test soil moisture content in soil for every 10 feet's and also senses the humidity. The LCD display is fixed in the system that displays the moisture and humidity content present in the farm. The communication between the spraying system and human is remote interface. The whole system will be monitor and control through wireless Human

Machine Interface (HMI) through RFX240. This RFX240 interface has long range of communication over the 1.5km. This communication interface, transfers the control instruction through the message to the system.

COMMUNICATION SYSTEM

RFX240

The technology defined by the RFX240 specification is intended to be simpler and less expensive than other (WPANs), such as. Applications include wireless light switches, electrical meters with in-home-displays, traffic management systems, and other consumer and industrial equipment that requires short-range low-rate wireless data transfer. Its low power consumption limits transmission distances to 10–100 meters, depending on power output and environmental characteristics. RFX240 devices can transmit data over long distances by passing data through intermediate devices to reach more distant ones. RFX240 is typically used in low data rate applications that require long battery life and secure networking. It is used for the communication between Agro-Robot and Human through wireless. The RFX240 modules work at the 2.4 GHz frequency which means smaller board and antenna size. RFX240 modules have the ability to transmit Digital, PWM, Analog or Serial RS232 signals wirelessly. To communicate



over UART or USART, we just need three basic signals which are namely, RXD (receive), TXD (transmit), GND (common ground). So to interface UART with LPC2148, we just need the basic signals. [4] discussed about Intelligent Sensor Network for Vehicle Maintenance System. Modern automobiles are no longer mere mechanical devices; they are pervasively monitored through various sensor networks & using integrated circuits and microprocessor based design and control techniques while this transformation has driven major advancements in efficiency and safety. In the existing system the stress was given on the safety of the vehicle, modification in the physical structure of the vehicle but the proposed system introduces essential concept in the field of automobile industry.

consists of sprinkler motor and blower for spraying purpose. Irrigation sprinklers are sprinklers irrigation to agriculture, crops, vegetation, or for recreation, as a cooling system, or for the control of airborne dust, landscaping and golf courses. The sprinkler system irrigates the field and thus it is widely used in sandy areas as it checks the wastage of water through seepage and evaporation. Sprinkler irrigation is a method of applying irrigation water which is similar to natural rainfall. Water is distributed through a system of pipes usually by pumping. It is then sprayed into the air through sprinklers so that it breaks up into small water drops which fall to the ground.



SPRAYING SYSTEM

a. sprinkler motor

This arrangement used to spray the pesticides over the crops with help of portable motor pumps. The spraying

b. stepper motor

Stepper motors provide very precise, extremely cost-effective motion control. The



2-phase motors inherently move in small, precise, 1.8 degree increments at 200 steps/revolution and are brushless and maintenance free. Stepping action is simple to control and does not require complicated, expensive feedback devices. National Instruments also offers

encoders matched to the motors for applications where position verification is required. Stepper motors are available with frame sizes and with either a single or a dual shaft. The motors provide optimum performance and easy connectivity when matched with the P7000 series stepper drives available from NI. It operated with 200 rpm. It rotates step by step

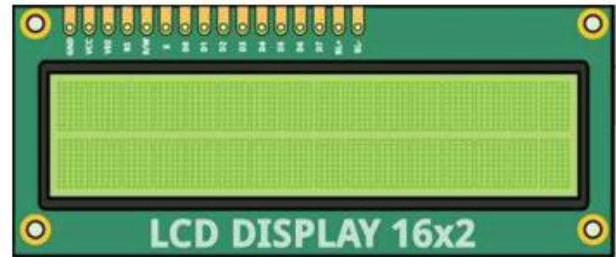


The message

LCD DISPLAY :

In our proposed system LCD display is used to display the soil moisture content and humidity contents present in the farm. In this proposed system 16x2 LCD display was used. The message was displayed when the command sent from the microcontroller. The LCD display operated with 5V power supply. The message will display on the

screen with time delay. It consist of 11 input lines.

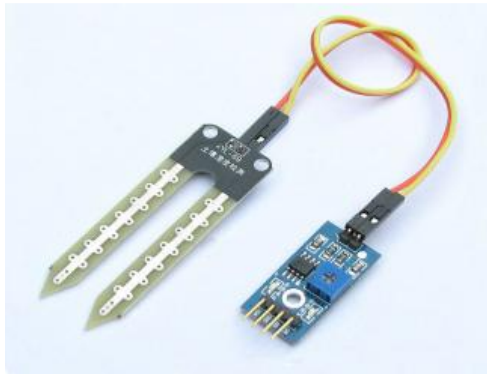


SOIL MOISTURE SENSOR:

This sensor used to detect the moisture level of the soil in the Agri-field to report the consumer advices to switch on the motor. Since the of free soil moisture requires removing, drying, and weighting of a sample, soil moisture sensors measure the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with , as a proxy for the moisture content. The relation between the measured property and soil moisture . The amount of moisture is measured for the irrigation of the system. The salinity sensors are mostly used for the measurement of the moisture content present in the agriculture. Soil moisture based control technologies water plants based on their needs by measuring the amount of moisture in the soil and tailoring irrigation schedule. An alternative to convention irrigation controllers, soil moisture-based control technologies makes



irrigation schedules adjustment by automatically tailoring the amount and frequency and timing of irrigation events based on the moisture content of the soil in the landscape.



