

StudentSphere

Team 058 - TUT 0104

Yihao (Jason) Lin, Mingyu (George) Sun, Marcus Cheung



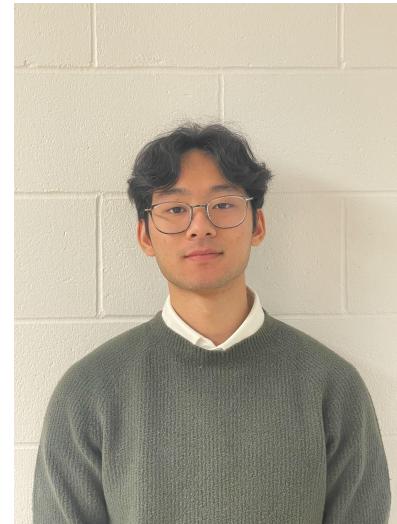
Meet the Team!



Yihao (Jason) Lin



Mingyu (George) Sun



Marcus Cheung

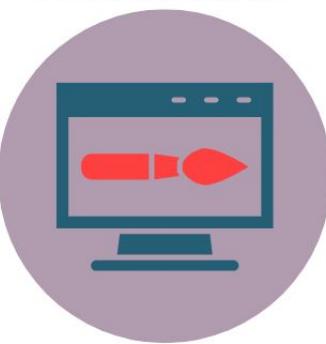
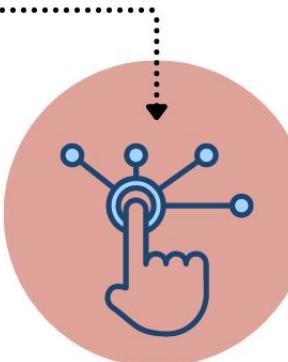
What Makes a Map Good?

Design Elements

Usability

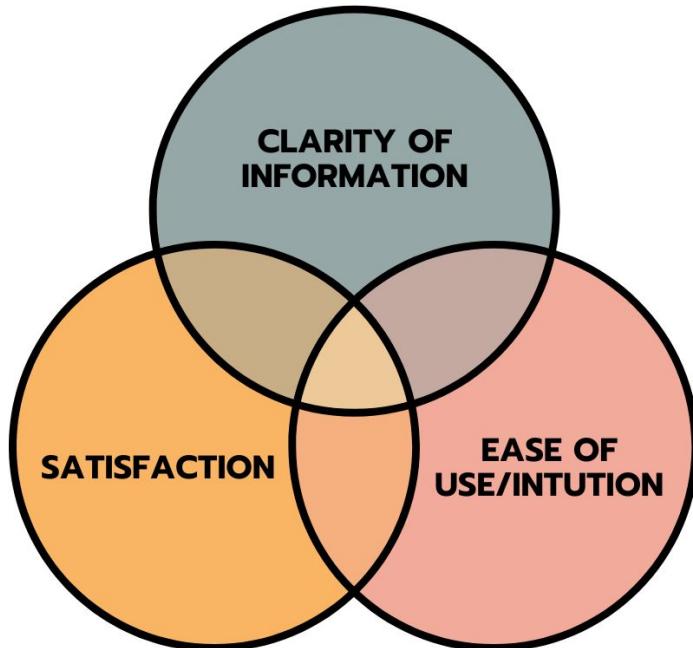


Responsiveness

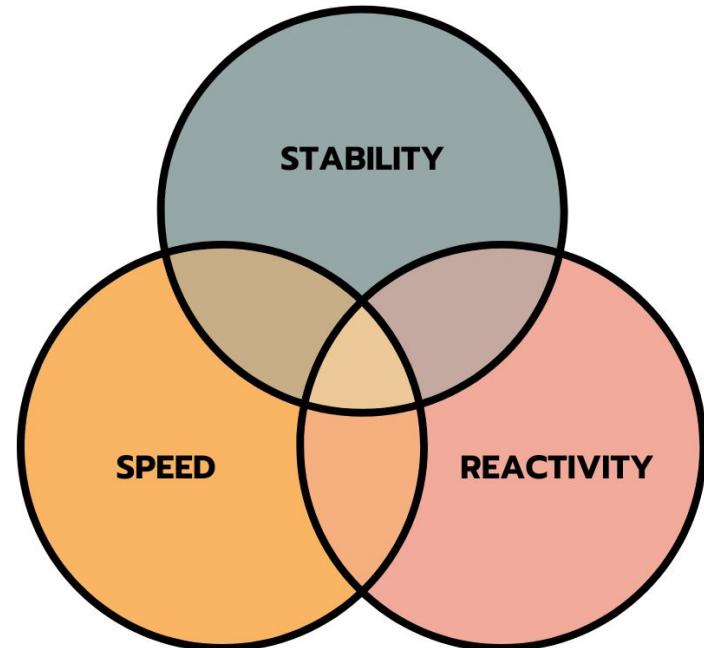


Design Elements to Consider

Usability



Responsiveness



Our project focuses on
displaying information clearly
to optimize information retrieval for students

What is Important for Students?

Student-Oriented Features

- Library, Cafe



Public Transportation

- Major choice of traveling [1]



Time Efficient

- Clear & Fast Information Delivery [2]

