



# ***Delivery Duo: "A Delivery Driver's Best Friend"***

Team 075

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# Outline

## Core Objective

### Our Features:

- Dark Mode
- Live Traffic Visualization
- Autocomplete
- Zoom levels
- Multi-Route Planning

### Future Vision:

- Live Driver Density Visualization
- Live Parking Availability

## Conclusion

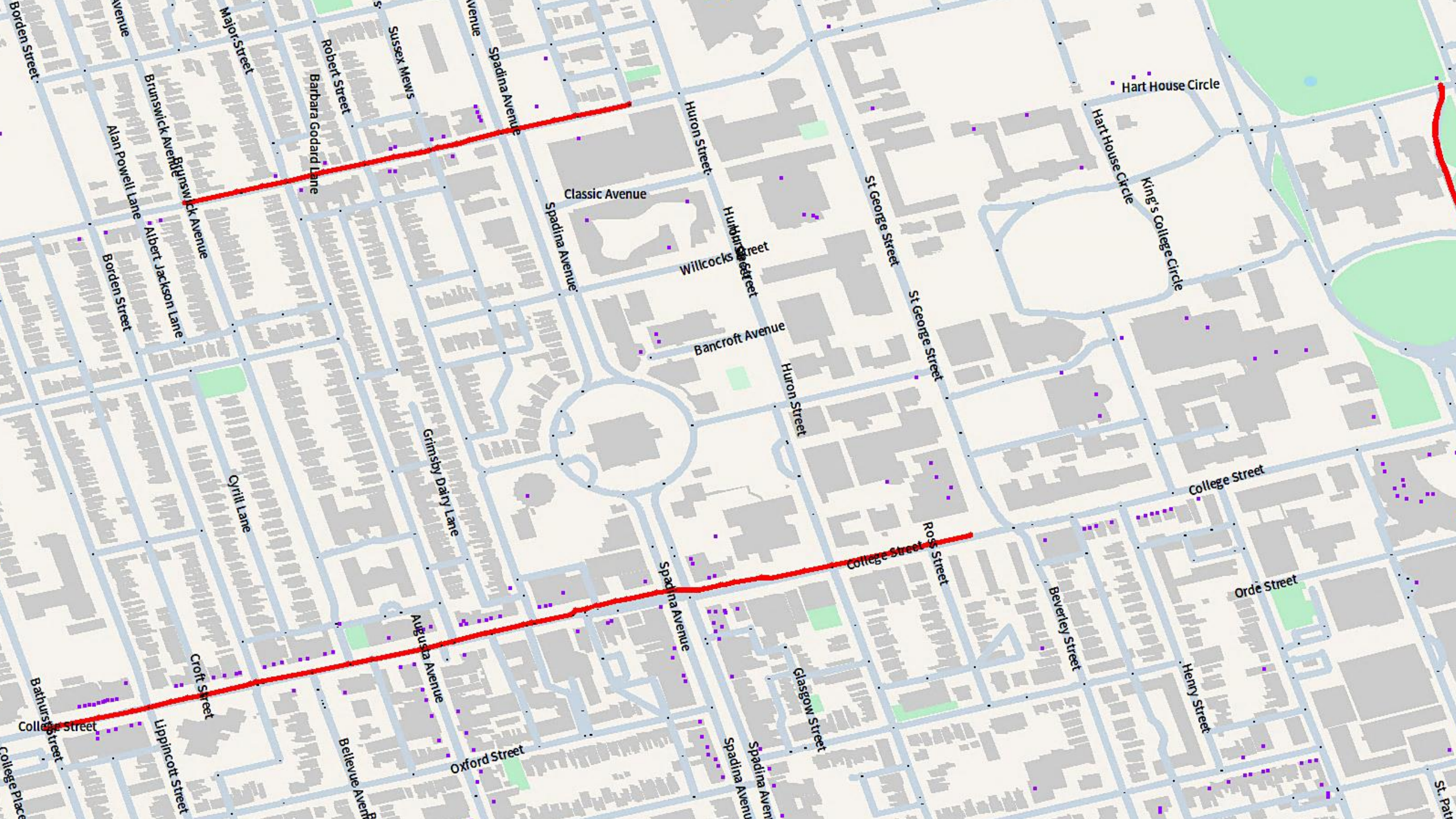


[3]



**"Navigate Smarter, Deliver Faster:  
The Companion That Keeps You Moving"**







A dark-themed map of a city street grid, likely in Toronto, showing streets like Spadina Avenue, Huron Street, and College Street. A red line runs diagonally across the map, and numerous purple dots are scattered throughout. The text 'DARK MODE' is prominently displayed in white, bold, sans-serif font, with the tagline 'Stay Comfortable, Stay Unstoppable' below it in a white, italicized, sans-serif font.

# DARK MODE

*Stay Comfortable, Stay Unstoppable*



# DARK MODE

*Stay Comfortable, Stay Unstoppable*





**Traffic:**  
**The hidden ingredient in cold  
food and bad reviews**



[6]

# Toronto ON #25



Canada, Americas



## Overview



**25** Congestion  
Rank  
Worldwide

**1** Congestion  
Rank in  
Canada



**61** Hours  
Lost in  
Congestion



A map of a city street grid, likely in London, showing a network of streets. Two prominent red lines are drawn across the map: one runs diagonally from the top-left towards the center, and the other runs diagonally from the bottom-left towards the center. Numerous small purple dots are scattered across the map, with higher concentrations along the red lines and in specific clusters. The text 'LIVE TRAFFIC INSIGHTS: see it live, beat it now' is overlaid in the center.

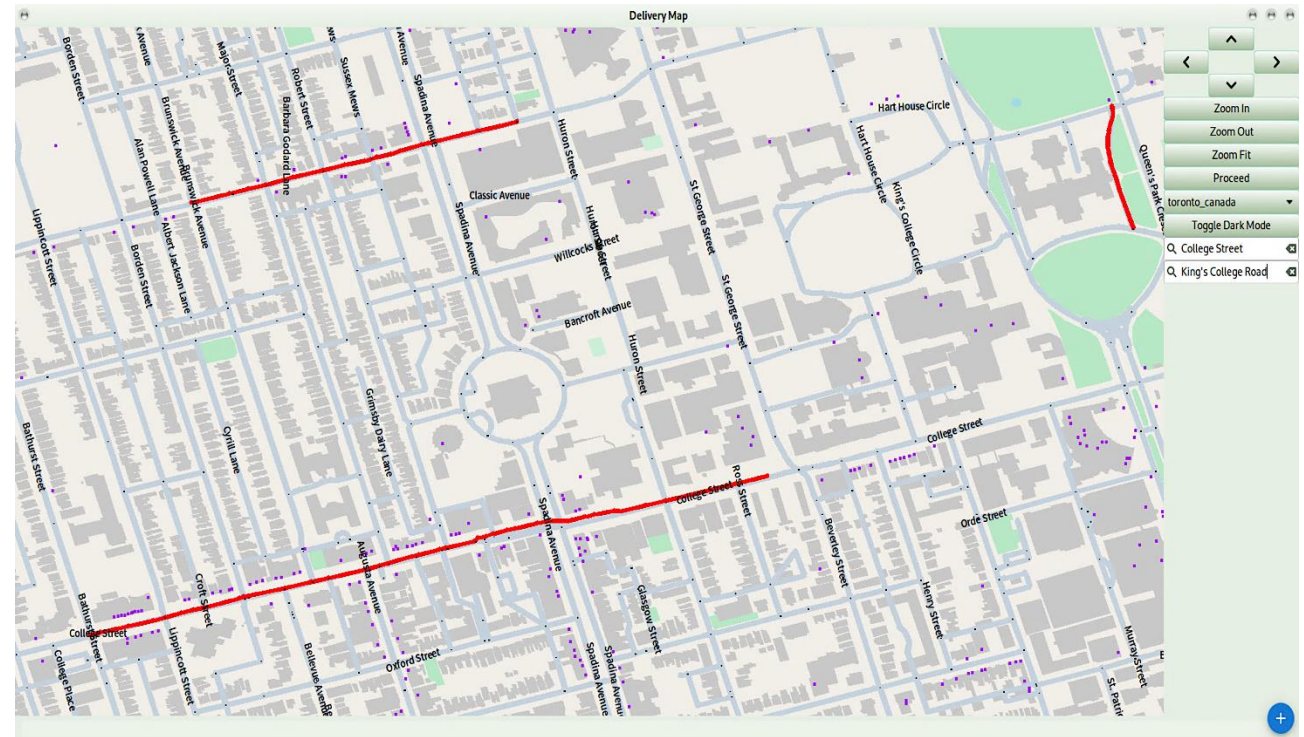
# LIVE TRAFFIC INSIGHTS: *see it live, beat it now*