HUMIDITY SENSOR:

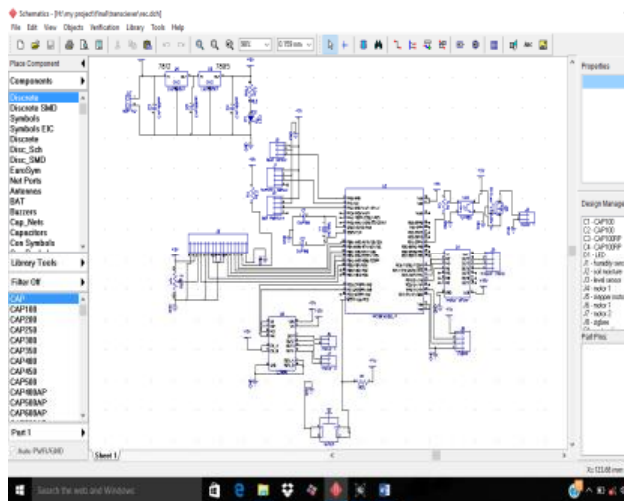
This is used to detect the humidity content in Percentage at the Agri-field. And to maintain the greenhouse properties. Humidity sensors provide accurate measurement of dew point and absolute humidity by combining relative humidity and temperature measurements. Our sensors are qualified for the most demanding applications, including automotive, heavy truck, aerospace and home appliances. We offer a variety of output signals such as digital (Frequency, I2C) and analog voltage, as well as, customized and proprietary output signals including PWM, PDM, LIN and CAN.



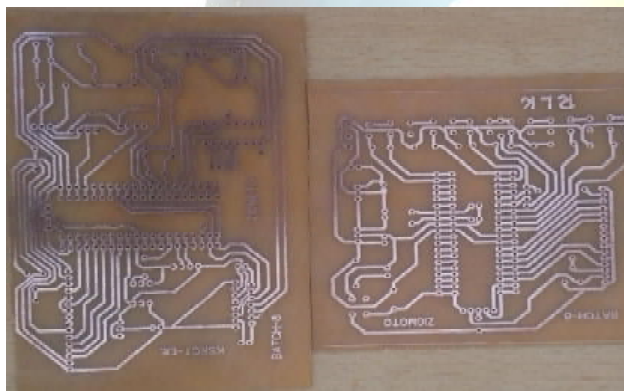
SOFTWARE:

PCB SOFTWARE:

Printed Circuit Board is used to design the circuit diagram. Our proposed system circuit diagram was designed using this schematic system of PCB. The required circuit components was searched in library files. This diagram shows the schematic capture of this proposed system. Early models of PIC had read-only memory (ROM) or field-programmable EPROM for program storage, some with provision for erasing memory. All current models use flash memory for program storage, and newer models allow the PIC to reprogram itself. Program memory and data memory are separated. Data memory is 8-bit, 16-bit, and, in latest models, 32-bit wide. Program instructions vary in bit-count by family of PIC, and may be 12, 14, 16, or 24 bits long. The instruction set also varies by model, with more powerful chips adding instructions for digital signal processing functions



PCB BOARD:



This is the pcb base board of our proposed system. With this board the components was placed . The tracks on the board is made up of copper coating. The ironing process was made to place the track on the board. After this process the etching process was made and the board was cleaned with ferric

chloride solution. After the cleaning process the whole on the board was drilled.

CONCLUSION:

Thus the proposed system states that the prevention of plants from the pests and also the human health from the pesticides spraying, fertilizers using the automation mechanism. The spraying device de-Signed by another thesis people were able to selectively spray designated groups of plants in the agriculture whilst moving along the field. The coverage of the spray coated the plants in adequate and consistent dosage .The high precision agriculture soil moisture monitoring requires more sensors. For another, sensors introduce new difficulties in sensor management, data processing, and information serving. Therefore, this paper proposed a soil monitoring to solve the existing problems. The humidity in the farm also measured for the cultivation of crops. The whole system was controlled by zig bee network.

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