

THE ROBOTIC HAND

Prepared by: Hee Qi Yang

ABSTRACT

One of the key aspects of understanding human intelligence is to investigate how humans interact with their environment. Performing articulated movement and manipulation tasks in a constantly changing environment, have proven more difficult than expected [12].

The design of a multi-fingered robotic hand with a wrist of three degree of freedom is presented. The robotic hand is self-operating; it able to perform stable and compliant hand grasping motion followed by hand shaking. Design considerations focus on adaptive grasp requirement; the fingers are able to curl while they flex independently of each other during closing as well as straighten individually as they extend. The wrist takes care of the hand shaking task and is able to mimic most of the human wrist motion with only three degree of freedom. A voice playback system that is computer interfaced is implemented and is able to greet in accordance to the time of the day during shaking of a human hand.

The robotic hand is equipped with a touch sensor which is based on a touch switch operation whereby detection of human skin resistance corresponds to the negative supply rail to the touch switch circuit. The integration of touch sensor is a key component in realizing robotic systems which organically interact with the world. This report details the mechanism used to achieve these sensory, actuation, and control objectives, along with the design philosophies and biological influences behind them.

Overall, the project went as planned. The main aim of this project was achieved successfully, all the robotic hand and wrist are able to perform required tasks and improvements were done beyond the objectives as well.

Keyword: Robotic Hand, Touch Sensor, Voice Playback System