CMSC 22010 Final Project: 3D Scanner

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1 Specific Aims of the Project

2 Background Research

3 Approach

4 Technologies Used

The laser scanner is controlled with an Arduino Uno, running a simple program that rotates moves the stepper motor by one step when it receives a message. Communication with the Arduino is controlled by a Python program which made use of the pySerial library in order to send messages to the Arduino. Data is captured by two Logitech webcams, which are controlled with OpenCV.

5 Innovations

6 Results

One of the challenges we faced in this project was designing the outer section (that is, the camera and laser mounts). We decided that the inner radius would be 65 mm so that we would be able to scan reasonably large objects. However, this meant that the outer section of our scanner was too large to be

printed in one piece. Because we needed the cameras and laser to be placed in precise positions relative to each other in order for our software to work, it was necessary for us to print the mounts in pieces that could connect to each other and lock. This was first attempted by creating tabs in the pieces that could slide into each other, but this proved difficult to print because the necessary overhangs sagged, and support was nearly impossible to remove because of how close to the bed the tabs were printed. The solution we found was to instead use puzzle piece-like connections, but this came with difficulties as well: PLA changes size slightly when it dries, so digitally fabricated objects which fit together perfectly did not actually fit together after being printed.

7 Lessons Learned

8 Conclusion

9 Team Member Contributions

A Photos

B Code Listings