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Intelligent Weather Monitoring and Crop Disease Control System

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ABSTRACT: In agriculture zone, it is difficult to check and monitor weather parameters through wires and analog devices. Weather monitoring plays an important role in human life, so the collection of information about the temporal dynamics of weather changes is very important. In any industry during certain hazards it is very important to monitor weather. The fundamental aim of this paper is to develop an embedded weather monitoring system which enables the monitoring of weather parameters in agriculture zone that plays an important role in farming production processes. Rapid, accurate identification of diseases in the fields is key to preventing serious outbreaks and losses in yield and quality of the crops. However, the presence of disease does not necessarily mean that a treatment is required. The severity of diseases varies from year to year, depending primarily on weather conditions. The measures to be taken to prevent losses may therefore vary from season to season. The purpose of the developed system is to monitor the weather conditions and guide the identification of diseases and in pest management decision-making.

KEYWORDS: Agriculture, Wireless sensors, Weather monitoring, Arduino, Solar Panel.

I. INTRODUCTION

Weather forecasting is the application of science and technology to predict the state of the atmosphere for a given location. Human beings have attempted to predict the weather informally for millennium and formally since the nineteenth century. Weather forecasts are made by collecting quantitative data about the current state of atmosphere at a given place. Weather is driven by air pressure (temperature and moisture) differences between different places. The atmosphere is a chaotic system, so small changes to one part of the system can grow to have large effects on the system as a whole. This makes it difficult to accurately predict weather more than a few days in advance [1]. An automated weather station is an instrument that measures and records meteorological parameters using sensors without intervention of humans. The measured parameters can be transmitted to a remote location via a communication link. Therefore, the communication system is an essential element in an automated weather station. The collected data by weather monitoring system can easily be exported to a PC via a serial port to make subsequent data analysis or graphic and digital storage thus automatic data collection is possible without giving up PC resources. Weather Monitoring System and Disease Control is an innovative system which is helpful and supporting system for agricultural development. The proposed system detect the crop diseases before it affect the crop.

II. BLOCK DIAGRAM OF WEATHER MONITORING AND CROP DISEASE CONTROL

Fig.1 shows block diagram of Weather Monitoring and crop disease Control system. The working principle of this system describes the interdependent functionality of the components and their output [2]. Firstly, all the components are initialized by supplying the required power of +5V. There are two temperature sensors and the output is average of the two values. The natural light intensity may vary from time to time. This is important in agricultural applications, where light is required for the growth of plants and some plants may not grow well in low light. Temperature and humidity can be used in predicting weather forecast without the use of any satellite data. The gathered data is serially fed into a

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computer, which uses the com port to communicate with the Arduino device and the data received is stored in a text file. The text file can be directly imported to an excel file. The imported data is then stored and formatted, and charts are plotted. The charts are visual representation of the data, which shows the weather pattern over a recorded period of time.

