

## ZIGBEE BASED WEATHER DISASTER ALARM MONITORING SYSTEM

Miss Dhanashree S. Kale  
(student- PG),  
Mr. Prasad P. Telharkar  
(Student PG),  
Dr U.B Shinde,  
CSMSS, Aurangabad.

### ABSTRACT

Natural disasters are becoming more severe. To carefully protect people in these areas, we need a weather monitoring and alarm system. In many events such as landslides and water flooding, they can be warned by a raised alarm within a specified period. The system with such facility equipment is a tool used to measure parameters such as sample temperature, air pressure, moisture, vibration etc. These parameters will vary depending on the requirement of the surveillance system.

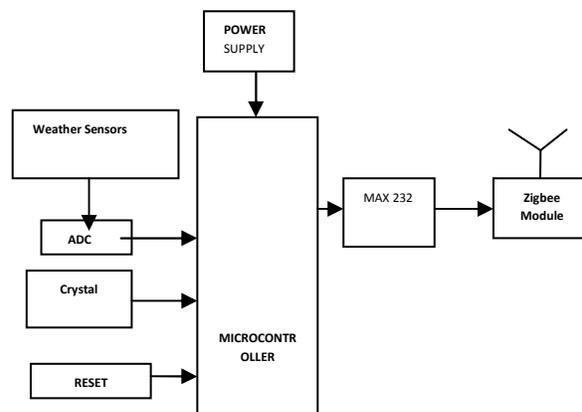
From the weather station research, it was determined that the most important factors for performance prediction are temperature, humidity, and barometric pressure, which are used to calculate corrected altitude. To achieve the necessary precision for a corrected altitude prediction, accuracies of 0.1°F, 0.1 in Hg, and 10% RH for temperature, barometric pressure, and relative humidity, respectively, are required; however, greater accuracy produces better results.

### INTRODUCTION

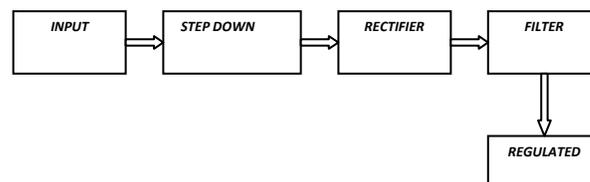
A weather station is a facility with instruments and equipment to make observations of atmospheric conditions in order to provide information to make weather forecasts and to study the weather and climate. The measurements taken include barometric pressure, humidity, wind speed, wind direction, and precipitation amounts. Wind measurements are taken as free of other obstructions as possible, while humidity measurements are kept free from direct solar radiation, or insulation. Manual observations are taken at least once daily, while automated observations are taken at least once an hour.

### PROPOSED HARDWARE IMPLEMENTATION

**DATALOGGER:** The electronic weather station includes a Datalogger, SM4M storage module, regulated 12-volt power supply, and various sensors. Data from the storage module is downloaded about once a week. Future equipment may include soil moisture sensors, or a modem to allow remote access and "real-time" download of data.



**Figure 1 System Block Diagram of Transmitter Section**



**Figure 2 : Block diagram of power supply**

**TOWER:** The tower is made of aluminum, and is 10 meters (33 feet) tall. It is anchored in concrete 4 feet deep, and at the top is a lightning rod to protect the weather instruments in case of a lightning strike. The tower has 3 guy wires to help support it, and is hinged at the bottom so that the instruments at the top of the tower can be easily lowered close to the ground for maintenance or calibration.

**RELATIVE HUMIDITY:** Relative humidity is the amount of water vapor that can be held in the air at a given temperature. It is expressed in percent, ranging from 0% (very dry) to 100% (dripping wet). The relative humidity sensor should be located inside the white 12-plate radiation shield, to protect the instrument from direct sunlight.

**AIR TEMPERATURE** This essential parameter is measured with a platinum resistance temperature detector, a very small and sensitive instrument. It is located inside a white 12-plate radiation shield, to protect the instrument from direct sunlight. It is located at a height of 2 meters (approx. 6 feet) to avoid temperature extremes found near ground level

## SOFTWARE DESIGN FLOW

In software design, we are taking the communication between the sensor nodes and the network coordinator as an example to introduce the flow of communication between the ZigBee modules. Before making communication, ZigBee module needs effective initialization. When the server receives weather data from sensor nodes, the server will check the weather data with notification value by using decision Tree techniques. If it matches with the pre-conditions, it will notify the system administrator and record of the notification and automatically store weather data to the database. The communication between sensor nodes and sink nodes, and exchange between sink nodes and networks coordination are similar. Software design mainly programmed with C# language combining for the collected data display, analysis and storage etc.

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## **SIMULATION RESULT**

This paper focuses on developing devices and tools to manage, display and alert the weather/disaster warnings using the advantages of a wireless sensor network system in mesh topology. The system can work over far distances. The system uses microcontroller and Xbee Wireless module base on the ZigBee/IEEE 802.15.4 standard. The developed system is very flexible and accurate. The developed system has core competency including

- 1) Display weather information,
- 2) Alert when weather conditions match using decision tree technique and
- 3) Keep weather information statistics.

## **CONCLUSION**

Thus ZigBee technology provides a direction to solve the safety environmental monitoring data in laboratories. The purpose of this study is to propose a solution suitable ZigBee based embedded web technology to safety monitoring. The embedded database manages the data collected by sensor networks, realizing the local management of environmental data. The simulation results will indicate that design of system is safe and convenient from local management of environmental data in laboratories which can be used further. Thus this system proposed to provide following benefits.

- Weather Reporting System.
- Industrial Applications.
- ZigBee protocols are intended for use in embedded applications requiring low data rates and low power consumption. Typical application areas include 1.Home entertainment and control 2.Home awareness 3.Mobile Services 4.Commercial building
- The technology is intended to be simpler and cheaper than other WPANs such as Bluetooth

In the designing of our projects, we have kept in mind the user. In the implementation part which interacting with the user we will try to give lot of guideline to user with various messages. Visual basic is a very good programming language for implementation of any data base projects because it has powerful control with which you can easily implement various facilities in our projects and make the screen that will be very user friendly.

## **PERFORMANCE ANALYSIS**

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