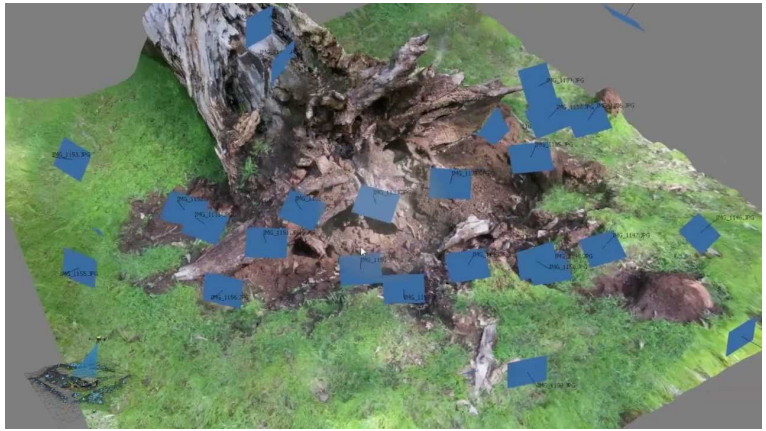
Real-Time Mobile Photogrammetry

A Senior Project by Connor Riva

Description & Personal Goals



Description: This project revolves around the area of study named Photogrammetry. Photogrammetry is the construction of 3D models using a set of 2D pictures. This project's goal is to use a mobile device's camera to provide a constant feed of frames in which a custom Photogrammetric software will build a 3D environment in real-time as the user continues use.

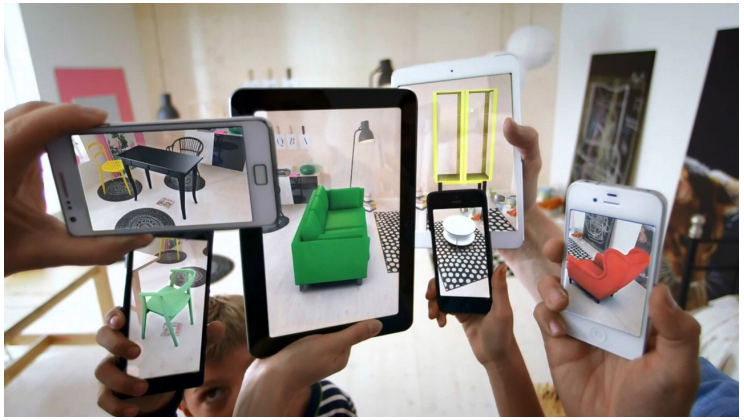
Personal Goals: Through this project, I would like to explore the mobile development space, as I have never worked on it before; to conquer my own personal fears and anxiety of taking a task I know nothing about and pushing through all walls and frustration till completion; and to use this project as a springboard into the post-graduation life where I will need to come up with my own motivation and projects to work on in the future.

Stakeholders: “Who would use my project?”

Assuming this project is even possible given the processing power of the mobile universe, this project could be very helpful for the future use of more immersive augmented reality in the mobile space, via games, exploration, or artistic expression. Those that develop for these spaces would be the primary stakeholders.

Other potential future uses:

- Land surveying
- Interior design
- Immersive online video communication
- Architecture
- Civil Engineering



Interface Description: How will the user interact with it?

The ideal would be a 2 phase Interface. The initial would be an “explore your world” phase in which the user would open the app via mobile device, and using the camera built into the device, start collecting video and movement data. The screen would either show the video feed from the camera, or the 3D world being built in real time.

Phase 2 would be an “explore the model” phase in which users could pinch, drag, etc. to navigate through the model which was rendered throughout the capture.

Proposed Technologies

Primary language used will be Java.

Using an Android device with internal compass/movement detection for implementation (will need to borrow one).

Trying to leverage an open source Photogrammetry software, or, if all else fails, attempt to build my own.

Features

- Use of a device’s movement detection in order to triangulate where certain points are in 3D space
- No focus on texture, only shape
- Mobile App

Other Relevant information

It seems that there are many applications in existence that implement Photogrammetry, but nothing I have seen performs this function in real time.

I don’t know how possible this project is given the processing power of the mobile space (or my skills in figuring out the problem), and If necessary, there might be ways of scoping this out of the mobile world.

This is more of a research project, as Professor Patterson pointed out, and as the article we read *Undergraduation*, the gaming industry is where a lot of the hard research questions are. So we will see where this goes.

Thank you!