Traffic Modeling with Unity 3D

Isaiah Martinez
CSUN
Computer Science Department
isaiah.martinez.891@my.csun.edu

Jae Molina
CSUN
Computer Science Department
jae.molina.499@my.csun.edu

Anastasia Naydina
CSUN
Computer Science Department
anastasia.naydina.947@my.csun.edu

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1 Change History

Version: 0.09
Modifier: Isaiah Martinez, Jae Molina, Anastasia Naydina
Date: 2/19/24
Description of Change: Discussed High Level Architecture of the project: Unity for modeling, C#/Python for helper script, Python for ML training, and JS for API connectivity. Added template to follow for documentation. Structured git repo directories. First, we will be working on a set amount of locations with small amount of available traffic data. Later, we hope to implement API connectivity to obtain traffic info and map data with more locations.

Version: 0.05
Modifier: Isaiah Martinez, Jae Molina, Anastasia Naydina
Date: 2/12/24
Description of Change: Made Git repository. Looked at scholarly articles for related works. Uploaded sample scholarly article to view. Laid out big ideas for project. Began work on models to be used in Unity.

2 Progress

Where are we with design/implementation?
We have made a simple Unity project containing camera pointing at a plane that has a texture of a screenshot from Google Maps. We intend to use this plane as a reference for whatever location we use in the program. See the image below:

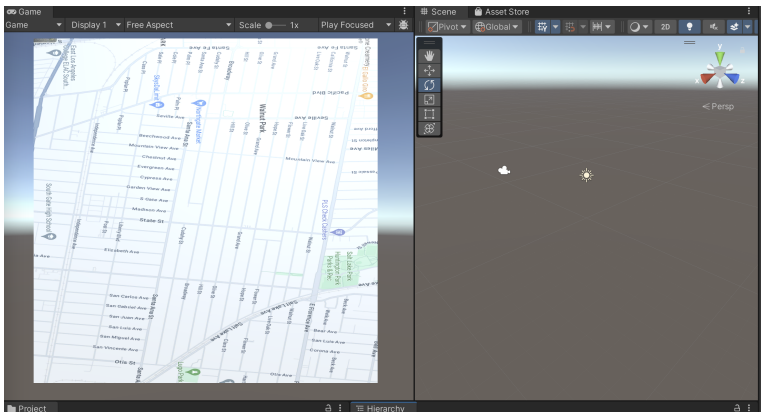

Figure 1: Screenshot of current Unity project with Game Panel on left.

We also decided on a plan for how to structure our architecture for the project moving forward. As seen with the diagram below, we decided on 3 levels of computation/algorithms that will happen behind the UI scene:

- Where the project will ask the User for a location.

- Feed the given user input into a script that will connect it to a webpage.
- This webpage will make the map and return it back to that script.
- The script will return the image to the Unity project.
- We then run the traffic model made with Machine Learning on that map with traffic data.

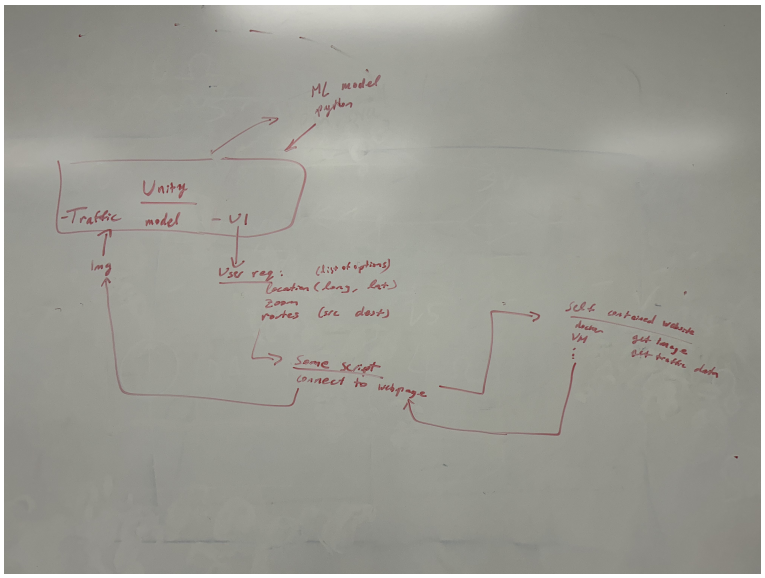

Figure 2: Sample Architecture Diagram outlined in Class 2/19/24.

Since the traffic data that we had found wasn't very consistent, one intersection would have data from 2015 when the other intersection nearby only had data from 1983. We are currently working towards grabbing a fixed amount of data for one location rather than letting the User input any random longitude and latitude for the program to run with. Instead, we are thinking of presenting the user with 3 or 4 options to choose from which is our fixed set of data to run.
Additionally, Isaiah has set up a GitHub page for writing both our reports as well as adding any implementations and ML models for the project which can be seen in Figure 3.

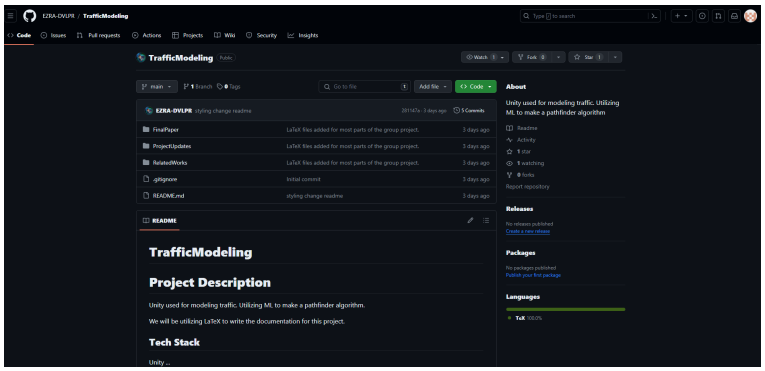

Figure 3: Screenshot of the Git Page.

3 Challenges

What challenges have occurred for this week?

We have continued to have difficulty looking for reliable sources of traffic information. It seems that there is not much publicly available information within recent years. There is also no general consensus as to how the data should be structured; Some provide daily tracking, some offer hourly updates, and others offer yearly summaries.

Another area we had encountered difficulty with, was knowing which API were available and applicable for our project. We wanted to utilize Google Maps API, but this seems to require a server to establish a connection to the Google API. As such, we have reduced the scale of the project, but hope to add this functionality in the future. There also exists a Python repository that automatically connects to the Google API's, but we are unsure of whether it provides the features we require.

We will continue to look for good and useful sources of traffic information. Additionally, we will be searching for API we can implement for the project, without adding much complexity.