Weather Monitoring System using Microcontroller

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Abstract: The measurement of temperature and humidity remotely by using the sensor is not only important in weather monitoring but also crucial for many other applications such as agriculture and industrial processes. A device for real time weather monitoring is presented in this paper to monitor the temperature and relative humidity of the atmosphere via GSM network, using analog and digital component. The sensor output will be given to the ADC. The microcontroller will read the ADC output and display the parameter value on the LCD. An LCD display is also connected to the microcontroller to display the measurement. For analysis and achieving purposes, the data can be transferred over GSM and receiver section that is mobile. The device has many advantages compared to other weather monitoring system in terms of its smaller size, on-device display, low cost and portable.

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I.   INTRODUCTION

Aim of our project is to monitor weather conditions including atmospheric humidity & atmospheric temperature with help of GSM modem. Local weather measurements are extremely important to a wider range of professions, from horticulturists to fire fighters. It provides around the clock monitoring of various types of applications. For example, it can be used in greenhouse to manage climate control and help to promote favorable growing conditions. On green roofs, it can help researchers understand performance by tracking soil moisture and air temperature. This project is fine combination of analog and digital electronics. The project consists of parameters like monitoring parameter sending through SMS. GSM interfacing is one of the main features of the project in which various data like value of parameters, date and time are sent by the SMS.

We have used microcontroller as main component of our project. Now, Microcontroller has become a main component of many electronic circuits. Also LCD and sensors are used for major basis of displaying and sensing purpose. This project consists of two basis modules like Data monitoring module and Data sensing module.

The display unit shows the value of parameters. This will help for the person to know the values, for this purpose we are going to use various sensors like temperature and humidity sensor which will be connected to ADC. The other module is named as parameter sending. It can be used to send the parameters value of remote location. We are going to use GSM modem. These values can later be seen using a mobile SMS inbox. This system is useful because many times it's difficult to measure the parameter values manually and also this module is more accurate than the domestic system.
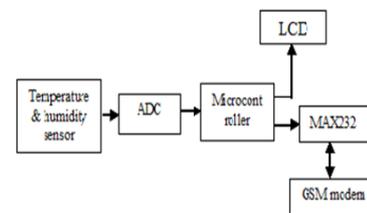

Figure1.Block diagram of weather monitoring system using microcontroller

Humidity Sensor: Humidity sensor works on the principle of relative humidity and gives the output in the form of voltage. This analog voltage provides the information about the percentage relative humidity present in the environment.

Temperature Sensor: The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in o C).

ADC: Mostly real world signals are Analog. Such signals are sensed through the sensors e.g. Temperature LM35. MCU/CPU processes only digital signals. ADC devices convert these analog signals into digital to be processed by the MCU/CPU. ADC 0808, 0804, 0809etc.

Microcontroller: microcontroller, as the name suggests, are small controllers i.e. called as single chip computer. This single chip computer is embedded into other systems to function as a processing/controlling unit.

LCD: A liquid-crystal display is a flat panel, electronic visual display that uses the light modulating properties of liquid crystals. Liquid crystal does not emit light directly.

MAX232: Max232 is designed by Maxim Integrated Products. Mostly MAX232 used is 16-pin DIP package. It consist of 3 major blocks .It can only be powered by 5

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volts to make it power supply compatible with most of the embedded systems.

GSM MODEM: A GSM modem is one of the wireless modem that is devised to work with a GSM with a GSM wireless network.

