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Brian Mahabir

Project 1 Summary: Photogrammetry from images to 3D point clouds

The topic consist of computer visions, imaging and optical science. Specifically, the problem is that industry has made use of a fairly complex pipeline to turn images into 3D point clouds for 3D modeling. These models are useful for architects in construction, restoration projects, and manufacturing of tools. On a large scale, the archiects can use these 3D models to figure out the exact area one has on top of a building for example. On a smaller scale, laser tech can create cloud points of tools which can be imported into CAD for nuanced editing of dimensions.

The problem is that the process to create 3D models from images is arduous. Useful images are gathered using drones. From there, photogrammetry algotherms map points to objects from one image to the next creating vector data that can be used in 3D modeling. From there the point clouds are then arranged in a 3D space to create a 3D model. The points create edges, then faces, then finally polygons. (“What are Point Clouds, And How Are They Used?” youtube video linked below)

Personally, I find this topic very interesting as an enthusiast of Iot devices. Finding methods to speed up the photogrammetry process would allow embedded systems on the edge to complete these tasks on the fly. Having these 3D models ready to go would give an edge to the manufacturing process in evaluating tolerances of their products. Better yet, on a larger scale this would introduce a method to 3D model large cities . Having 3D models would be hugely beneficial in shortest path problems that plague our society. (

<https://www.youtube.com/watch?v=yXCkyuo8bcs>

<https://www.geoweeeknews.com/blogs/ultra-intelligent-point-clouds-make-modeling-obsolete>

Look into

<https://www.sciencedirect.com/science/article/abs/pii/S0924271622002015>

<https://link.springer.com/article/10.1007/s10712-019-09529-9>

<https://www.mdpi.com/2504-446X/3/2/35>