Project Proposal

Human Interface for Robotic Control

SYSC 4907 - 4th Year Project

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Team Members:

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The project aims to develop an interface between intuitive natural human movements and robotic control. Specifically the target objective is for a robotic hand to mimic the movements of a human hand with minimal latency and high accuracy. The system is to be developed such that a user at a remote location can control the robotic hand over an internet connection.

The system is a low-cost development platform for robotic applications involving hand and arm control. The intent is to showcase current robotic technology that may find applications where human interaction is necessary but human presence is unsafe or inconvenient. Such remote control applications may include bomb diffusion, and assembly line work for tasks such as welding and parts placement.

# Background

Robotics has long been an area pursued by industry and hobbyists. Its applications today range from manufacturing plant assembly lines, to self-driving cars, to kid’s toys and beyond. Previously this area of study required a high initial cost for equipment and long lead time to design and manufacture the hardware. This led it to only being a specialized topic of study to those with enough funding and time available. However now with the practicality of 3D printers, the hardware can be obtained as simply as downloading open-source designs and printing it. One such open-source project is InMoov which is a complete life size human robot replica that is put together using 3D printed parts. With InMoov, the inclusion of robotics hardware into the 4th year project became practical.

The vision of this project is to develop a true embedded robotics platform that can serve as the foundations for developing robotic applications that replicate human movements. Due to the academic background of the 3 team members in electrical and computer systems engineering, it was decided that the system should have very close control to the hardware. For this requirement a hobbyist microcontroller such as the Arduino Uno was unacceptable. A combination of a Texas Instruments Tiva C Series microcontroller and Leap Motion for interfacing user interaction was the best possible choice for the goals outlined. Features such as remote control over internet and record/playback of user action were decided to be added to the platform to widen the scope of future development opportunities.

# Description

# Timeline