Wheelchair Enaction

Overview
Our group was tasked with using data mining software for determining emergent unsafe behaviour in wheelchair users. This is to be done by using infrared depth and skeletal image sensing kinematic technology. We were further tasked with giving the wheelchair patient live feedback to indicate whether or not they are safe.

Objectives
The goal was to give wheelchair patients live feedback to indicate whether or not they are making safe or unsafe movements. In addition we want this feedback to be readily available to their physician or doctor to negate the need for constant monitoring of the patient.

Approach
- Met with our sponsor to clarify project goals and acquire necessary hardware for the project
- Identified temporary wheelchair patients as our primary target audience with our sponsors aid
- Determined that the Microsoft Kinect was the best tool to collect data from patients
- The Kinect needed to be mounted on the wheelchair itself for mobility
- Made plans and CAD models for a rigging fit to attach to a wheelchair for mounting purposes
- Implemented a prototype rigging that attaches to the wheelchair for mounting purposes
- Made a few small adjustments and implemented finalized rigging after one prototype
- Above the Kinect we mounted a Surface Pro tablet to display live skeletal feedback
- Developed code for the data mining process building off work done previously in PSU D.A.T.A Lab
- Delegated a portion of the display screen for a Skype window to contact doctor or physician directly

Outcomes
- Implemented an innovative new system which allows wheelchair patients to receive critical feedback in order to enhance their safety from home
- Doctors can acquire feedback about their patients remotely rather than meeting them in person
- This data mining algorithm is not limited to wheelchair patients alone but rather can be easily be applied to other areas in the medical field
- Patentability is currently being researched by professionals that the project team and sponsor met with
- This is a significant step in the medical field and others will continue from here