# LIVE TRAFFIC

*See It Live, Beat It Now*

- Optimized routes improve delivery speed.
- More accurate delivery times: your customers can order in a hurry – risk free.



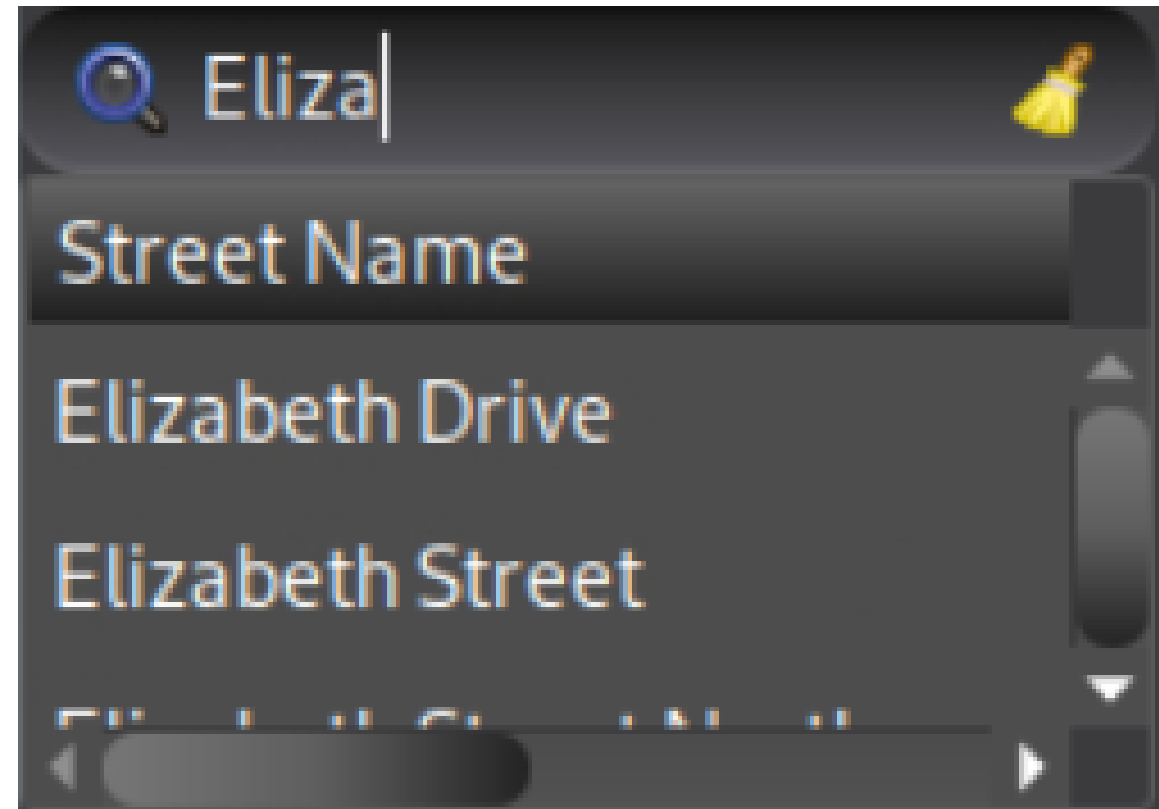
Red lines in the picture represent traffic jams



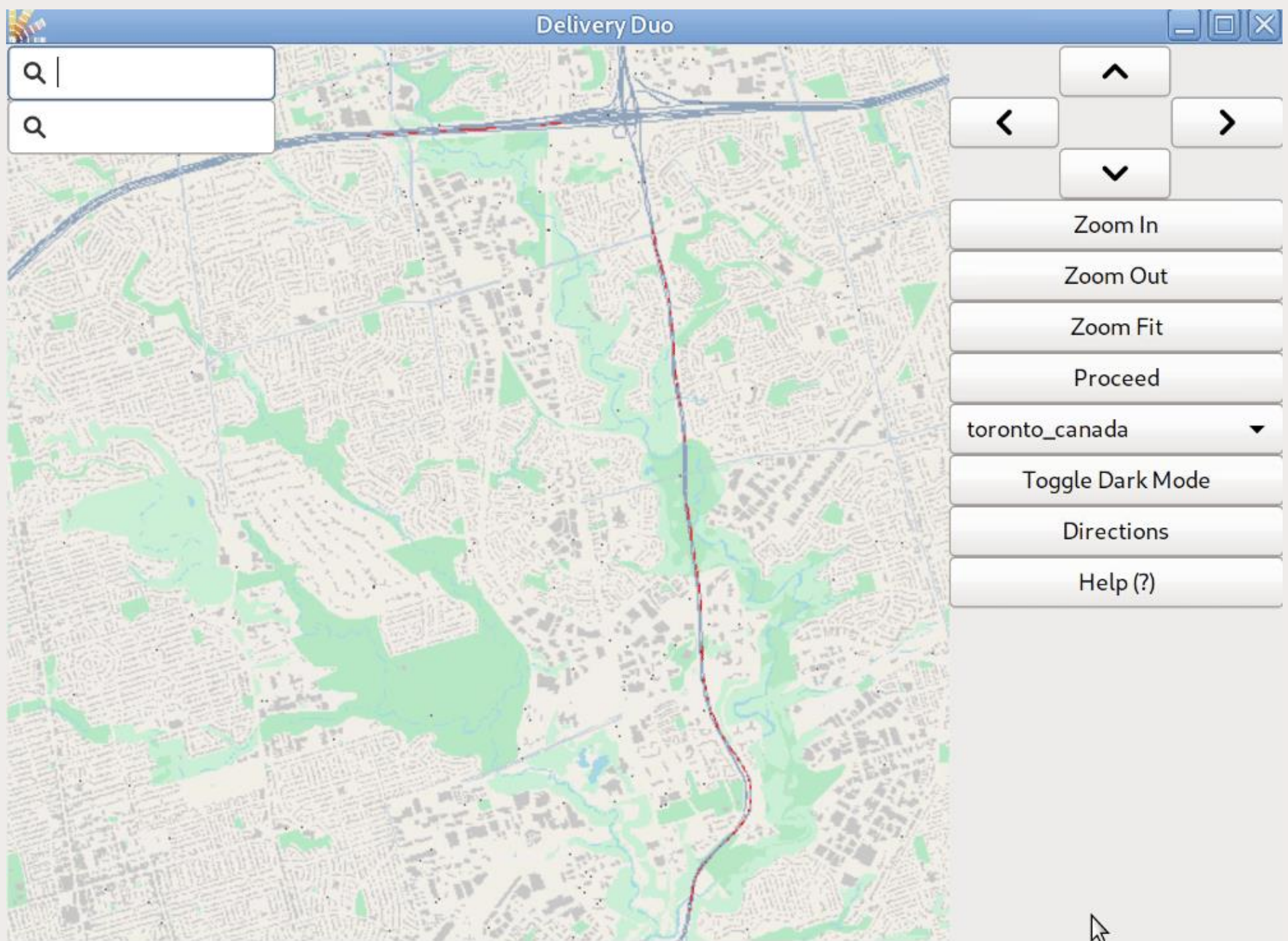
# AUTOCOMPLETE

*Best friends can finish each other's sentences!*

- Select your destination quickly and save time.