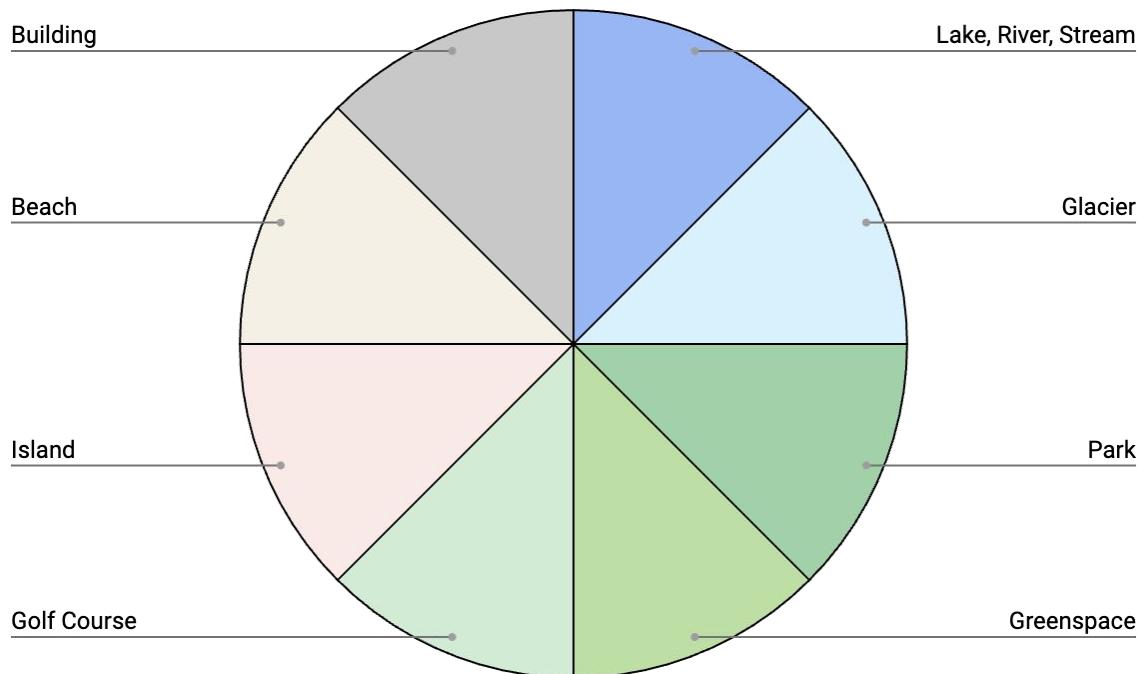


01

Design Features

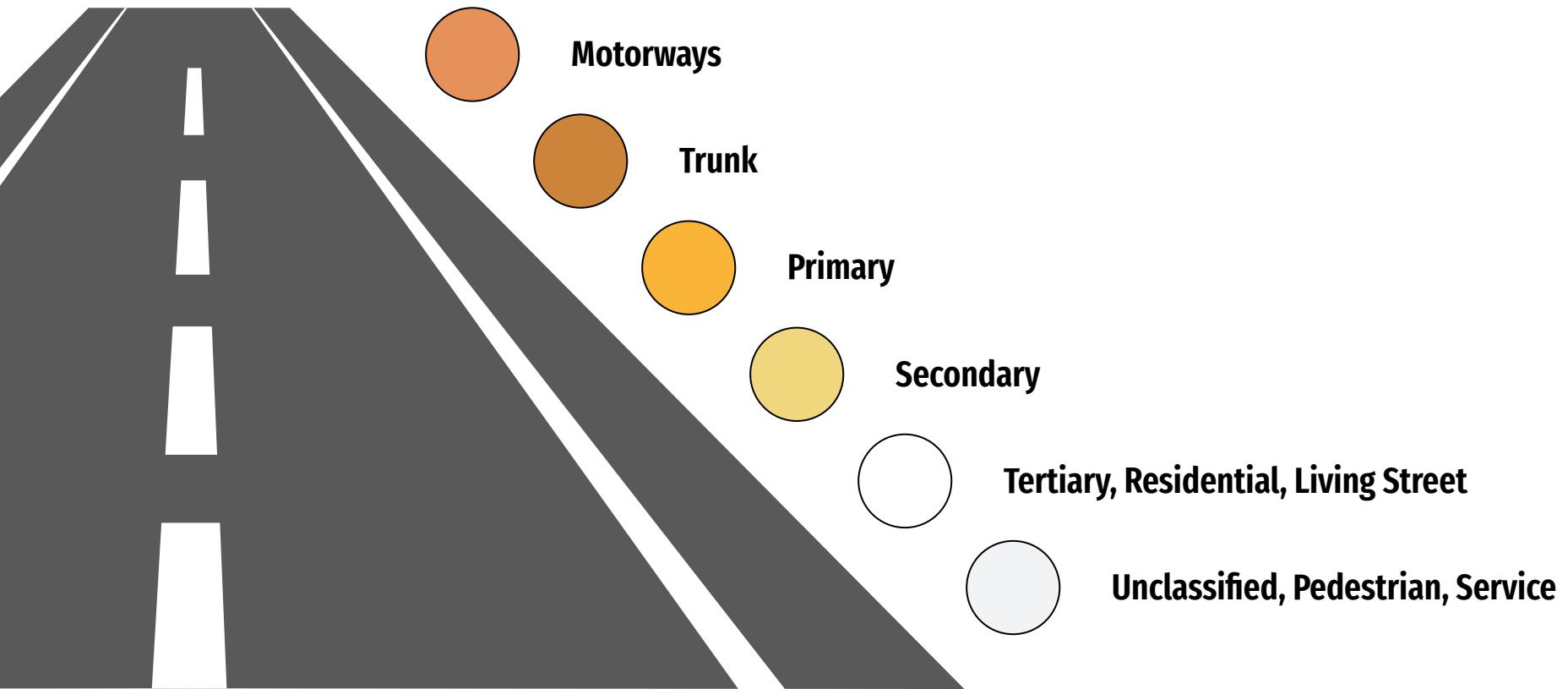
Frontend + Backend Features of StudentSphere

Colour System/Palette [3]

