Project Name – PSU Smartphone/Tablet Camera Detection of User Selected Movement

Overview
Children and adults with physical disabilities often have small movements such as a thumbs up or looking up to the right, that is easily recognizable by a supportive partner, but not as a method of switch input for computer technology. After working with the Rehabilitation Engineering Research Center on Augment, we have designed and developed a new and innovative way for people with such disabilities to communicate with their supportive partners. This design method allows the user to send a distress signal via text message to their supportive partner with the simple movement of a thumb up.

Objectives
To develop a method by which a user-selected movement is used as a method of switch input using new and innovative technology.

Approach
• After meeting our sponsor, we took the steps necessary in order to gather functional requirements
• Knowing that it would be difficult to find the hardware necessary to develop this design, we began generating working concepts that would allow us to deliver
• The most reasonable approach to this problem was selecting and affordable camera that detected hand skeletal tracking
• After searching for a camera that fit with our needs, we bought the Intel RealSense F200 camera
• This camera was compatible with a Microsoft Surface Pro 3 which was also affordable and would fit in our budget
• Once we had the necessary equipment, we needed to develop a working application that did exactly what we needed to do, which was to send a distress message to a supportive partner
• The only reasonable approach we could take was to develop a web application that once started, would turn on the camera to begin detecting the "thumb up" hand gesture
• Once the camera detected the hand gesture we programmed it to send a distress message to the default cell phone number that the user provided
• We went through a testing phase to ensure the web application worked as expected, and did

Outcomes
• The final outcome of the project was a new, unique way of combining Intel's RealSense F200 camera with innovative tablet technology
• It provides an easy way for people with physical disabilities to make contact with their supportive partners in emergency situations