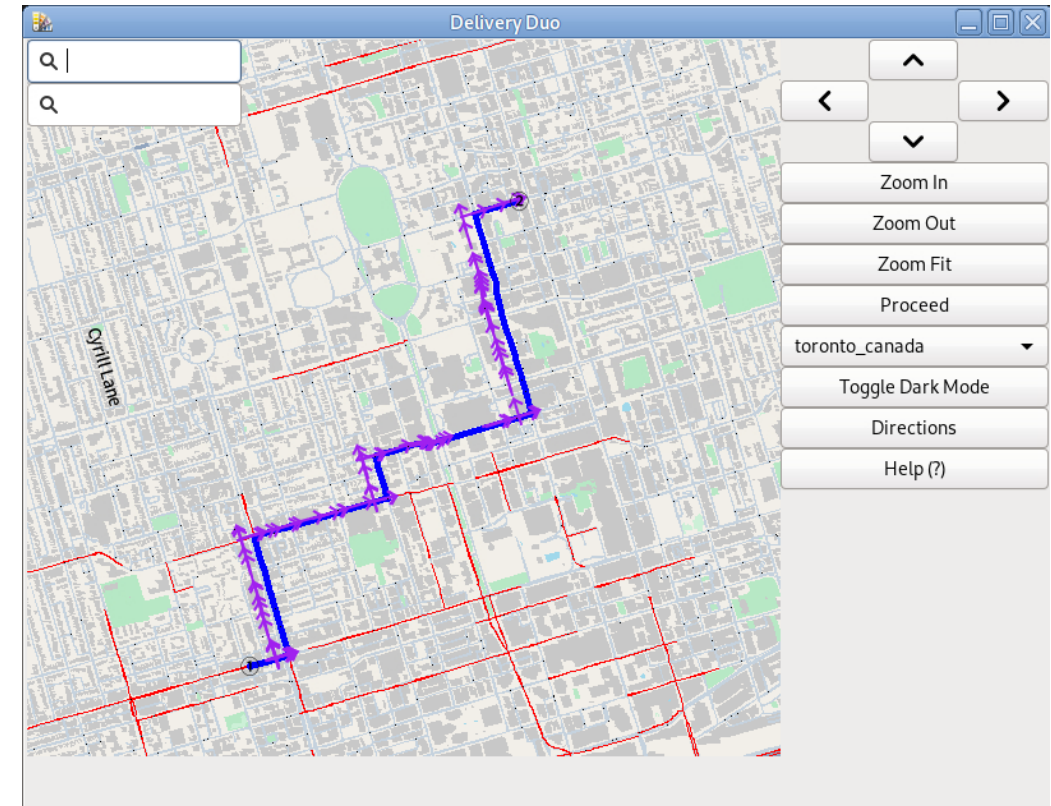




# NAVIGATION

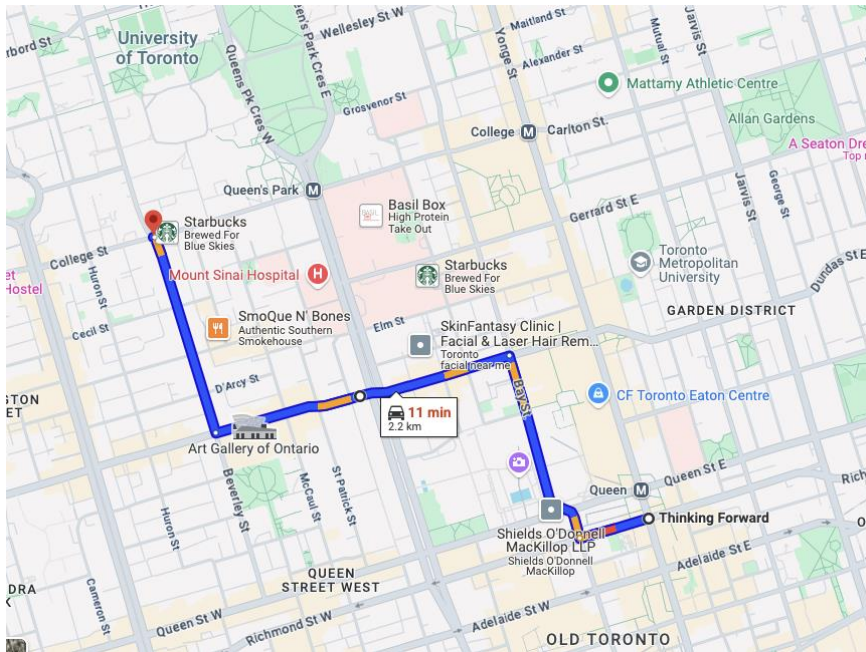
*Know Your Next Move at a Glance.*

- Couriers set start and end points, best route will be computed by Delivery Duo
- Route shown with solid blue line with large purple arrows
- Designed for quick, intuitive navigation, customized for delivery drivers



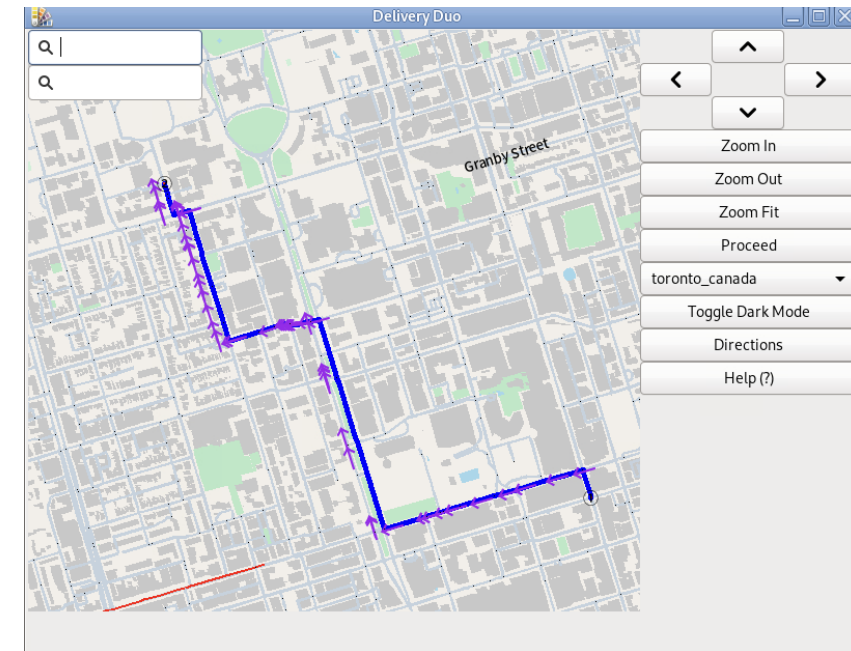


# COMPARISON WITH GOOGLE MAPS



[7]

