Review on Microcontroller Based Disease Predicting System Using Sensor and GSM in Plant

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Abstract – In the past pair of decades, there is swift ambit in terms of technology in the field of agriculture. extraneous monitoring and controlled disposition are installed in order to boost the yield. The yield rate may deceases due to numerous factors. Disease is one of the key factors that cause the degradation of yield. So the developed monitoring system mainly focuses on predicting the start of germination of the disease. Sensor module is used to ascertain different environmental condition beyond the farm and the sensed data is show on Liquid crystal display using microcontroller. Microcontroller wirelessly transmits distinct environment conditions beyond the farm to central unit where data is stored, and analyzed. Central unit checks the present data with disease condition and if matches then it commands microcontroller to operate relay. Sensor module is tested for different temperature range and it is found that there are little variations in recorded values. Wireless data transfer is tested with the introduction of various obstacles like wall, metal body, magnet, etc. and it is found that same data is transferred to central unit but with some amount of deferment in it. The developed system nearly predicts the start of germination of disease.

Index Terms – Agriculture, disease, microcontroller, monitoring system, wireless.

1. INTRODUCTION

Agriculture is most important part in our day to day life. It is basic platform for economy of most countries. It is one of the main sources of livelihood of people. It provides not only food but also some important raw materials. The other advantage that agriculture provides is large scale employment. But in past pair of decades, it is observed that the yield rate is not been increased, since in some areas it is even declined. There are number of factors which are liable for the low yield. It may be due to fertilizer pervert, reducing arable land, fragmentation of agricultural land, agricultural bankruptcy, water waste, low soil fertility, climate change or diseases, etc. Out of these, disease is one of the broad factors which have strained the yield rate averse. To analyze the effect of disease, citrus plants (oranges) in Maharashtra state (India) is considered which is among the leading state in cultivating much variety of the citrus. But large number of diseases due to fungi and viruses has been observed on citrus. The root decompose, collar decompose, fruit (brown) rot and gummosis caused by phytophthor spp. are most important. During monsoon months it is seen that the germination rate of the disease is defector high. Distinct environmental conditions that are liable for the growth of gummosis are as given below. Temperature - 28 to 32 _C

- Soil moisture - around 65% for 15 days
- Relative humidity - 80%

Consideration of Gummosis has shown that it grows when a peculiar environment is appeared beyond the field. This environment depends on special set of temperature, soil moisture, and relative humidity. Thus the three sensors, temperature, soil moisture, relative humidity, are used in the system. The real time values of these sensors are given to microcontroller. Now these values are displayed on Liquid crystal display (LCD) as well as wirelessly transmitted. Microcontroller verifies the real time values with context set of conditions of Gummosis disease. If it ascertain the inception of disease germination then it operates the buzzer. In today's world agricultural areas are getting reduced due to sloth of mankind in irrigation. Irrigation which is of current technology is a time consuming and also requires aloft maintenance during the yielding. Further the quality of the crops is also depends on the human management. In today's world most of the water is used for the irrigation system. In order to minimize this, a system has to be developed to perform irrigation automatically which acts dynamically upon the weather conditions. This system mainly converge on the conservation of the water resources by watering the crops whenever it is needed and it is

made through moisture sensor in the fields. This paper concerns the Dynamic and Unmanned irrigation system which reduces the wastage of water and to avoid the pesticide in the crops . This system intelligently adapts the water flow and irrigation based on the weather and moisture content of land. It reduces the maintenance cost and this system is more suitable for the complexity of high crops generation. The system consists of various subsystems such as moisture sensor, soil sensor, energy harvesting systems and microcontroller. In our research we mainly focused on the conservation of water resources and unmanned irrigation system. An additional feature has also been included in the system to identify the insects in crops and pesticide is sprayed only in that portion using the on stream video camera via image processing.

