Master thesis in Mechanical Engineering

Title

Human robot interface for a Robotic ROV Arm

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Description

Remotely operating underwater vehicles are becoming smaller and more accessible due to their cost and price reduction. By using small ROVs (mini and general class), the operator will benefit from the reduction of operation costs and easier availability of crew, hardware and boats. However, nowadays small ROVs are mostly used for inspection, lacking adequate tools to perform maintenance procedures with high dexterity and payload. The purpose of this thesis is to design and develop a human robot interface to control a seven-degree robotic arm. The system to be de will be designed by taking advantage of the bio inspired arm design and allowing the user to control the robotic arm with the assistance of an optical pose measurement sensor. The optic interface (LEAP motion - www.leapmotion.com) measures the human hand pose and uses this information to control the robotic arm end-effector.

Objectives

The purpose of this thesis is to design a seven degree of freedom lightweight robotic arm and integrate with a Human Robot Interface controller

1. Literature review of Human Robot Interface Controllers and robotic manipulator arms;
2. Design the HRI control station to be robust to external factors, such as light, and coupled with two or more optic sensors to maximize the workspace volume and minimize visual obstructions (Line of sight);
3. Robotic Arm Kinematics Study;
4. Validation of the HRI in a Simulation Environment
5. Robotic arm hardware specification and selection;
6. Thesis submission;

This work will be developed in a partnership with WavEC – Offshore Renewables (www.wavec.org).