- Identifying the direction of a route depends mainly on finding the location of the end point
- Hard to identify correct direction of route

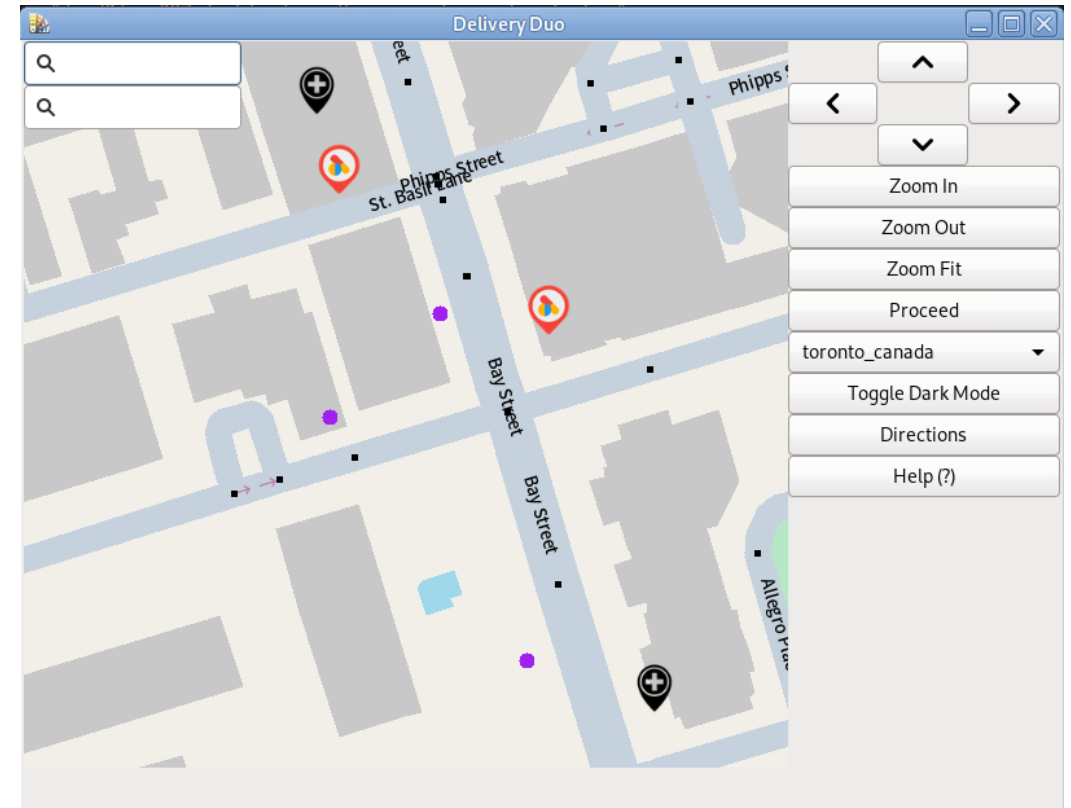
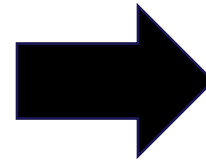
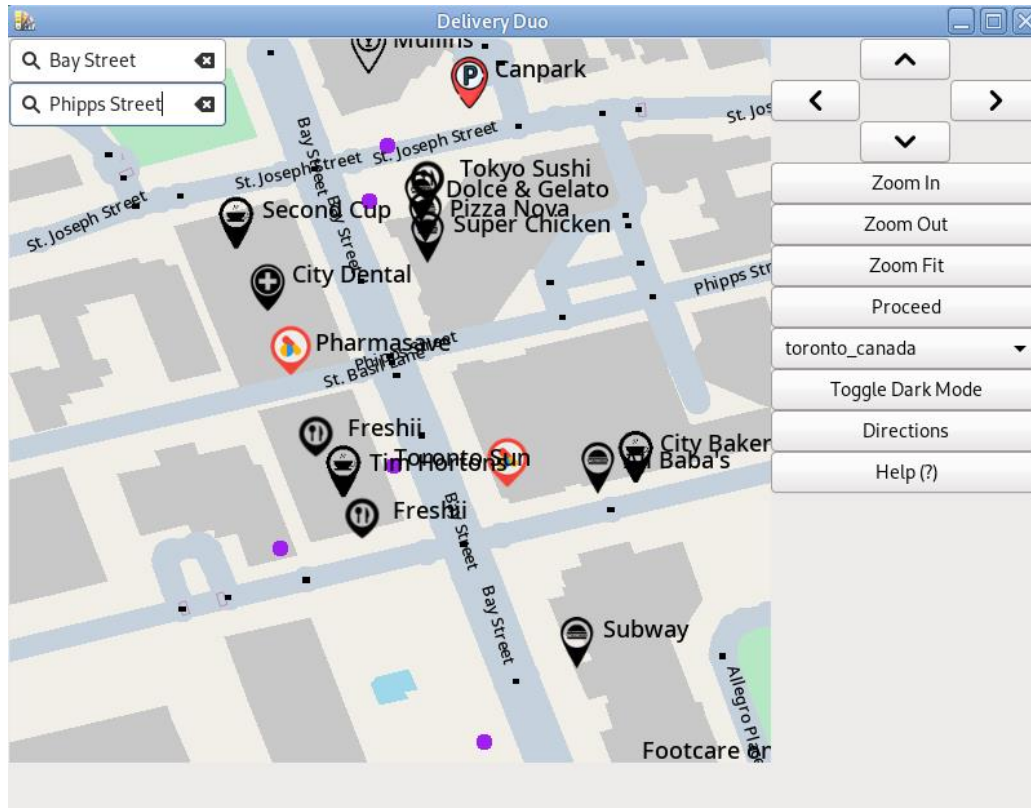