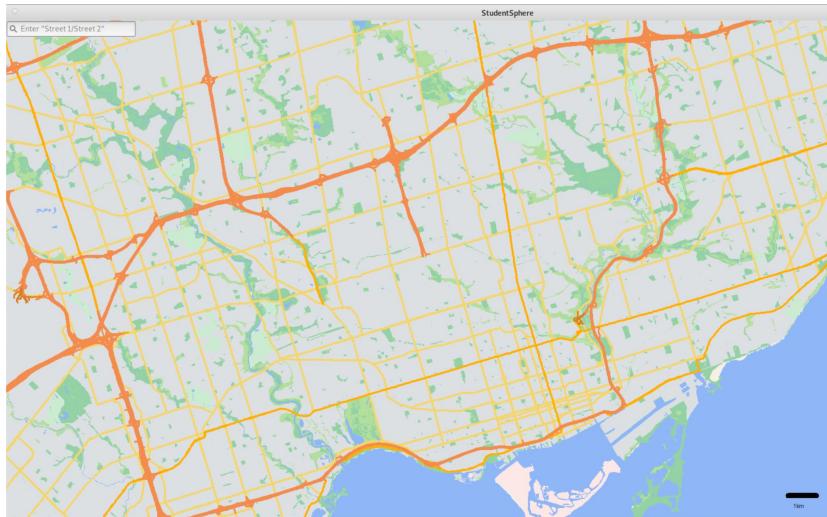


- LAKE, RIVER, STREAM**
- GLACIER**
- PARK**
- GREENSPACE**
- GOLF COURSE**
- ISLAND**
- BEACH**
- BUILDING**

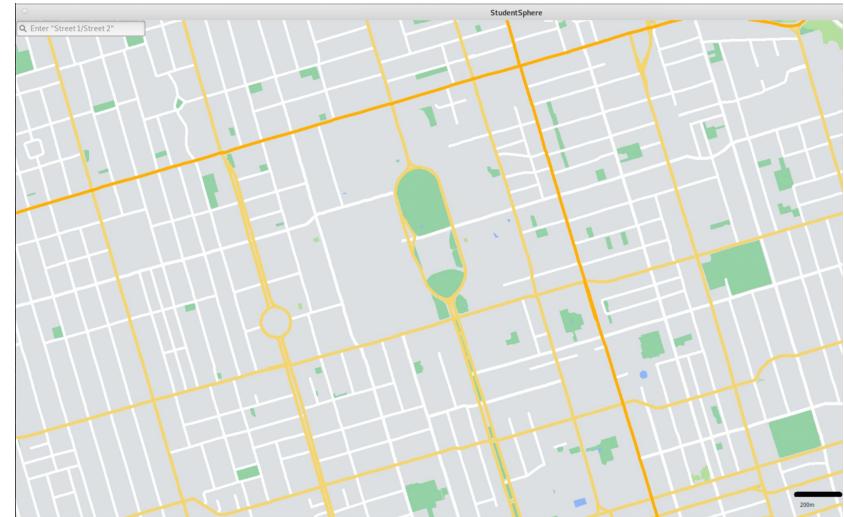
Road Colour System



Too Much Information? → Hierarchical Map Display



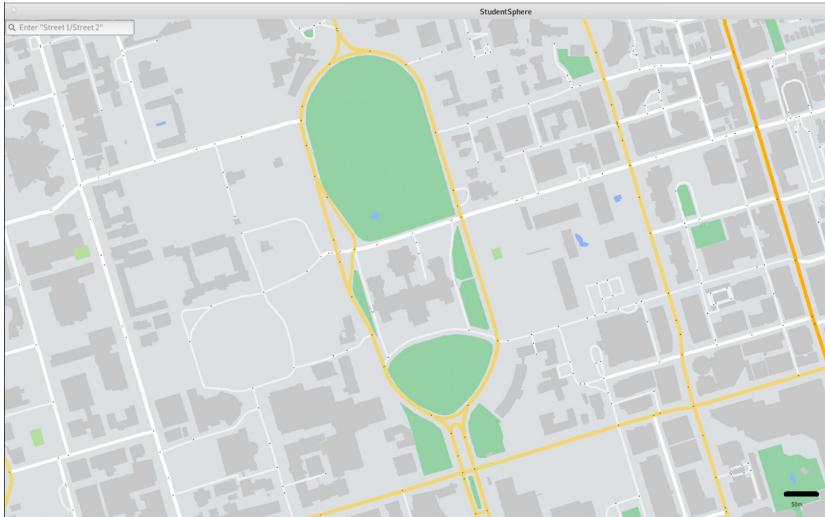
Regional View



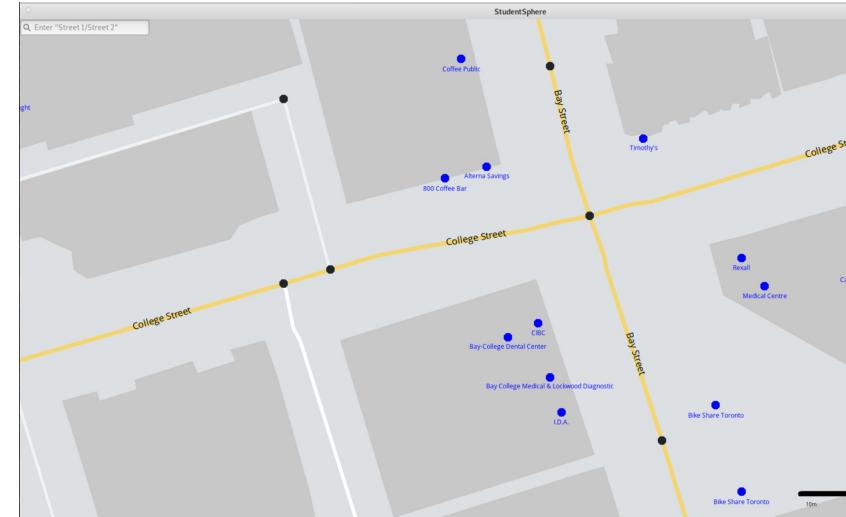
City View

Results: reduces cognitive load of the user by minimizing irrelevant information [4]

Hierarchical Map Display (cont.)



