

Rattanasak Kasettham 2011: Embedded Multi Sensors for Hydrological Monitoring System. Master of Engineering (Information and Communication Technology for Embedded Systems), Major Field: Information and Communication Technology for Embedded Systems, Department of Electrical Engineering. Thesis Advisor: Assistant Professor Dusit Thanapatay, Ph.D. 61 pages.

The purpose of this research is to design and implement the low cost sensor nodes for Hydrological Monitoring System. It consists of low cost flow velocity sensors and low cost flow direction sensor. This sensor node is used to measure the flow velocity in various depths and the flow direction of the river. The flow velocity sensor is designed by using a propeller and a Hall Effect sensor. The rotation of propeller is designed to provide a pulse when it passes Hall Effect sensor. So, the frequency of the pulses is proportional to the velocity of water. The flow direction sensor is implemented by using a compass sensor, magnet, vane and controller (MSP430). It is used to measure the angle between the flow direction of the water and the flow velocity sensor. Then, the angle is used to improve the accuracy of flow velocity.

For experimental results, demonstrate that the low cost flow velocity sensors have a low root mean square error. So, they can measure the flow velocity in general flow-velocity condition. And the low cost flow direction sensor has an acceptable accuracy but it need to calibration before using. Furthermore, the pitch and roll of the flow direction sensor has effect to the accuracy. Then, the sensor node should install in horizontal to prevent the error. Therefore, the low cost sensor nodes which consist of low cost flow velocity sensors and low cost flow direction sensor have efficiency for using in the hydrological monitoring station.

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