THE UNIVERSITY of TENNESSEE MARTIN

Remote Weather Sensing Station

2008-2009

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Abstract

A low cost remote sensing weather station capable of communicating back to a base station and uploading data to the internet allowing anyone to access live accurate weather data.

Requirements

- Acquire all the weather data at a remote station.
- Compile all the data using a microprocessor.
- Transmit data wirelessly to a base station.
- Upload the data to a user friendly web interface.
- Explore alternate methods of accessing data.

Hardware Design

- A variety of weather sensors are used to gather all the required weather data. The sensors included temperature, rainfall, humidity, wind speed/direction, and pressure

- The data from the sensors is compiled in a PIC microcontroller.
- Each sensor is connected to it's own separate interrupt on the PIC to allow real time data to be acquired.


- A Solar Panel was used to charge the weather station during the day.
- The Solar panel put out 10 Watts of power at 12 V DC.

	Load (mA)	Optimized Load (mA)
Wireless	48	0.01
Pressure	11	11
Humidity	2	2
Temperature	0.5	0.5
Rain	0.01	0.01
Wind	13.2	13.2
Board w/o chip	25	0
Microprocessor	5	5
TOTAL	104.71	31.72

Software Design

- Development of the PIC microcontroller used the MPLAB IDE and CCS C compiler.
- Other platforms include ASP .NET in the Visual Studio 2008 Suite for web development, XCODE for Python and mobile app development.
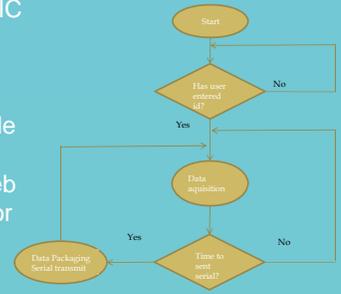
Applications

- There are two methods of accessing the real time weather data.
  I. On a web browser through a user friendly interface.
  II. On a mobile device allowing access anywhere from a cell phone.
  III. Other software includes the python apps in the transceivers to handle the communications protocol and the base station software to read the data.

Discussion and Conclusion

- Fall 2008/Spring 2009, successfully researched and developed PIC software for the PIC 16F877A microprocessor.
- Successfully integrated all of the weather sensors with the microprocessor.
- Power management was critical for the station's survival.
- Future Plans:
  I. Add more sensors such as UV Index and a radar technology.
  II. Kramer Types Here…