- Large purple arrow, couriers can easily identify the direction at a glance



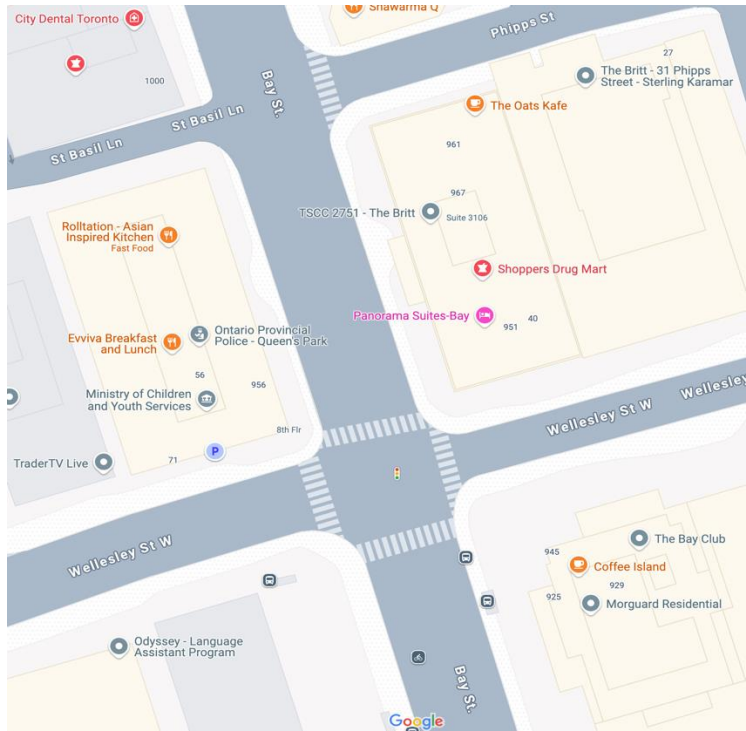
# POI DESIGN FOR NAVIGATION

*Know Your Next Move at a Glance.*



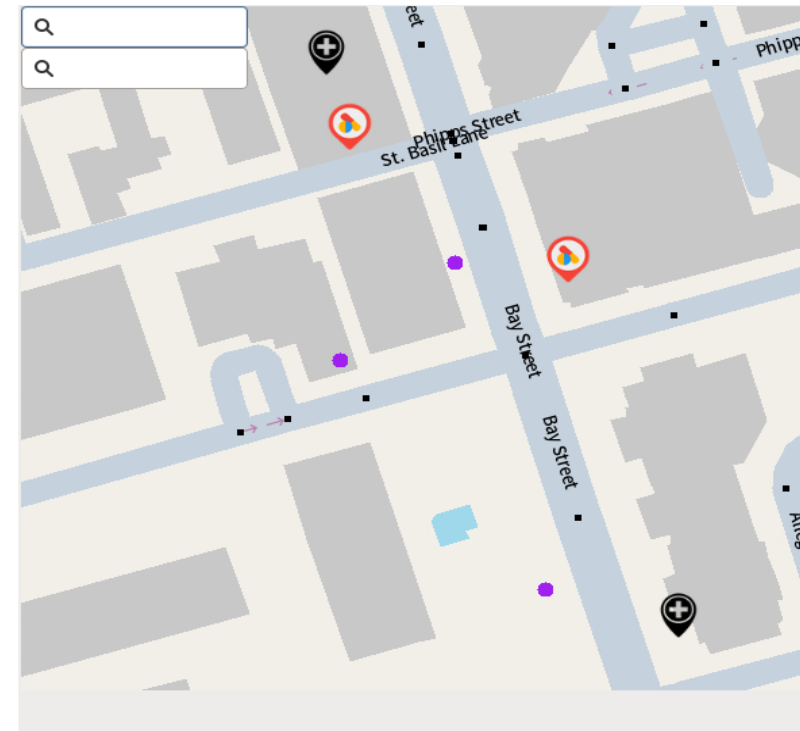


# COMPARISON WITH GOOGLE MAPS



[7]

Too many useless POIs for delivery service



Only important landmarks, less interference



# Multi-Delivery Route Planning

*Friends can help when you have a lot to deal with!*

- Delivery drivers may accept deliveries from multiple sources at once, known as Multi-Apping [8].
- Delivery Duo can plan a route that allows drivers to pick up and deliver various orders as efficiently and quickly as possible!
- This multi-delivery routing algorithm was implemented in M4.



ChatGPT 4o - Generated Image

[9]

# Multi-Delivery Route Planning

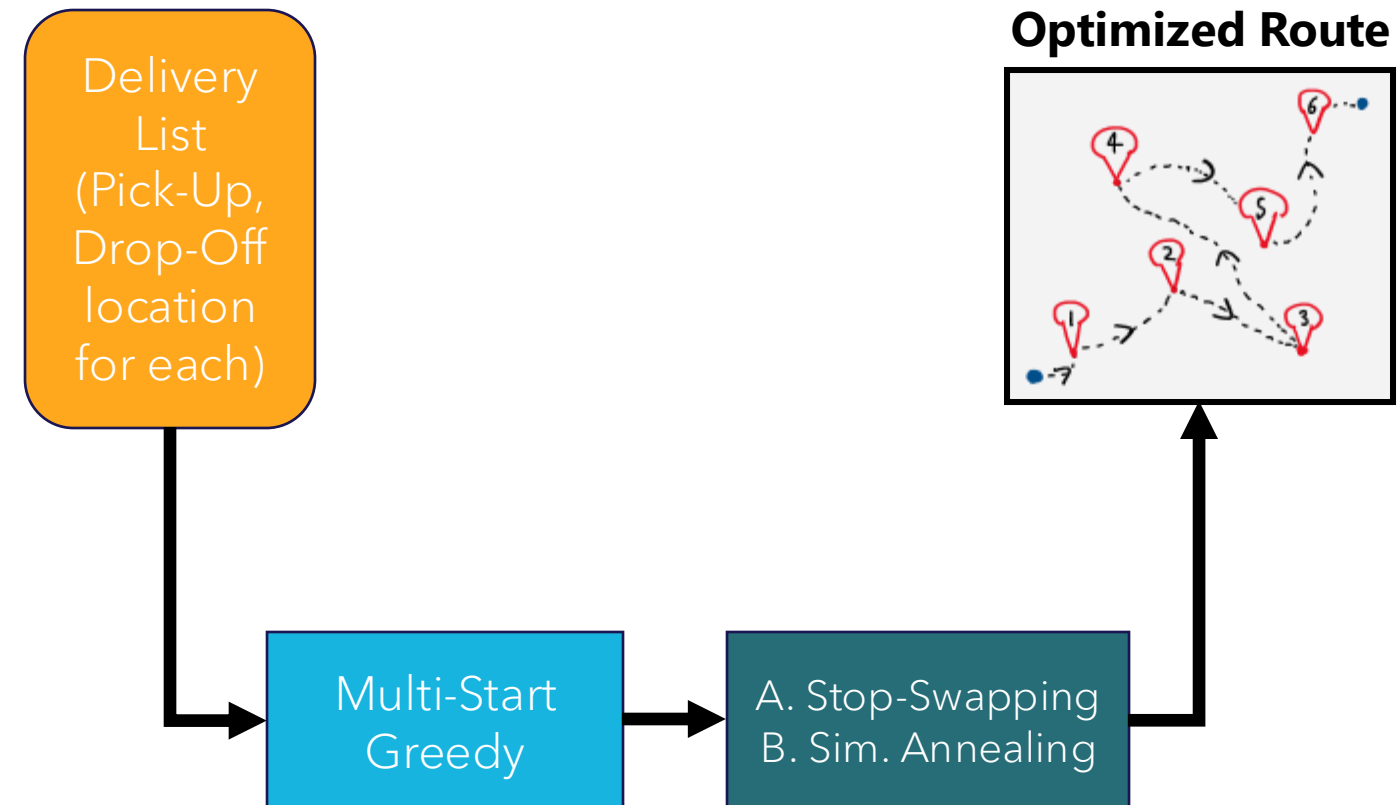
*Friends can help when you have a lot to deal with!*

**Our master algorithm is like a black box**

It consists of the following sub-algorithms:

- 1) Multi-Start Greedy Method
- 2) A. Stop-Swapping (Modified 2-Opt)  
B. Simulated Annealing

