

Pattern recognition applied to physical measurements

Chameleon: Data collection in remote and hostile environments

There are many situations in which there is a need to collect data from sensors in remote and hostile environments. Some examples are: Vibration data from geophones. Data about pollutant concentrations in the atmosphere. Data from machine monitoring systems. The environment in which this kind of data is generated is typically wet, muddy, or oily. It is often geographically remote, and there may be no phone lines or radio system over which the data can be sent for analysis. UEA has been involved in analysing just this kind of data collected from hydrophones placed on mains water distribution pipes alongside main roads. The aim is to use the sounds picked up by the hydrophones to detect and locate leaks in the pipe. To carry out this task we have developed a novel data logging system which is designed to collect data from a variety of sensors and operate unattended for days or weeks in hostile conditions. The data logging system is called Chameleon.

Chameleon has the following features:

1. Collects measurements from sensors and stores them internally until required by the user.
2. A GPS receiver is integrated into the system allowing precise time of a measurement to be determined. The time is accurate to within ten millionths of a second allowing measurements made by chameleons many miles apart to be accurately correlated.
3. The GPS system also tells the geographical position of the Chameleon unit when the measurement was taken. This facility lends itself to using the Chameleon in situations where the sensor is moving; Oceanographic studies, metrology, vehicles etc.
4. Current versions of Chameleon download their data via a link to a lap top computer. Future versions will use wireless networking technology such as Bluetooth.
5. Very low power electronics are used through out the design. Power management involves selectively powering down sections of the circuitry whenever possible.

6 Knowledge discovery and data mining

Commercial Development We have developed a prototype of the Chameleon. The next stage is ruggedisation, miniaturisation, and designing to minimise power consumption. We are currently seeking industrial partners to help get Chameleon to market. Research Team: Dr. Paul Linford and Dr. Graham Tattersall. Funding: EPSRC, water boards