City View
(more zoomed in)

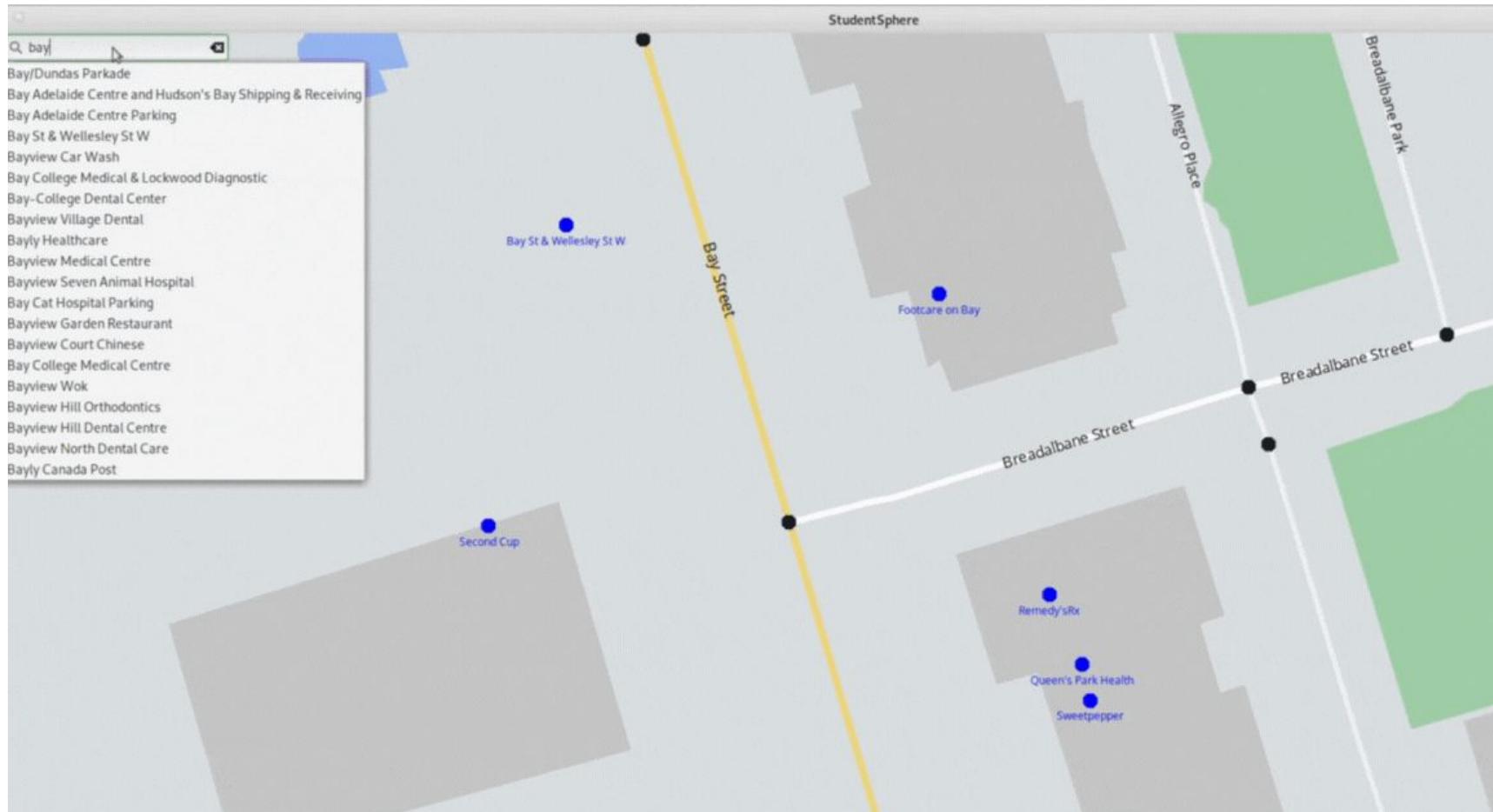


Street View

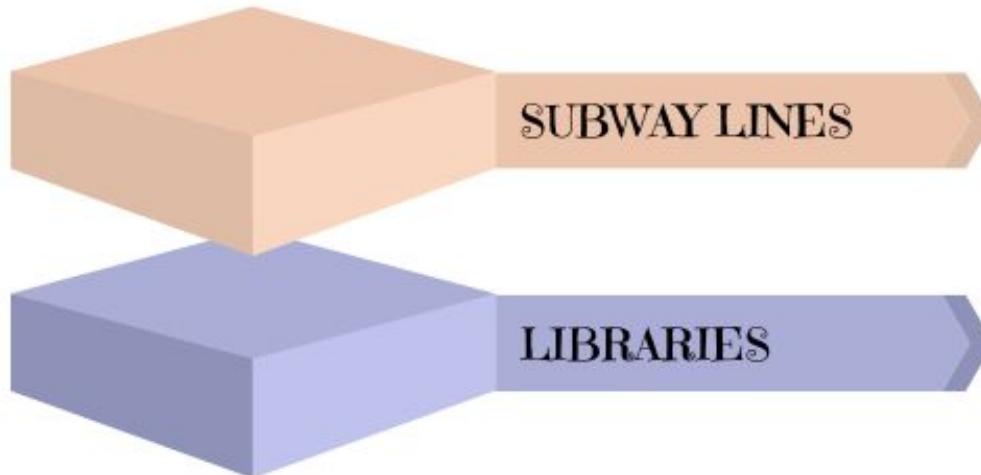
Results: reduces cognitive load of the user by minimizing irrelevant information [4]