**We'll go over each one!**



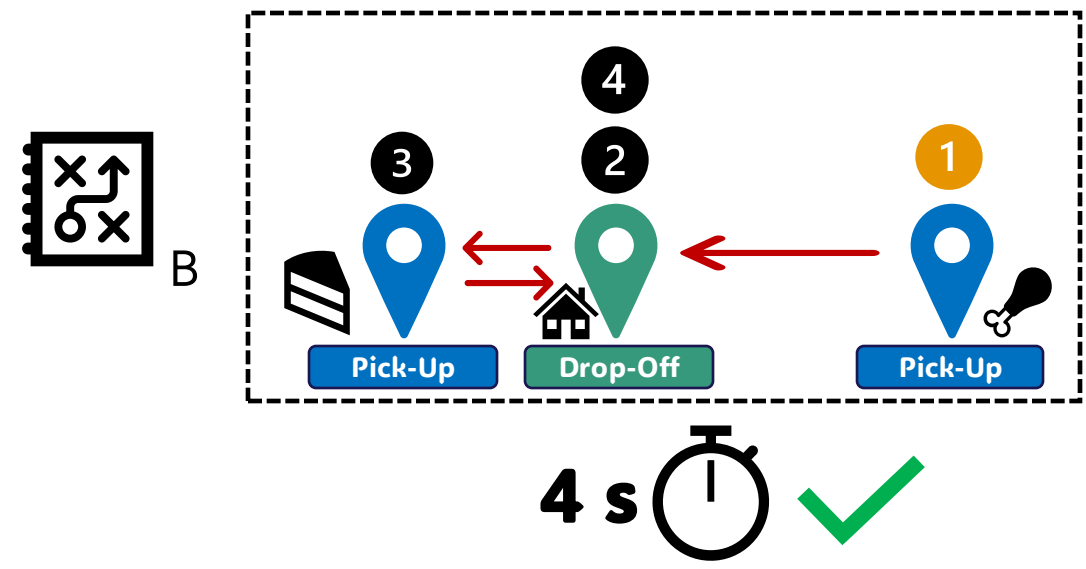
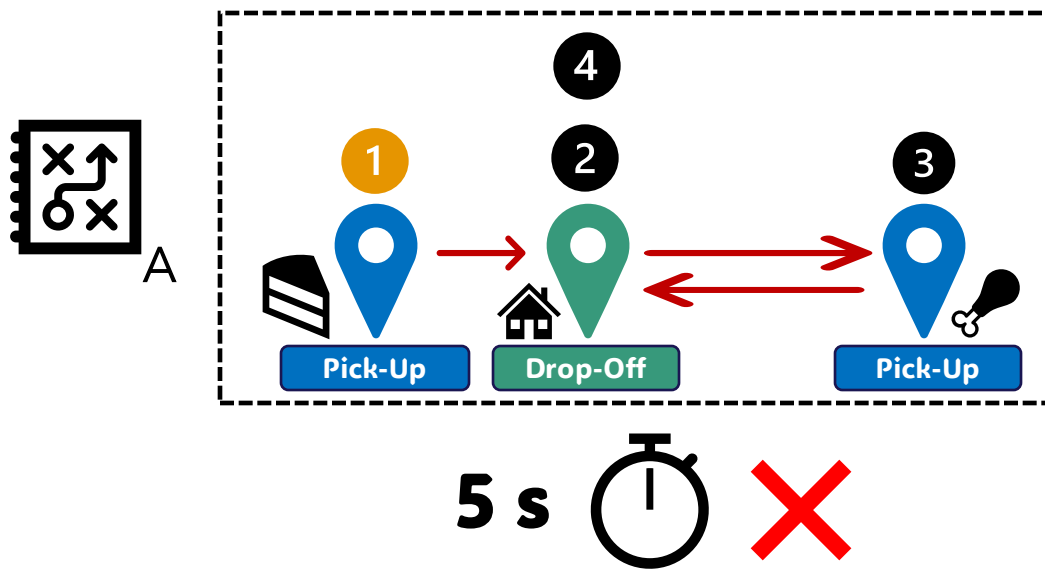


# Multi-Delivery Route Planning

*Friends can help when you have a lot to deal with!*

## 1) Multi-Start Greedy Method

**Example, with two possible routes:**



**Route B would move onto the next stage**

# Multi-Delivery Route Planning

*Friends can help when you have a lot to deal with!*

## 2) A. Stop-Swapping



**Benchmark:**  
Multi-Start Output

**Benchmark Time:**  
20 seconds

Multi-Start Output (Original)

20 s 



# Multi-Delivery Route Planning

*Friends can help when you have a lot to deal with!*

## 2) A. Stop-Swapping



**Benchmark:**  
Multi-Start Output

**Benchmark Time:**  
20 seconds

Multi-Start Output (Original)

20 s 

# Multi-Delivery Route Planning

*Friends can help when you have a lot to deal with!*

## 2) A. Stop-Swapping



**Benchmark:**  
Multi-Start Output

**Benchmark Time:**  
20 seconds

Random Stop-Swap #1

15 s 



# Multi-Delivery Route Planning

*Friends can help when you have a lot to deal with!*

## 2) A. Stop-Swapping



**Benchmark:**  
Multi-Start Output

**Benchmark Time:**  
20 seconds

Random Stop-Swap #1

15 s 

# Multi-Delivery Route Planning

*Friends can help when you have a lot to deal with!*

## 2) A. Stop-Swapping



Random Stop-Swap #1

15 s 

**Benchmark:**

Multi-Start Output

**Benchmark Time:**

20 seconds

\* The current route configuration has a lower travel time, so let's set it as the new benchmark!



