

Environment sensing – Adding a bit of down-to-earth cognition to your PC

Abstract

This general-purpose application provides a 5-channel analog interface to the PC, has local intelligence in the form of a microcontroller and provides web server interface through CGI. Further, it does not need an external power supply as it draws power from the PC serial port itself thus bringing about a reduction in size and cost.

It can be used in several applications –both standalone and Internet-based. Three applications are described here. Of these two have been tried out and the third can be done with some minimum modifications. The first, called the environment sensor, uses the PIC16C73 to capture environmental parameters and convey them to the serial port of a server. A CGI script on the server processes these values and displays them on a web page thus converting the server into a “cognitive server” that is “aware” of its environment. The second application is Web-based instrumentation. Here, the board was converted into a multimeter that provided two channels of voltage measurement and two channels of current measurement. The third application is to use this device as a mini-weather station. The sensors can be replaced with appropriate weather parameter sensors to measure atmospheric parameters such as wind speed, atmospheric pressure, etc. thus converting this device + server combination into a weather station. It is possible to have one such station at every major city or holiday resort. These stations can be servers themselves or they can collect the data and FTP it to a central server periodically thus making real-time weather data available to tourists across the world.

The environment sensor senses three environment parameters –light intensity, sound intensity and temperature. The chief criterion for this application was size. The electronics including power supply had to be small enough to fit into a tennis ball. PIC16C73 was chosen because of its size and the fact that it was possible to power the device as well as the rest of the electronics from the serial port itself. The sensors, numbering five, consist of two microphones that detect sound. These correspond to our ears - ears that can only detect only loudness but cannot understand what is being said. Two LDRs (light dependent resistors) sense light intensity. These correspond to the eyes, actually eyes that are closed, because the sensors can only detect light intensity but have no image capturing capabilities like that of a camera. A temperature sensor senses the surrounding temperature. This roughly corresponds to our ability to tell if it is hot, warm or cold. The sensors are connected to an interface board. The board uses PIC16C73 that accepts these analog values, digitizes them, and sends them to the serial port of a server. The software at the server end interprets these values and displays them on a web page.

Block Diagram

