COMPUTER CONTROL OF A PROTOTYPE UNDERWATER ROBOT FOR ENVIRONMENTAL MONITORING

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Project Description:

Environmental monitoring of rivers, lakes, and other ecosystems has become a major economic, social, and academic concern. Underwater robotics plays an increasingly important role in the monitoring of ecosystems, due to advantages of low cost, safety, and convenience. The current project focuses on the computer control of an underwater robot – consisting of a remotely operated vehicle (ROV) and a manipulator – for environmental monitoring. A low-cost, proof-of-concept prototype capable of navigating the shallow waters of the aquatic environments around New Orleans (e.g., the Mississippi River, Lake Pontchartrain, and the Gulf Coast) is currently being developed. The mentored student will have the opportunity to work on computer control of the prototype robot, in collaboration with the faculty and Tulane graduate students.

Project Objectives:

The mentored student will work on the computer control of the ROV and manipulator using a portable, laptop computer. The programming environment will be Visual Basic or Visual C++. The computer control consists of data collection from various sensors using a PCMCIA analog to digital converter card, and issuing control commands to the vehicle and manipulator actuators using a PCMCIA digital to analog converter card. The data collected from various environmental sensors will be stored in a data base for interpretation later. The student will develop a graphical user interface for data collection and manual control of the robot-manipulator. Depending on completion of these tasks, the student might also be able to participate in research on computer control of the underwater robot over the Internet, and development of a programming language to enable school children to control the robot to perform specific tasks and do environmental monitoring.

Prerequisites or Experience Required:

Background in electrical engineering, computer engineering/science, or mechanical engineering. Experience in computer programming on Windows PCs, preferably Visual Basic and/or Visual C++. Familiarity with computerized data acquisition is desirable but not essential.