

3D Traffic Modeling in Unity

Group 2:

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

05/13/2024

Contents

1	Change History	3
2	Introduction	3
2.1	Background	4
2.2	Related Works	4
2.3	Stakeholders	4
2.4	Document Structure	4
2.5	Responsibilities	4
3	Design Goals	4
3.1	Purpose	4
3.2	Objectives	4
4	System Behavior	4
4.1	General Overview	5
4.2	Key Features and Functionality	5
5	Logical View	5
5.1	High-Level Design (Architecture)	5
5.2	Detailed Class Design	5

1 Change History

Version: 0.42

Modifier: Isaiah Martinez

Date: 4/21/24

Description of Change: Finished TomTom API using Python. Made Python Script accessible via Command line.

Version: 0.19

Modifier: Isaiah Martinez

Date: 3/29/24

Description of Change: Added API for TomTom to obtain Images of Traffic Flow. Demo car scene implemented. Pathfinding added.

Version: 0.11

Modifier: Isaiah Martinez, Jae Molina, Anastasia Naydina

Date: 2/26/24

Description of Change: Simple Car model made. Looked at Related Works for process in utilizing Unity for traffic modeling. Looking for additional related works.

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 Introduction

This document describes the work put in to create a program that runs in Unity to model traffic in 3D. It allows for users to determine a start position, as well as a desired ending position which will follow traffic rules to ensure a legal and fast guide.

2.1 Background

Traffic congestion is a very common experience for those in Los Angeles [1]. In order to address this problem many apps such as Waze and Google Maps were created [2]. Following in the style of these applications, we wanted to create software that follows a similar purpose: to provide a good model for traffic flow and path to a destination with this information.

2.2 Related Works

2.3 Stakeholders

Stakeholders are:

1. stakeholder 1
2. stakeholder 2

2.4 Document Structure

What does each section of the document cover? What style of explanation will be used?

2.5 Responsibilities

Isaiah: API connectivity. Obtained the Traffic Data and Map Data through the use of a Python Script and TomTom's developer API. Added ML Agents to the unity project.

Jae:

Anastasia:

3 Design Goals

This section outlines the main objectives and guiding principles that drive the design of the software project. It provides a high-level vision of what the software aims to achieve in terms of functionality, usability, performance, and other key aspects.

3.1 Purpose

3.2 Objectives

what were our initial goals for the project? were they met? why/why not. how does our finished project compare to that of our initial vision?

4 System Behavior

This section describes how the system behaves as a whole and its overall functionality. It should give readers a clear understanding of the system's expected actions and reactions in different scenarios.

4.1 General Overview

what is the project? what is the core of the project?

4.2 Key Features and Functionality

what are some cool things that we made/implemented?

5 Logical View

The logical view provides a conceptual model of the software's architecture and its components. This includes how the software is organized and how its different parts work together. This will be the largest section of the document.

5.1 High-Level Design (Architecture)

insert an image showing how the different components connect together to form the project

Should be a layered image for each section of the project from unity to connecting to the python script, pathfinding, etc.

each layer should be explained as well

5.2 Detailed Class Design

should show a list of all functions and classes used to create the project

all classes/functions should have: -dependencies -Methods -output -purpose

References

- [1] A. L. CNN Illustrations by Natalie Leung, “Los Angeles’ traffic problem in graphics,” CNN, Feb. 27, 2018. [Link](#)
- [2] “The 7 Best Traffic Apps of 2023,” Lifewire. [Link](#)