Navigating the Map – The Search Bar

Mingyu Sun

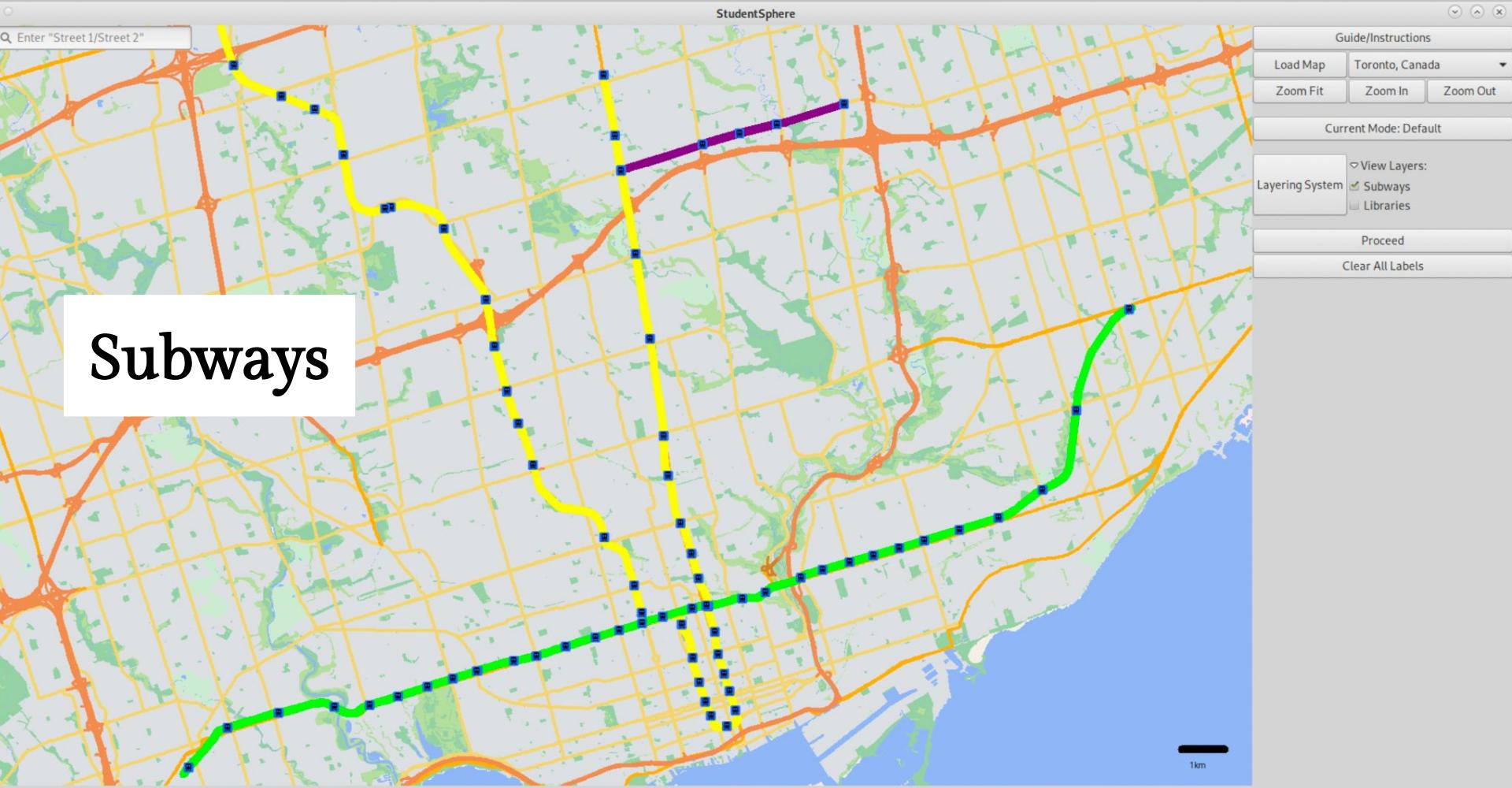


Layering Systems



includes all subway lines and stations (stations are marked with an icon)

includes all libraries using an appropriate icon



Enter "Street 1/Street 2"

Guide

Load Map

Zoom Fit

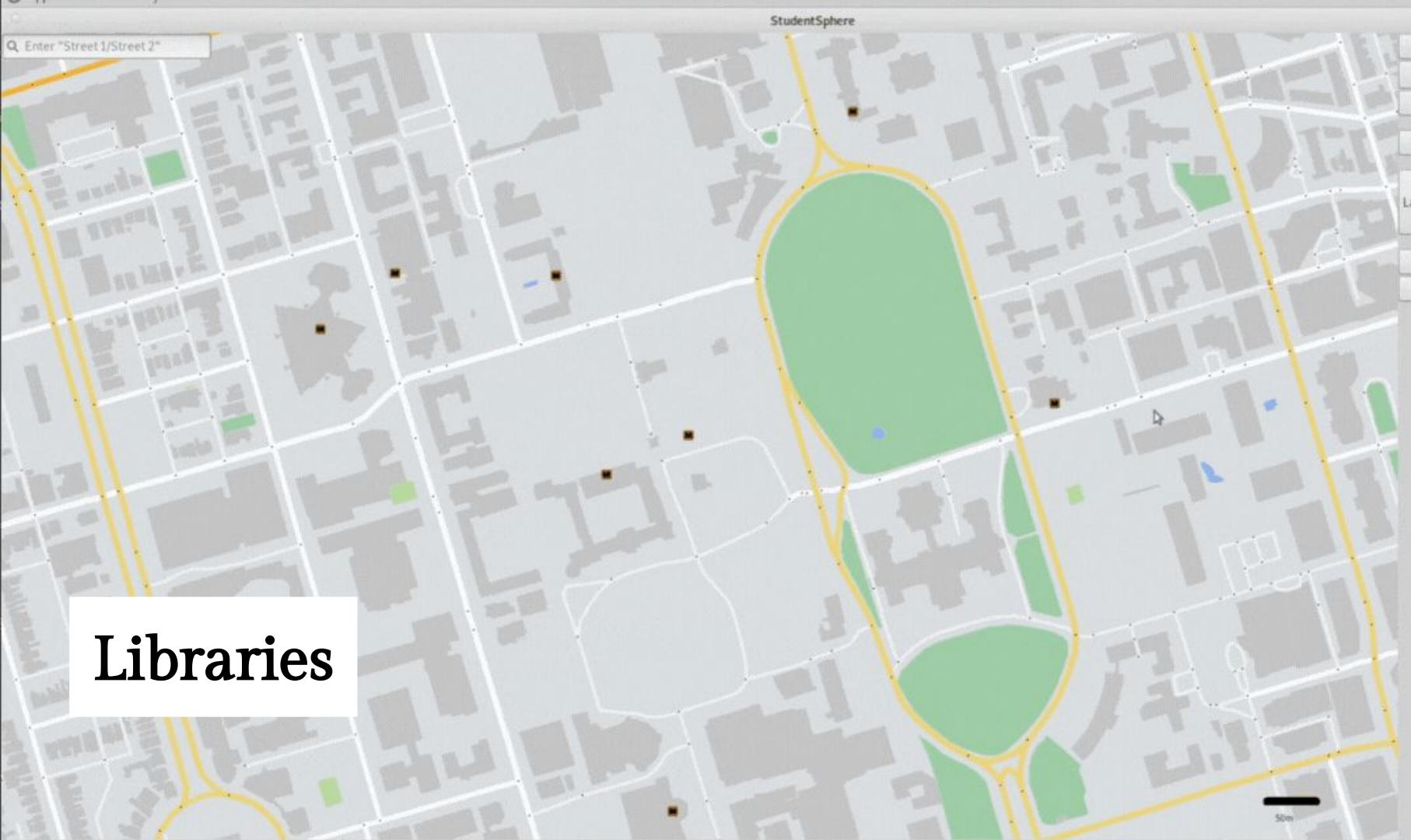
Current

Layering System

P

Clear

Libraries



Backend Design of StudentSphere



Target



Method



Result



Target

- **Minimize Irrelevant Information**
- **Smooth Interface Operation**
- **Efficient in Loading, Processing Information**

