SE/CprE 492 Weekly Report

Date: **10/21/2017**
Team: **Dec1704**
Project: **Danfoss Visual Inspection System**
Client and Advisor: **Radoslaw Kornicki and Professor Dogandzic**

1. **Brief summary of the activities in the last ~~two~~ three weeks**

   Joey Elliott:
   I worked on improving the THREE.js integration in the client repo. There are a few milestones the client needs to hit to reach prototype potential. First, the client needs to be able to calibrate the camera. Part of this process involves loading a 3d view of the camera's environment, allowing the user to determine what part of the 3d space to scan. For this, I've worked on rendering the room, and being able to move a calibration zone inside the environment. Second, the client needs to be able to load both the CAD models and scanned models side by side. My initial approach turned out to be a bust, so I've spent some time switching things around to render both models.

   Nick Gerleman:
   I worked to integrate the server platform and error detection application. After printing and attempting to scan more 3D analogues, it was determined the RealSense would not be acceptable for our project. I tested the raw depth information from the Occipital Structure sensor and determined that it is a much better fit. I have written camera code within the server to interface with it and am writing code for manual 3D reconstruction. I developed a simple binary format for the interchange of point clouds between the client and server.

   Cory Itzen:
   Scanning an object with 3D camera involves rotating an object to make all sides visible from the perspective of the camera. In our capstone project demo, this will be accomplished by making a rotating platform that is controlled by the server. I wired a 360 degree continuous rotation servo to an Arduino, which then communicates through a Serial port to our server. Whenever a scan is initiated, the server sends a signal through the Serial port to the Arduino, which will rotate the servo one rotation while the camera simultaneously retrieves live 3D data.

   Evan Woodring:
   I began working on the client. This involved learning Dart, as that is what we had begun writing the client with. Beyond this, I have been helping with transitioning to the new version of rendering both models. Rendering two side by side did not work, so we had to migrate to them both being rendered in the same window. Some bugs had to be fixed, such as the objects not rendering until the user clicked, as well as the window not resizing as the browser is scaled up and down. I have also worked on adding a viewer to our group's project website.

2. **Status-summary of the extra credit homework(s) that are due week#10**
   The homework is done and has been submitted.

3. **Any exceptions that could affect the demo/presentation**
   After retesting the Occipital camera, we found it to be more reliable and better suited for our project than the RealSense camera. However, we are still uncertain about the performance of the camera while demoing; it is possible the data retrieved from a live demo will be unreliable, which will make for an unsuccessful demo. Potential issues include inconsistencies in the output data such as lines appearing as rounded edges, and artifacts from the environment being collected as part of the output data. We still have yet to get the project running end-to-end, so this will be something we will be looking for when we get to that milestone.

   If the probability of an unsuccessful live demo seems too high, we plan to use pre-scanned data in our presentation in place of the live data from the camera.

4. **Any items more-remotely related to the project that need to be discussed**

   We have looked into using the Kinect V2 as alternative 3D camera. While the Occipital has been promising thus far, it seems like it may provide higher quality scans, which is something that will benefit our project.