II. FLOWCHART
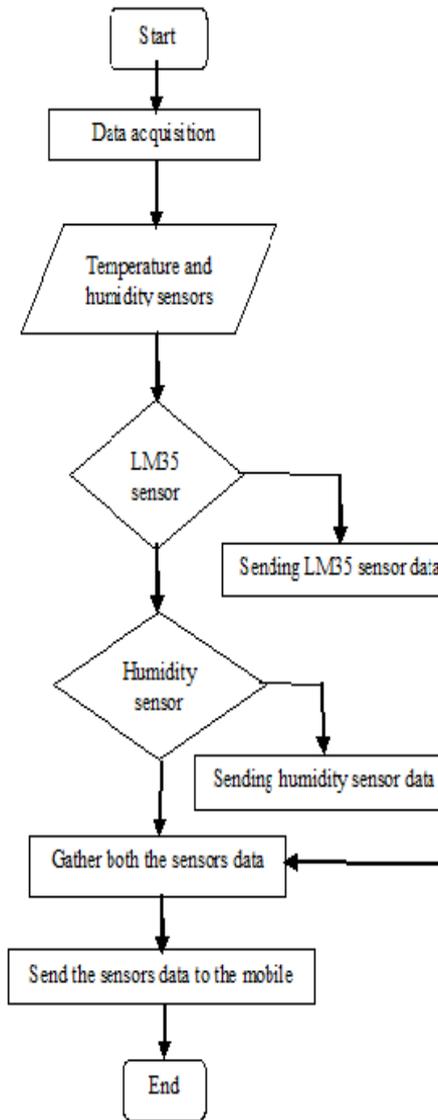
III. ADVANTAGES

1. Reduces manpower
2. Wireless Sensor Systems
3. Accurate system
4. Faster Data transfer
5. Automatic Indication
6. Low cost.
7. Less circuitry required because of software used.
8. Time saving
9. Enhanced for monitoring & controlling of atmosphere conditions.

10. Detection of the Temperature conditions will help us to avoid damages.

Table 1:Comparative study of temperature & humidity

Season	Temperature			Humidity		
	Morn	Aft	Eve	Morn	Aft	Eve
Summer	30^0C	40^0C	41^0C	27%	35%	27%
Monsoon	28^0C	32^0C	26^0C	60%	48%	64%
Winter	22^0C	29^0C	26^0C	74%	42%	49%

IV. DISADVANTAGES

1. If we want continuous monitoring of required parameter then we have to keep pc on at receiver that will increase the power consumption.
2. Limited Communication range.
3. Less Secured.
4. Low data rate.

V. APPLICATIONS

1. Industrial purpose.
2. Home automation
3. Agriculture field monitoring
4. Also this system communicates with a mobile and sends various data like level of humidity and temperature of water.

VI. EXPERIMENTAL RESULTS

The environmental monitoring data sensors automatically monitor the temperature & humidity. It can realize the remote access of sensor monitoring data and download of the environmental monitoring data to the client according to requests. The simulation result is shown below the table.
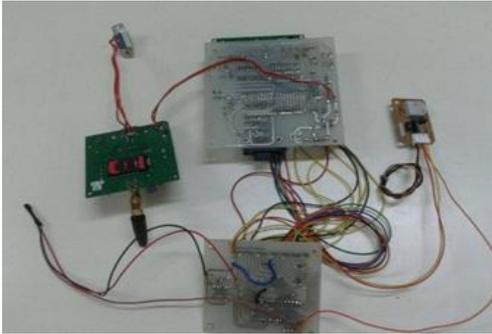
Figure 2.Circuit Photo

VII.   FUTURE SCOPE

1. Different other sensors as light intensity sensor, pressure sensor can also be interfaced with the microcontroller to fetch various information about a location.

2. Automatic irrigation control can also be implemented using moisture sensor to fetch regarding water presence in the farm and do turn on or off water pump accordingly.

VIII.   CONCLUSION

Our aim is to implement a simple and low cost weather monitoring system using LM35, LCD and 89v51RD2 microcontroller unit to monitor weather conditions of the desired location and transmit it to a cell phone at distant location through SMS. This wireless monitoring system implements real-time remote monitoring and management of wind power generation by using the wind station network (WSN). By using this we calculate the direction of winds, current and voltage which will be transmitted wirelessly to the base station.

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