

CSE6730/CX4230

Project Checkpoint 2

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Project Overview

Project Abstract and System Description

In this project, we model traffic flow at Georgia Tech using campus road networks as they currently stand. This simulation will allow users to adjust various parameters such as traffic flow while putting in place terrain-changing obstacles such as road blockades and intersection shutdowns which alter traffic flow. While these help students navigate campus, a key challenge is smoothly navigating all road traffic around campus even under perturbations that change traffic patterns. As such, traffic patterns under perturbation can be observed and used to identify pain points in the campus road networks for city planning in the future. Our system that we are modeling includes all Georgia Tech campus roads where automobiles such as cars and trucks can drive. This ranges from the intersection between North Avenue and Techwood Drive in the South East to the intersection of Curran Street and 14th Street in the North West. It is important to know that all Georgia Tech bus routes are also contained within this perimeter. As our simulation is meant for use in redirecting traffic given perturbations in regular flow (intersection blockages, road closures, etc.), the system will feature all of the same road rules as those present in the real world. We aim to provide easy UI options to alter traffic flow, car speed, road blockages, etc. to test different scenarios and analyze their impacts. This includes all the same traffic patterns due to features such as one-way streets or limited turning lanes. Our system also includes traffic lights, important road signs (ie. stoplights), and speed limits for all streets within the perimeter.

GitHub Repository

Link to GitHub Repository - <https://github.gatech.edu/tgoli3/gt-modsim-s22-team11>

Repository Permissions - Private Repository

Collaborators - Tusheet, Tushna, Matthew, Aarun, Dr. Vuduc, and Takahiro Furuya (TA)

Has README (instructions to run the simulation), gitignore, and documents.

Project Progress

Gantt chart link -

<https://github.gatech.edu/tgoli3/gt-modsim-s22-team11/blob/main/charts/Gantt%20Chart.jpg>

Division of Labor

We have created a detailed Gantt chart to showcase all the progress we have made for this project and the task we plan on completing for the upcoming checkpoints with appropriate due dates and members assigned. For a brief summary, we have divided the entire project into five phases based on the five deliverable deadlines for the project. Please refer to the Gantt chart for more details. You can use the link above or scroll down to the end to see the Gantt chart.

Phase 1 - Form Project Teams (Done)

Phase 2 - Literature Survey (Done) - Gantt chart shows work distribution for the assignment

Phase 3 - Project Checkpoint 1 (Done) - Includes finalized project idea, conceptual model, platforms/software of development, and initial data cleaning and collection.

Phase 4 - Project Checkpoint 2 (Done) - Coded out the system being studied (GT road maps) within the bounds of the proposed conceptual model. We also got our basic simulation working (pygame) and are currently working on adding UI features that can change and disrupt the natural traffic flow to analyze the impacts this has. This is our main analysis and novelty aspect.

Phase 5 - Final Project - Complete implementing all the UI features, culminating progress and efforts from previous phases to deliver a complete project with a project report (with final results and analysis), tutorial/demo, and code packaging. All these tasks have been equally split up among the team members.

Project Progress

We have not diverted the broad idea behind our project, i.e. analysis of traffic and road systems. During this project checkpoint, we have been able to successfully implement our simulation system and conceptual model that represents the Georgia Tech map we want to analyze. We have created a pygame simulation that shows how traffic flows in a given road system. We have a simple test map up and running and we are incorporating these features into the actual GT road plan. The individual contributions of the members can be seen in the Gantt chart. All members did an equal amount of work and contributed to this project code and report.