Method



- **Hierarchical Information Display**
- **Multi-threading:**
 - Parallel Task Executions

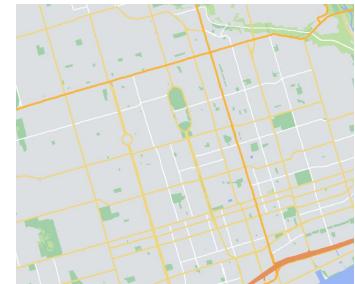
Result



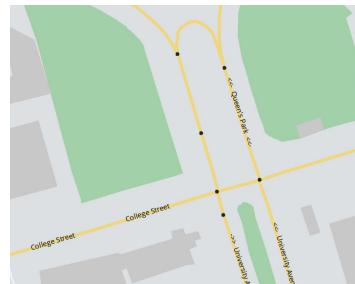
- **Enhanced Performance in:**
 - FPS
 - Map Loading
 - Path finding
 - Travelling Courier Problem

FPS Performance Measure

Maps	FPS (City Level)	FPS (Street Level)
Toronto, Canada	24.8	13.9
Golden Horseshoe, Canada	22.3	10.1
Beijing, China	28.7	15.8
Tokyo, Japan	15.1	7.4
New York, USA	16.2	8.6
Iceland	15.2	8.3