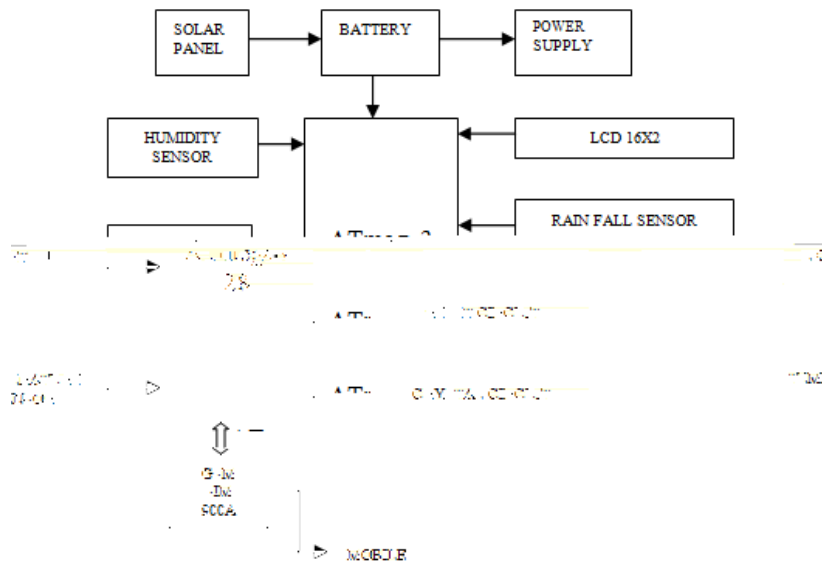


Fig.1 Block diagram of weather monitoring and disease control system

The visual patterns indicate weather behavior of the particular region which is the primary objective of the present work. Based on the weather conditions, the proposed system identifies the crop diseases before it affect the crop.

III. HARDWARE COMPONENTS

1. Arduino



Fig.2 Arduino microcontroller

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. Arduino is an open source tool for making computers that can sense and control more of the physical world than desktop computer. It has an open-source physical computing platform based on a simple microcontroller board and a development environment for writing software for the board [3]. Arduino can be used to develop interactive objects, taking inputs from a variety of switches or sensors and controlling a variety of lights, motor and other physical outputs. Over the years Arduino has been the brain of thousands of projects, from everyday objects to complex scientific instruments. A worldwide

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community of makers - students, hobbyists, artists, programmers, and professionals - has gathered around this open-source platform, their contributions have added up to an incredible amount of accessible knowledge that can be of great help to novices and experts alike.

2. GSM Module



Fig.3 GSM Module

The GSM900 device integrates an analog interface, an A/D converter, an RTC, an SPI bus, an I²C, and a PWM module. The radio section is GSM phase 2/2+ compatible and is either class 4 (2 W) at 850/900 MHz or class 1 (1 W) at 1800/1900 MHz. The TTL serial interface is in charge not only of communicating all the data relative to the SMS already received and those that come in during TCP/IP sessions in GPRS (the data-rate is determined by GPRS class 10: max. 85,6 kbps), but also of receiving the circuit commands (in our case, coming from the PIC governing the remote control) that can be either AT standard or AT-enhanced SIMCom type. The module is supplied with continuous energy (between 3.4 and 4.5 V).

3. 16×2 LCD Module

A liquid crystal display (LCD) is a flat panel display that uses the light modulating properties of liquid crystals (LCs). LCD Modules can present textual information to user. The 2x16 character LCD interface card supports both modes 4-bit and 8-bit interface and also facility to adjust contrast through trim pot. In 4-bit interface 7 lines needed to create 4-bit interface; 4 data bits (D0 – D3), three control lines, address bit (RS), read/write bit (R/W) and control signal (E). 16×2 LCD module is a very common type of LCD module that is used in 8051 based embedded systems. It consists of 16 rows and 2 columns of 5×7 or 5×8 LCD dot matrices. It is available in a 16 pin package with back light, contrast adjustment function and each dot matrix has 5×8 dot resolution.

4. DHT11: Temperature and Humidity Sensor



Fig.4 DHT11 Sensor

Humidity is the amount of water vapor in the air. Water vapor is the gaseous state of water and is invisible. Humidity indicates the likelihood of precipitation, dew, or fog. This sensor is used to sense humidity. It facilitates us with analog and digital output. We have used digital output pin to connect it directly to Arduino's digital pin (pin 7).

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5. LM35:Temperature Sensor

Fig.5 LM35 Sensor

LM 35 is a precision IC temperature sensor with its output proportional to the temperature (in °C). The sensor circuitry is sealed and therefore it is not subjected to oxidation and other processes. The operating temperature range is from -55°C to 150°C. The output coefficient is 10mV/°C.



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Monitoring rainfall is of great interest to meteorologists and climatologists as well as to the general public. The tipping bucket type Rainfall Sensor 3864 is designed to measure this important parameter with great accuracy and reliability. It is a lightweight, heat-

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V. EXPERIMENTAL RESULTS

The testing of each module was carried out successfully. The sensor outputs are stored in files. The files are imported in excel automatically using macros and the data is presented in graphical form. The sensor outputs have been analysed to get the weather conditions of a particular area. Based on the weather conditions the decisions are taken about type of disease and set of actions are specified.

