

AGREED PROJECT PROPOSAL DOCUMENT

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Mentor: Dr Lightbody

Draft Project Title: 3D reconstruction of 2D images for use in virtual space
Project Description (300 words): In the immersive tech space, one thing that is lacking is accurate and fast 3D image reconstruction of spaces. Currently you have photogrammetry that will give us accurate 3D space scans at the cost of time. This project aims to use cutting edge research to attempt to detect an object in an image, the rotation and scale/depth of the object and substitute this with a 3D model in a virtual scene. Initially, the final output will be a working model that can detect a single simple object and place a similar 3D model of this object at a similar depth from the camera point in a virtual space. If this spike is complete, project scope may be increased to add more complex objects. This technology will seek to be generalisable to a point, such that it can be released for the immersive community to build upon and add more recognisable objects.
Project Aim: space reconstruction library/codebase for a creating virtual environment based on a single point photo.
Copyright/IPR/Commercial Sensitivity: Currently no issues have been raised about the project's copyright or commercial sensitivity
Hardware and Software Resources to be used within the project: This project will be making use of cutting edge technologies currently being researched. For developing in the virtual space I will be using the Unity physics engine with SteamVR for immersive developing. For object recognition I will be using RCNN technology (open source) along with keypoint net open source tool for pose estimation of objects. For hands on testing of the virtual environment, I will be using an Oculus rift or HTC Vive through Digital Catapult NI.
References (Use Harvard Style): <ul style="list-style-type: none"> - Suwajanakorn, S., Snavely, N., Tompson, J. and Norouzi, M. (2018). Discovery of Latent 3D Keypoints via End-to-end Geometric Reasoning. - Henderson, P., Ferrari, V. (2018) Learning to Generate and Reconstruct 3D Meshes with only 2D Supervision. - Zou, C., Colburn, A., Shan, Q., Hoiem, D. (2018) LayoutNet: Reconstructing the 3D Room Layout from a Single RGB Image

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