City Level

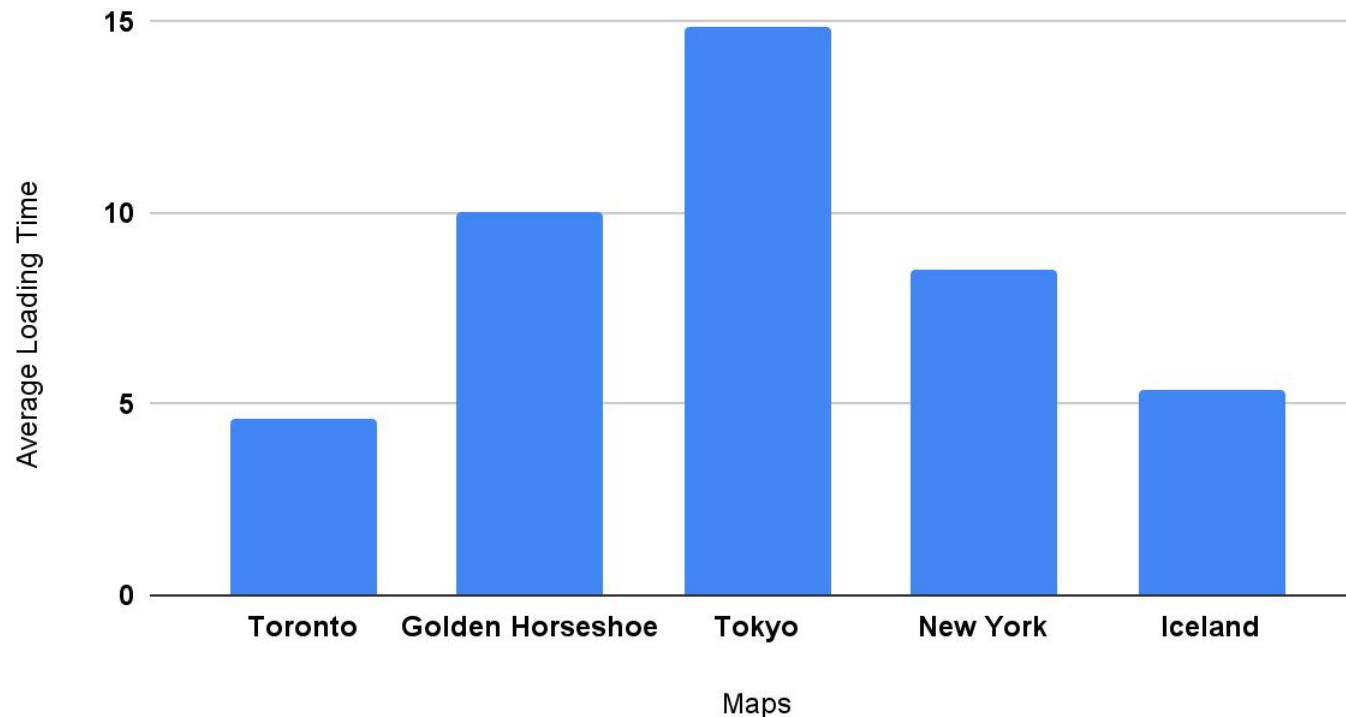


Street Level

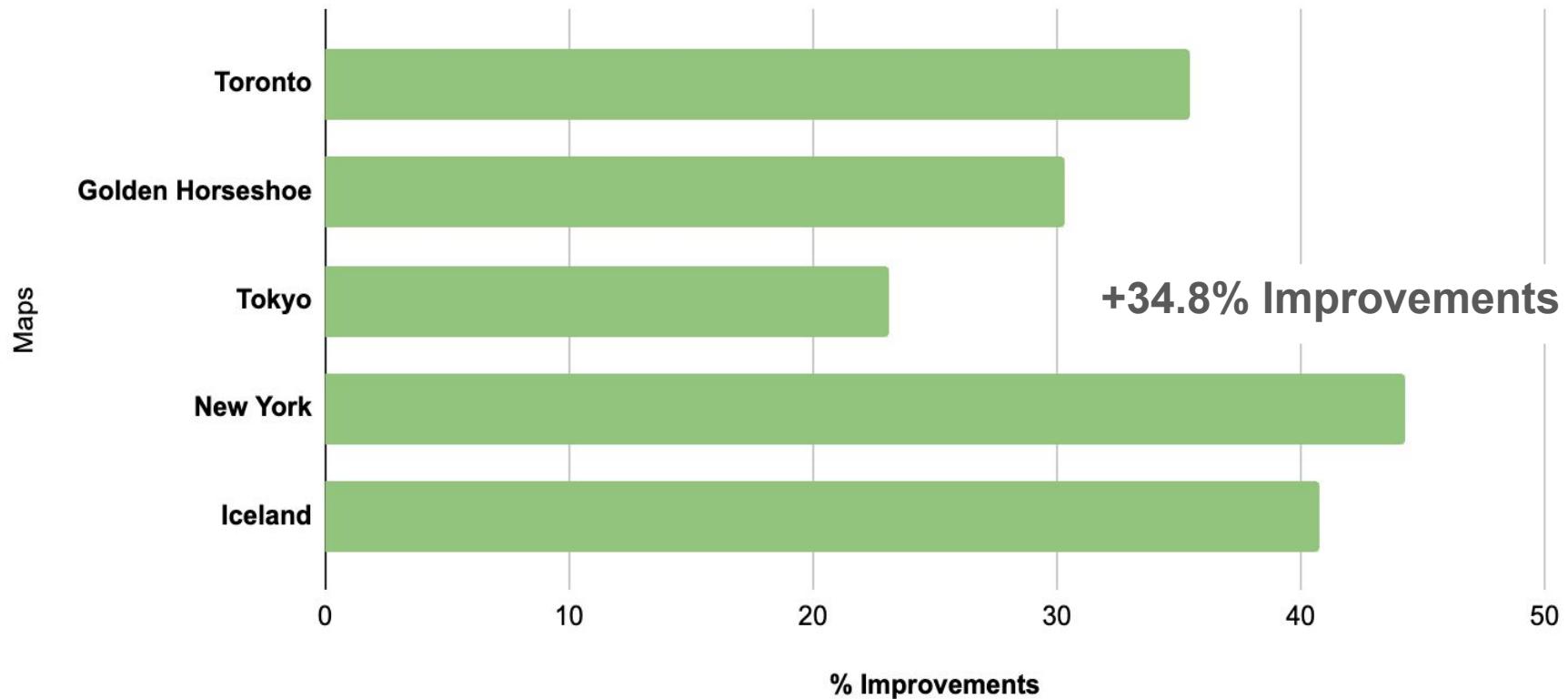
Results: Achieved minimal average FPS (15 fps) for daily using [5]

LoadMap() Performance Measure

Average Loading Time vs. Maps Requirement: <45s



Runtime Improvement % of Loadmap()