# Multi-Delivery Route Planning

*Friends can help when you have a lot to deal with!*

## 2) A. Stop-Swapping



**Benchmark:**

Random Stop-Swap #1

**Benchmark Time:**

15 seconds

Random Stop-Swap #1

15 s 

# Multi-Delivery Route Planning

*Friends can help when you have a lot to deal with!*

## 2) A. Stop-Swapping



**Benchmark:**  
Random Stop-Swap #1

**Benchmark Time:**  
15 seconds

Random Stop-Swap #1

15 s 

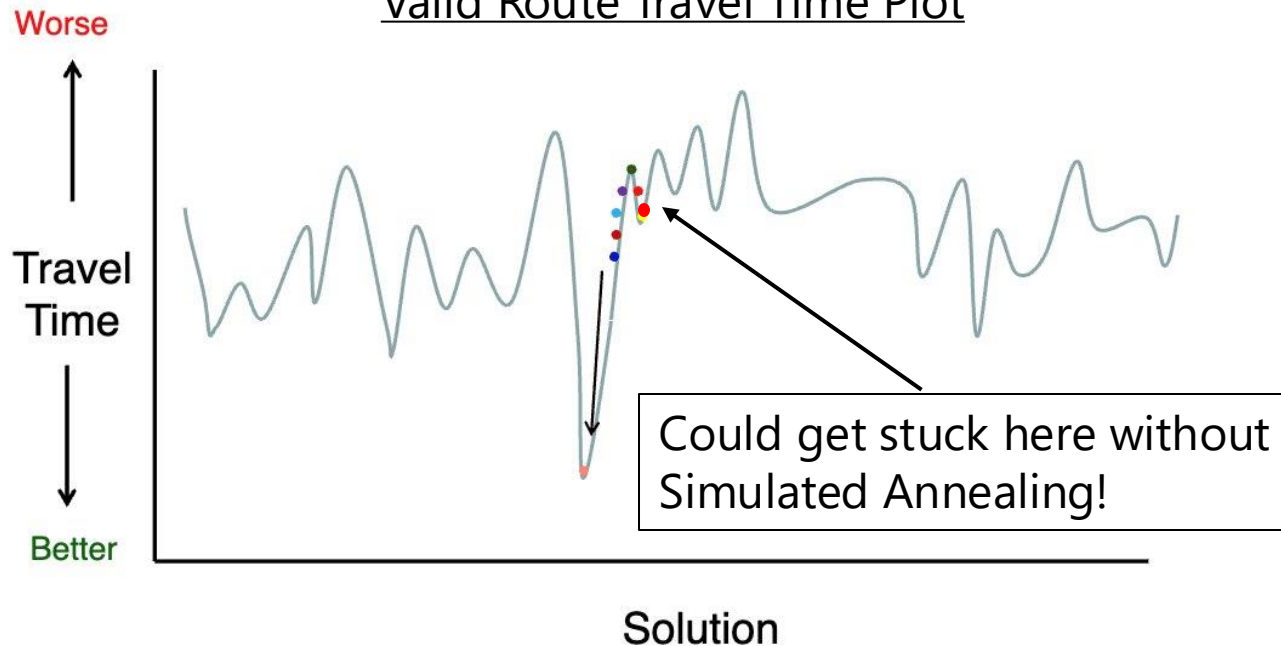


# Multi-Delivery Route Planning

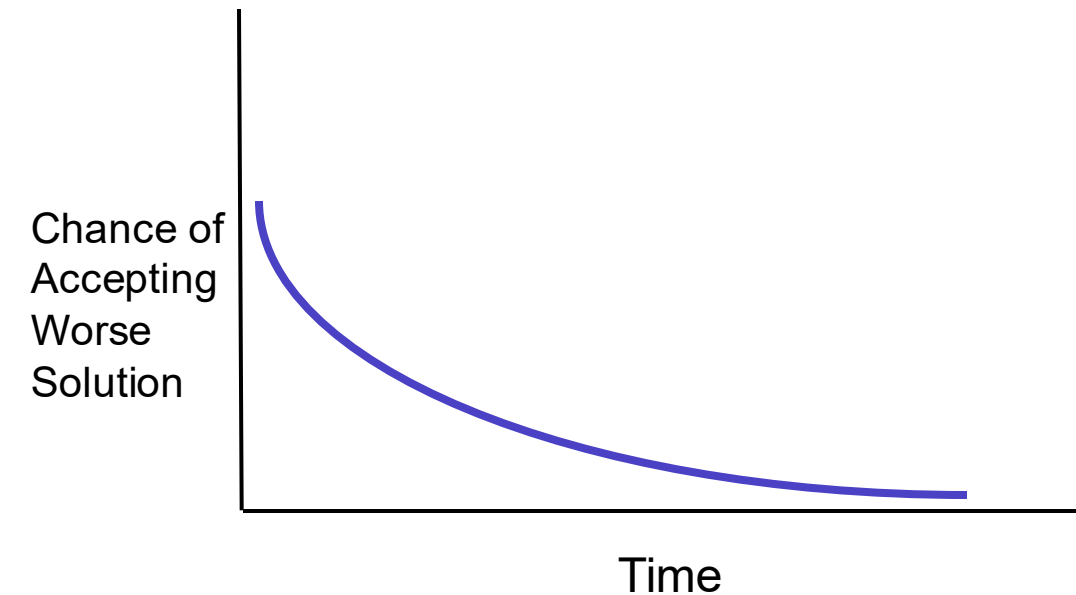
*Friends can help when you have a lot to deal with!*

## 2) B. Simulated Annealing

Valid Route Travel Time Plot



Heuristic Probability Plot



[10]

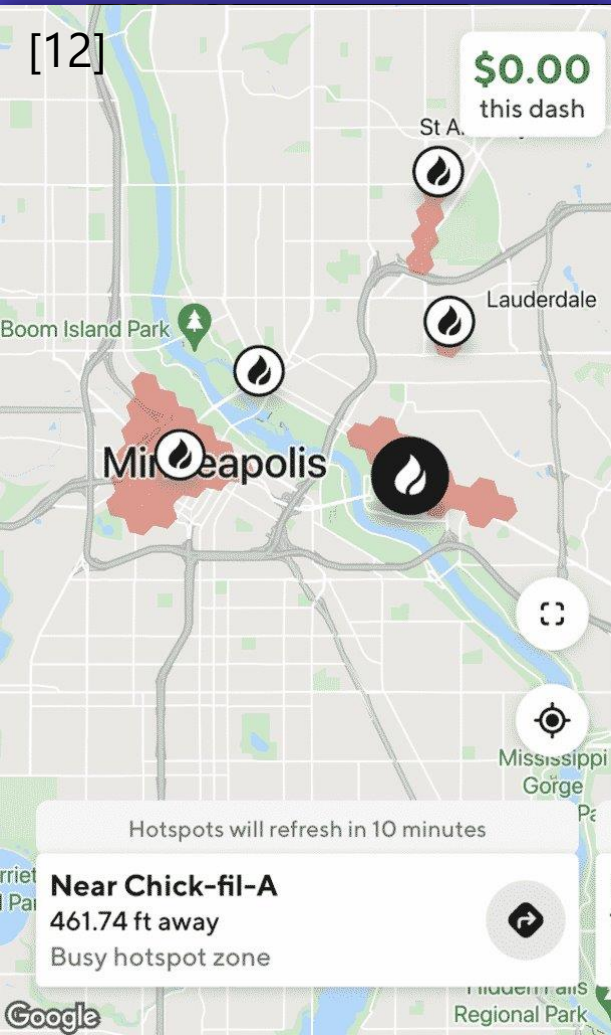


# Future Vision: The Companion Map Built For Hustlers



# The Flaw With Existing Hotspot Alerts:

*Half the Map. Twice the Wait.*

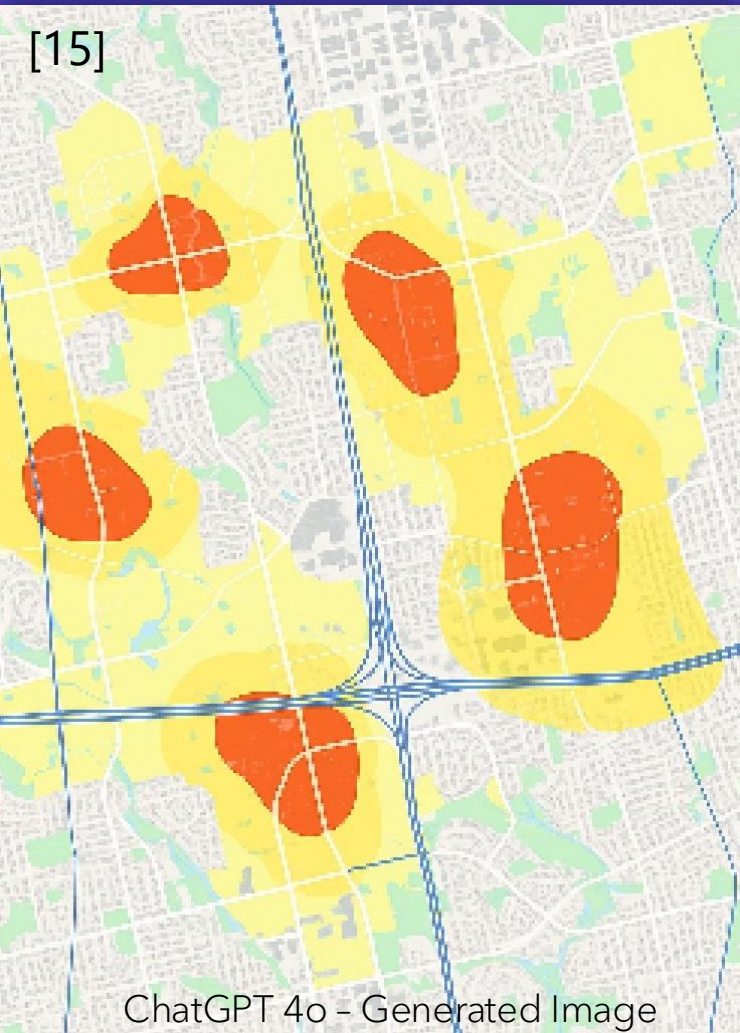


"The thing is, when an app says in some way 'hey we need people in this zone,' then everyone flocks to that zone. **All of a sudden you have more couriers than you do orders and things get real slow.**"