2. DIFFERENT MONITORING SYSTEM IN AGRICULTURE

Field of agriculture has seen the quickly elevation in terms of technology from beyond incorporate of decades. Farmers initiative to resort individualize monitoring and controlled system in instruction to augmentation the yield. Different agricultural parameters like temperature, relative humidity, soil moisture, carbon dioxide, light discovery, soil pH, etc. are monitored as well as controlled. Here it is critigue of some of these monitoring disposition which can help the farmers to amend the yield. Hierarchical wireless sensor network was installed to measured different soil parameters. Underground placed sensors send the data to base node through various relay nodes. Crutch node consists of 8051 microcontroller. Using the same microcontroller, a password protected water flow control system was developed using conjunct tone multi frequency (DTMF) technique. DTMF tones are used for the communication between farmer and All the sub topics should be numbered as shown above. monitoring poky. In one of the systems, Wi-Fi module is used for wireless communication. The system used At mega controller. It mainly focuses on transmitting different environment conditions to selected server via. routers. One other system with same controller, monitored temperature and water tenancy. The authentic time values are transmitted wirelessly to the substation using ZigBee. Substation performs the controlling action on motor and irrigation valve according to preset flap of moisture as set by the farmers. Environment inside playhouse was controlled using programmable interface controller (PIC). The system has indurate some references like Tmin, Tmax and Rhmin. Once these references are violated then controller would decree to relay operating circuitry for allow able controlling action. An irrigation management model for higher crop yield was presented. This model is based on commendation of soil water tension (SWT). PIC would innovate the irrigation scheduling based on this SWT value. Bluetooth and GSM based remote monitoring and control system is proposed using PIC. Weird conditions across the field are informed to farmers via.SMS and then farmer can take befitting controlling action.

3. CIRCUIT DESCRIPTION

The developed system (but not implemented) is trite to predict the inception of germination of gummosis. System consists of Sensing unit, LCD, buzzer, wireless module and microcontroller. Sensing unit construe the different atmospheric conditions. It consists of temperature sensor, relative humidity sensor and soil moisture sensor. The readings are given to microcontroller (PIC 16F877A). Microcontroller elaborate show these reading on LCD as snuff as transmit it.

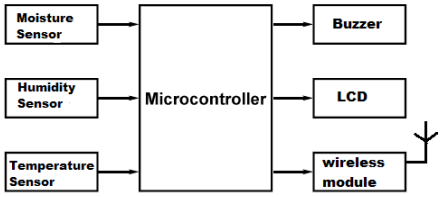

Figure 1. Block diagram of transmitter

Precious wireless module (CC2500 module). Block diagram of transmitter is as shown in Figure 1. Here in the figure, entire the sensors are interfaced to microcontroller. Microcontroller will dispel the buzzer if needed and different values will be displayed on LCD. Receiver consists of wireless module, serial communication expedient (RS 232) and personnel computer. Wireless module will espouse these different sensor readings and bestow it to computer via RS 232. Receiver is as shown in Figure 2. Wireless module is interfaced to central unit (Laptop) using standard communication protocol RS 232. Receiver consists of wireless module, serial communication device (RS 232) and personnel computer. Wireless module will receive these divergent sensor readings and give it to computer via RS 232. Receiver is as shown in Figure 2. Wireless module is interfaced to central unit (Laptop) using standard communication protocol RS 232.

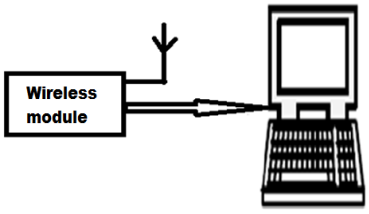

Figure 2. Block diagram of receiver

A. Humidity Sensor

Humidity is the presence of water in air. The amount of water vapor in air can affect human comfort as well as many manufacturing processes in industries. The presence of water vapor also influences various physical, chemical, and biological processes. Humidity measurement in industries is critical because it may affect the business cost of the product

and the health and safety of the personnel. Hence, humidity sensing is very important, especially in the control systems for industrial processes and human comfort.

A relative humidity is to be measure in percentage at a given temperature the total amount of vapors that could be held in the air. It accurately tracts the humidity range from 30-90% which is more regularly find out inside the cropping land. This sensor operated on DC 5v of supply which can be easily arranged as pic microcontroller will also be the same temp. It's temp. range is 0-60°C it is suitable for field work.Fig.3 show the humidity sensor SY-HS-220.

