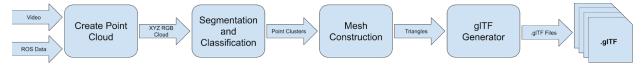# CIS 565 Final Project: Model Reconstruction from Drone Data

Repo: https://github.com/taylornelms15/Final-Project-CIS565
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Overview

We will create a tool that converts incoming visual and sensor data from an Unmanned Aerial Vehicle (UAV) and uses it to recreate world spatial data. The tool will then convert that to mesh data and output it into a glTF file. We will use an Nvidia Jetson Nano as our platform to simulate the resources available on a UAV. Video and ROS telemetry will be fed into a pipeline that will generate point cloud data. The point cloud will then be classified into individual objects and converted into meshes. The meshes will finally be written out as one or many glTF files.

Milestone 0 - Monday 11/11
- Identify useful algorithms, papers, and libraries for implementing our project.
- Interfaces for each component thoroughly defined.
- Working ROS data and/or video stream reader on Jetson Nano.

Milestone 1 - Monday 11/18
- Simple implementation of each segment working.
- Data flow between all components working. Interfaces from Milestone 0 verified.

Milestone 2 - Monday 11/25
- Point cloud generation from video complete.
- Segmentation and Classification (S&C) working on test data.
- Mesh construction working on test data, point clouds converted into geometry.
- glTF writer complete from test models.

Milestone 3 - Monday 12/02
- S&C working with output data from Point Cloud creation.
- Mesh Construction working with S&C output.
- Valid glTF files generated and tested working in a third-party glTF reader.

Milestone 4 - Sunday 12/8
- Performance analysis complete.
- Bottlenecks identified and resolved (time permitting).

References
https://www.forbes.com/sites/amitchowdhry/2017/10/16/dronedeploy/#3c81639a592d

Libraries
OpenCV3 for SIFT features, edge detection convolution, video I/O.
TensorFlow for Segmentation and Classification help. Further research needed.
tinygltf for outputting valid glTF files.