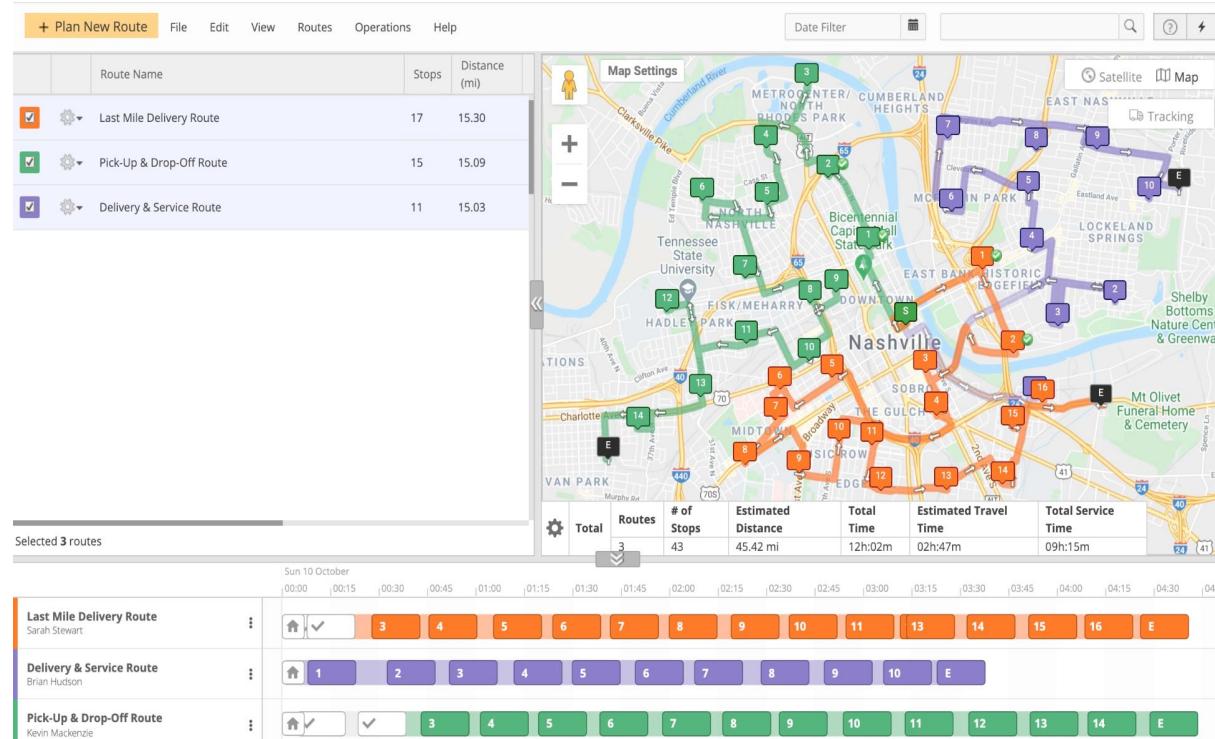
Pathfinding & Traveling Courier Problem

02

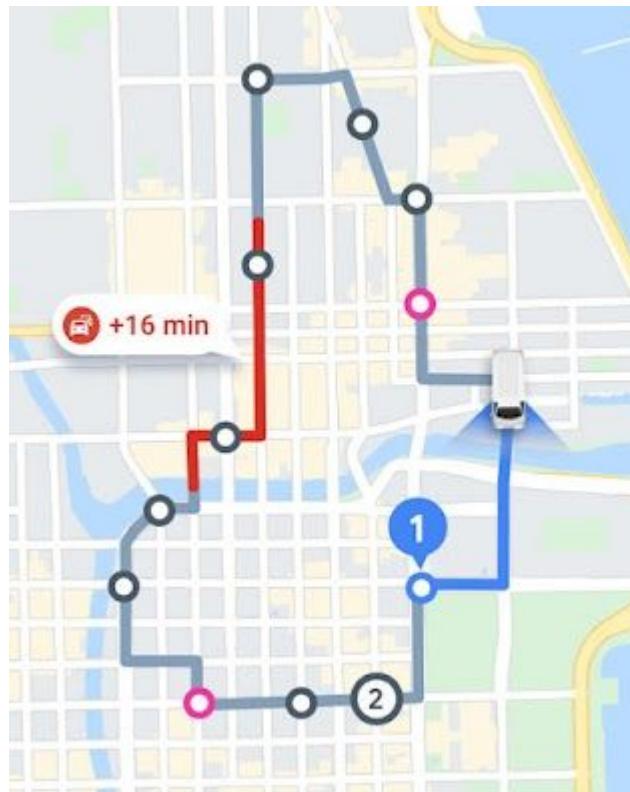
Future Plans

Current State + Future Development Ideas

Existing applications for the Traveling Courier Problem



Application 1: Book borrowing and returning



- Having access to books available in each library
- Find the most efficient route for book pickups

Application 2: Navigating in campus



- Mapping a timetable

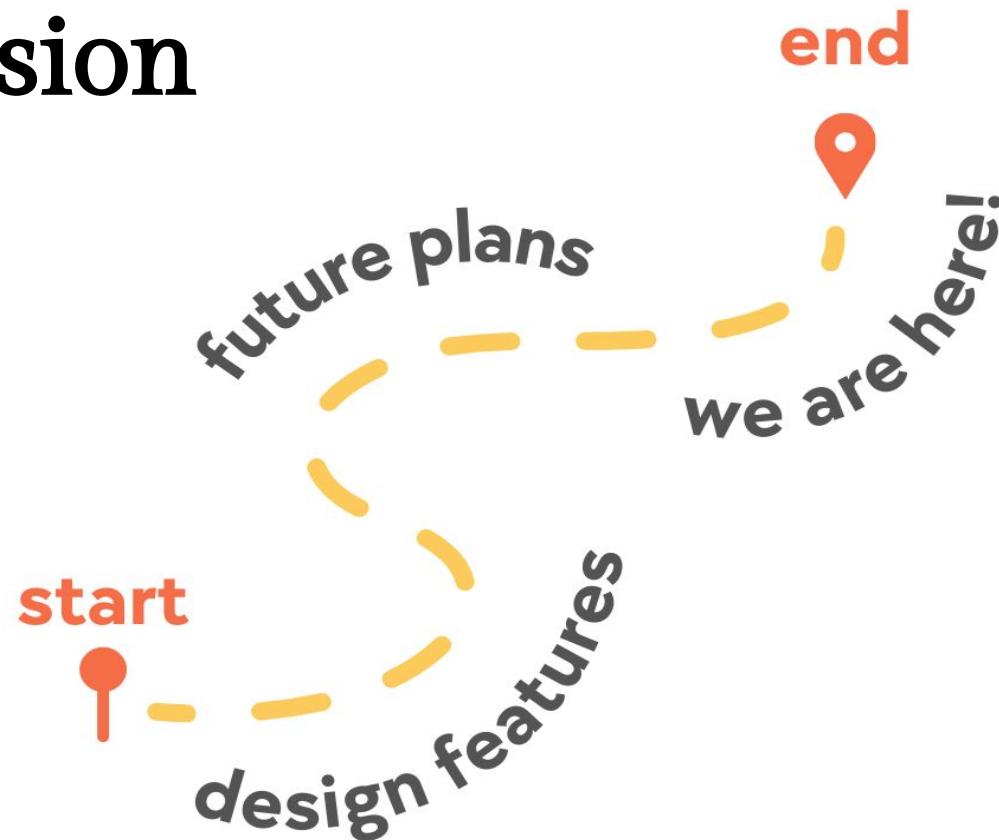
Student Sphere



- **platform for students to stay informed and participate in various activities.**

03

Conclusion





Thank You!

List of References

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- [2] M. Harvey and M. Pointon, "Searching on the go: Proceedings of the 40th International ACM SIGIR Conference on Research and Development in Information Retrieval," ACM Digital Library, https://dl.acm.org/doi/abs/10.1145/3077136.3080770?casa_token=6WS6hs-3OewAAAAA%3AiqfluAH1Ou1TTd36ai0DFFPC9hHSSd1JsG1Od2oVnfY_a8mrFStqC_rGbe3K23aWVb4lSWzO1gHcss (accessed Apr. 29, 2024).
- [3] F. I. Waliullah and H. Ekman, "Reducing cognitive load on the working memory by signaling primed colors " KTH, <http://kth.diva-por>
- [4] L. Harrie, H. Stigmar, and M. Djordjevic, "Analytical Estimation of Map Readability," ISPRS international journal of geo-information, vol. 4, no. 2, pp. 418–446, 2015, doi: 10.3390/ijgi4020418.
- [5] J. Wang and R. Shi, Effect of frame rate on user experience, performance, and simulator ..., https://ieeexplore.ieee.org/document/10049694/?jsessionid=8pPHTxBWY4fUdy_ca3WvgWCKqV_ibeiIgi3UnrfLEM_qbuVMYfAtl-1752545838 (accessed Mar. 15, 2024).
- [6] A. Yasko, "Route Planner Technical Requirements - software and hardware," Route Planning Support, <https://support.route4me.com/web-platform-route-planner-technical-requirements/> (accessed Apr. 29, 2024).
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- [8] "Navigating the education system with autism," Lake Ridge Community Support Services, <https://www.lrcss.com/navigating-the-education-system> (accessed Apr. 29, 2024).
- [9] R. Ransaw, "The psychology behind why we share on social media," The Shutterstock Blog, <https://www.shutterstock.com/blog/the-psychology-behind-why-we-share-on-social-media> (accessed Apr. 29, 2024).