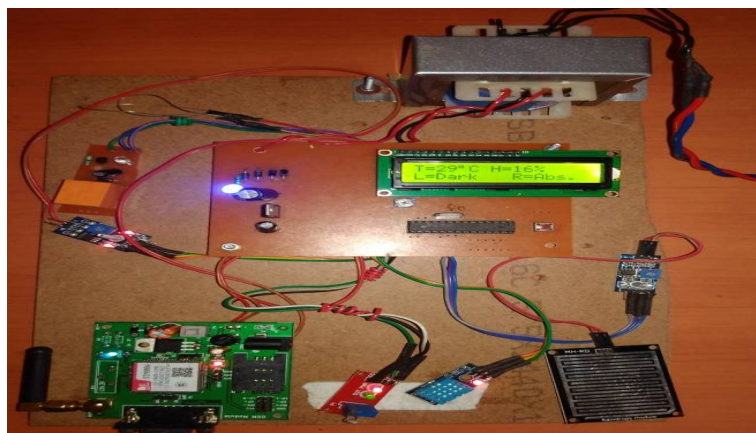


Fig.9 Weather parameters monitoring

Fig.9 shows the display of weather parameters: temperature, humidity, light and rain fall. These parameters are used to take further decisions.



Fig.10 Final output of the system

Fig.10 shows final output of the system. The system has used the disease application available in the mobile phone. By checking weather conditions the application sends sms containing disease information and remedial measure.

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VI. CONCLUSION

The developed system provides a competent method for recording real time weather conditions and help the farmers whose livelihood depends on the weather. It can be used together information about the requirements for each area over the years. The gathered information is used to determine appropriate remedial measure against crop disease. This, in turn will have a huge impact on agriculture and also on farmers throughout the world.

REFERENCES

- [1] Karthik Krishnamurthi, Suraj Thapa, Lokesh Kothari, Arun Prakash, "Arduino Based Weather Monitoring System", International Journal of Engineering Research and General Science Volume 3, Issue 2, ISSN 2091-2730, March-April, 2015.
- [2] Cindy M. Weinbaum, MD, Ian Williams "Recommendations for Identification and Public Health Management of Persons with Chronic Hepatitis B Virus Infection" 2014
- [3] Modicon Inc. Industrial Automation System, "Modicon Modbus Protocol Reference Guide-PI-MBUS-300", Rev. J, June 1996, http://www.modbustools.com/PI_MBUS_300.pdf, Accessed June 1st, 2011
- [4] Zhengtong. Y, Wenfeng. Z, "The research of environmental pollution examination system based on the Cloud Computing", International Conference on Communication Software and Networks, pp.514-516, 2011.
- [5] Zhengtong. Y, Wenfeng. Z, "The research of environmental pollution examination system based on the Cloud Computing", International Conference on Communication Software and Networks, pp.514-516, 2011.
- [6] Wei. Q, Jin. N, Lou X, Ma. R, Xu. J, "Software design for water environment remote monitoring system based on mobile devices", Applied Mechanics and Materials, pp. 2027-2032, 2011
- [7] Montgomery. K, Chiang. K, "A New Paradigm for Integrated Environmental Monitoring", ACM International Conference Proceeding Series, 2010.
- [8] Satoh. F, Itakura. M, "Cloud-based Infrastructure for Managing and Analyzing Environmental Resources", SRII Global Conference, pp.325-334, 2010.
- [9] Kurschl. W, Beer W, "Combining cloud computing and wireless sensor networks", International Conference on Information Integration and Web-based Applications and Services, pp.512-518, 2009.
- [10] Vogt T, Wise ME, Shih H, Williams IT. Hepatitis B mortality in the United States, 1990–2004 [Abstract]. 45th Annual Meeting of Infectious Diseases Society of America, San Diego, California; October 4–7, 2007.