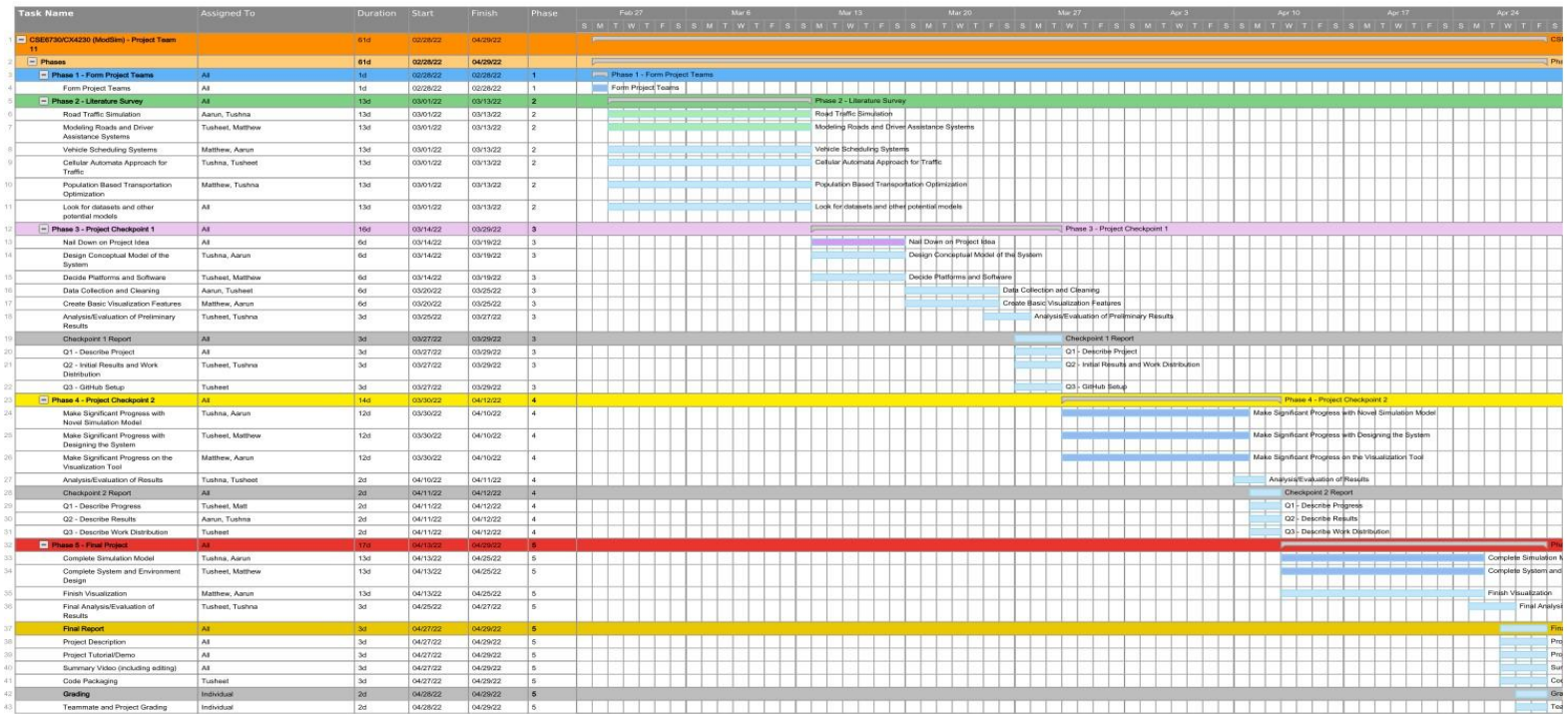
1. Tushna - Worked on creating the simulation engine and pygame along with some road rules.
2. Matt - Created the Georgia Tech road system and implemented traffic flow features on this.
3. Tusheet - Implemented UI features like blocking roads, modifying car speeds, creating diversions, etc. Also worked on analyzing and implementing some road rules on the GT map.
4. Aarun - Worked on creating the GT roadmap and getting the car flow working on this. Also helped with the simulation engine.

Tasks Left

We have made a good amount of progress with our system (GT road map) and modeling it within the rules of our conceptual model. The simulation is also up and running on the mini-test map.

We need to integrate the traffic flow model into the created GT road map system. Right now, the controls to the road (blocking/unblocking), car speeds, number of cars, etc. are all functional but can only be modified in the backend. We are working on adding easy-to-use UI options and buttons to make this an easy interaction experience for the users. After we are done with this, we plan on finetuning our code and model to have a good simulation of the GT traffic flow. After achieving this, we plan on analyzing pain points in the campus road networks for city planning and making a detailed report of what might be areas that need some improvements in the current road system. We feel we have made good progress as per our initial plan and are working on completing the project in this final stretch.

Gantt Chart



References

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