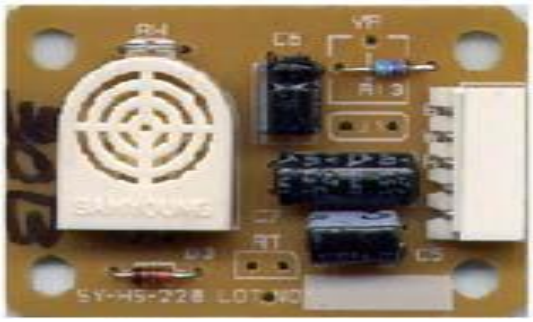

Fig.3: humidity sensor SY-HS-220

B. Temperature Sensor

National Semiconductor's LM35 IC has used for sensing the temperature. LM35 series are precision integrated-circuit temp. Sensors. The output voltage is linearly proportional to the Celsius temperature. The LM 35 is rated to operate over a -55° to +150°C temperature range it suitable field work. An advantage over linear temperature sensors calibrated in degree Kelvin as the user is not subtract a large constant voltage from its output to obtain convenient centigrade scale.

C. Moisture Sensor

It is to measure the present in moisture level of soil. This sensor is self-bridge of resisters and capacitors two aluminum foils are used which used as capacitive plates. Soil acts as dielectric medium. The electrical conductivity of medium there by reducing the voltage beyond the plate. 1% moisture change there is 2.90 PF change in capacitance.

D. PIC 16F877A

The project is PIC 16F877 from microchip family. There are numerous reason behind selecting this microcontroller has 14 bit core,40 pin DIP works up to 20 MHz. This microcontroller is very easy in assembling and price is very cheap. The old program will automatically be erased immediately. PIC 16F877A already made with 368 bytes of random.

The size of program code that can be stored is about 8k words inside PIC 16F877A rom. 1 word size is 14 bits which is more than enough for the system. The speed that crystal oscillator is connected to the PIC microcontroller range from 20 MHz. Receiver has the same wireless units as that transmitter. The received signal is then given to central unit. The data stored it and command microcontroller to operates buzzer.

E. Wireless module CC2500 RF

The wireless module used to transfers the real time value of temperature, humidity and soil moisture to central unit. This obstacle like wall, metal body, magnet, etc. Here only moisture sensor reading. CC2500RF module is a trans receiver module which provides easy to used RF communication at 2.4 GHz. It can be used to transmits and received data at 9600 baud rates from any standard COMS/TTL source.

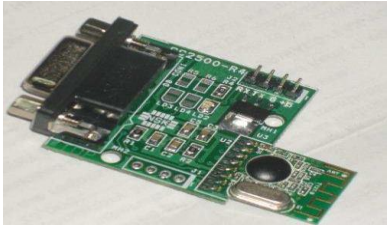

Fig. 8 : Wireless module CC2500 RF

The serial communication it required no extra hardware and no extra coding works in half duplex mode that is it provide communication in both direction.

F. Graphical User Interface (GUI)

It is developed for the ease of farmers. After registering into the GUI, farmer can access the system. As farmer logged in into the system, he / she will be directed to min output window. It shows the present clock time and real time reading of all the three sensors. Option is provided to switch to see the recorded data. Data logging facility is also provided in the system. Database is created which store huge amount of data. One of the database windows. It gives all the readings of three sensors with the exact time of the reading.

4. CONCLUSION

The developed system is Simple in construction and low cost than other systems present in the market. It measured of atmospheric temperature, relative humidity and soil moisture, etc. The wireless module will be used for to transmit the data and communication purpose. So it can be used in open fields as well as inside greenhouse as the range of wireless module is up to 25m with / without different obstacles like trees, benches, walls, cupboard, magnet, etc. With the use of wireless module, system becomes flexible, robust, etc. Sensors can be located any place in the field. If there is require relocation then it can be motile done. System is also tested for different temperature and it is found that all the sensors work with minimum deviation in output. Using of drip irrigation water can feed directly to roots of the crop. Thus shrinkage of water is minimized and water resources are optimized to derive

preferable crop yield. This system is fruitful to farmer as it neither saves water nor helps farmer in fighting the diseases. Thus it will boost the yield of the crop.

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