<u>**Final Project Proposal: Group 11**</u>

Problem Statement

The purpose of our final project will be to use deep learning to train a network that can measure building density of areas that are currently poorly mapped by using geospatial images as input. This model could then potentially be used to measure the growth or expansion of any given area by comparing historical images to current ones. This problem was chosen due to the interest of both members having taken a GIS course while in the Data Science program.

Data Sources

There are many potential data sources of satellite images that can be used for this task. An example could be Esri images or any opensource platform such as OpenStreetMap. For training purposes, the scope of the area to train could be narrowed to the DC, Maryland, and Virginia. There should be more than a sufficient amount of data to train our network, but if needed there are methods to generate more images off the original sources.

Network & Framework Selection

Initially, we are planning to use the Convolutional Neural Network due to its proficiency in image processing. While the plan is start with the standard CNN, additional customizations will be implemented to improve performance. The Keras framework used throughout the course would be a option to create a CNN network.

Reference Materials

There is a plethora of research in GIS available to the public online as well as academic journals available through the GWU library website.

Network Performance

The measured performance of the network will determine on the final structure of the network. If the measure of accuracy would be the true space between buildings in images, classification methods (i.e. cross validation) could be used, but this aspect will need to be considered as the project continues.

Tentative Schedule

- Oct – 11/1: Proposal Development & Research
- 11/2- 11/10: Data collection and preprocessing
- 11/11 – 11/24: Network Development, Testing, and Evaluation
- 11/25 – Presentation: Presentation & Report Development