– EntreCourier, DoorDasher Advice Blog [14]

# Our Solution: Driver Density Visualization

*See the Crowd. Beat the Crowd.*

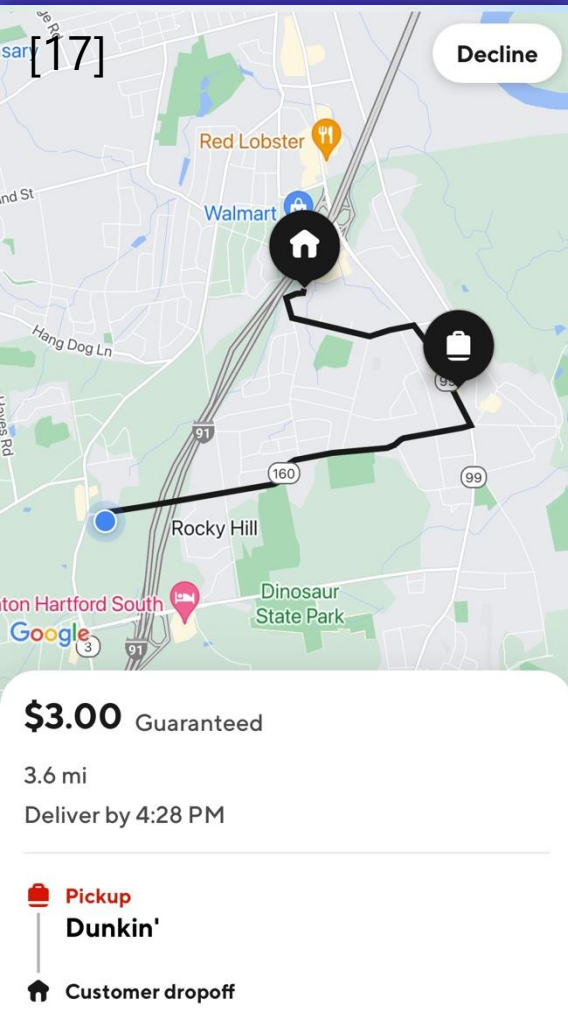


- **Live Driver Locations:** See real-time updates of nearby delivery drivers.
- **Heatmap Visualization:** Instantly spot high-competition zones and avoid oversaturated areas.
- **Smarter Hotspot Decisions:** Know when a hotspot is truly worth it – or when it's time to move.
- **Boost Efficiency:** Spend less time waiting and more time earning.



# The Parking Problem.

*Rush to the Hotspot, Circle for a Spot.*



## Current Apps Provide No Parking Insights for Drivers:

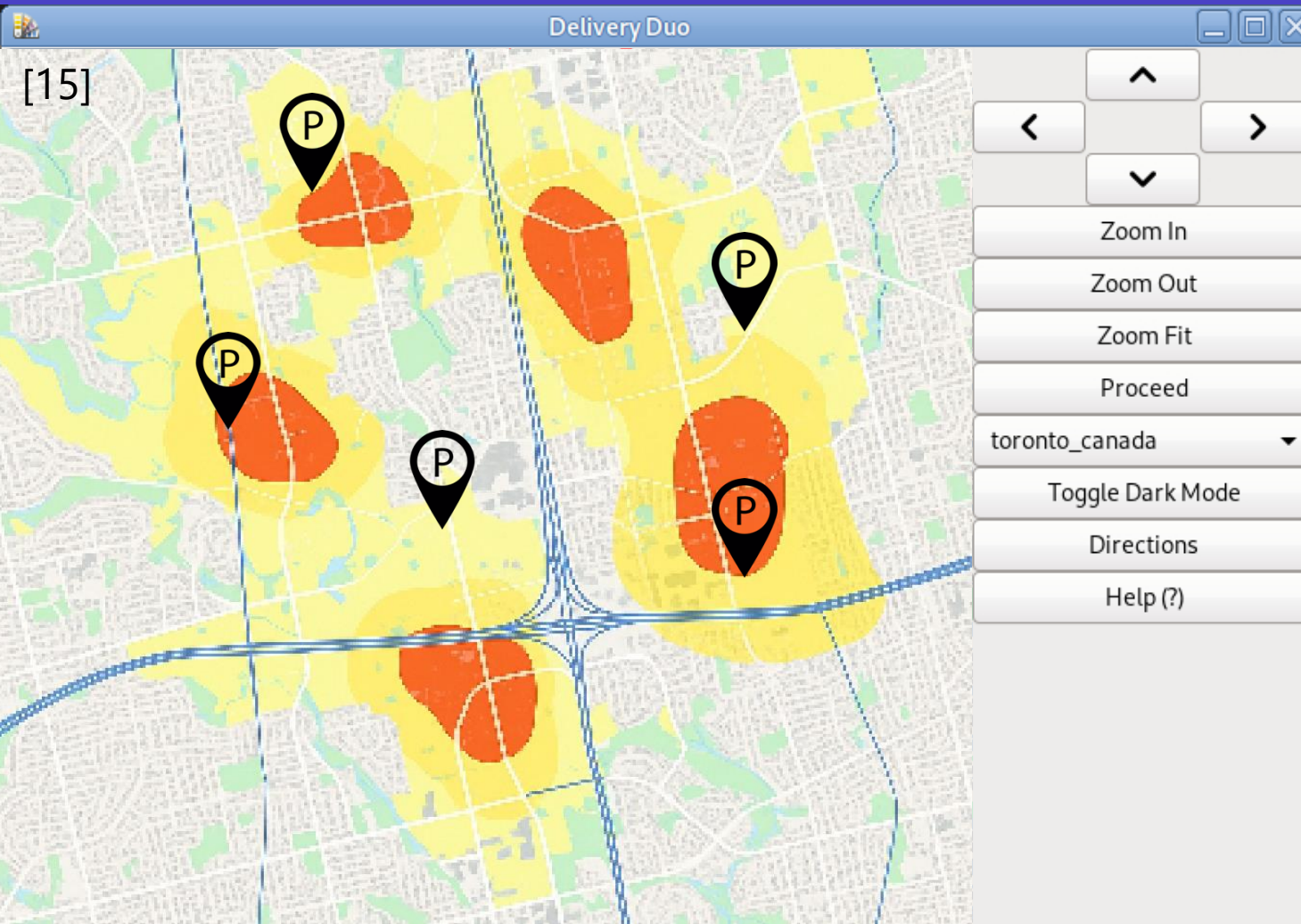
- Hotspots often ignore parking difficulty
- Wasted time circling blocks leads to missed deliveries and lost dollars

*"If a hotspot is right in a downtown core where you can never find parking, I'd probably skip that one."*  
- The BudgetDiet, DoorDasher Advice Blog [17]



# Our Solution: Live Parking Availability

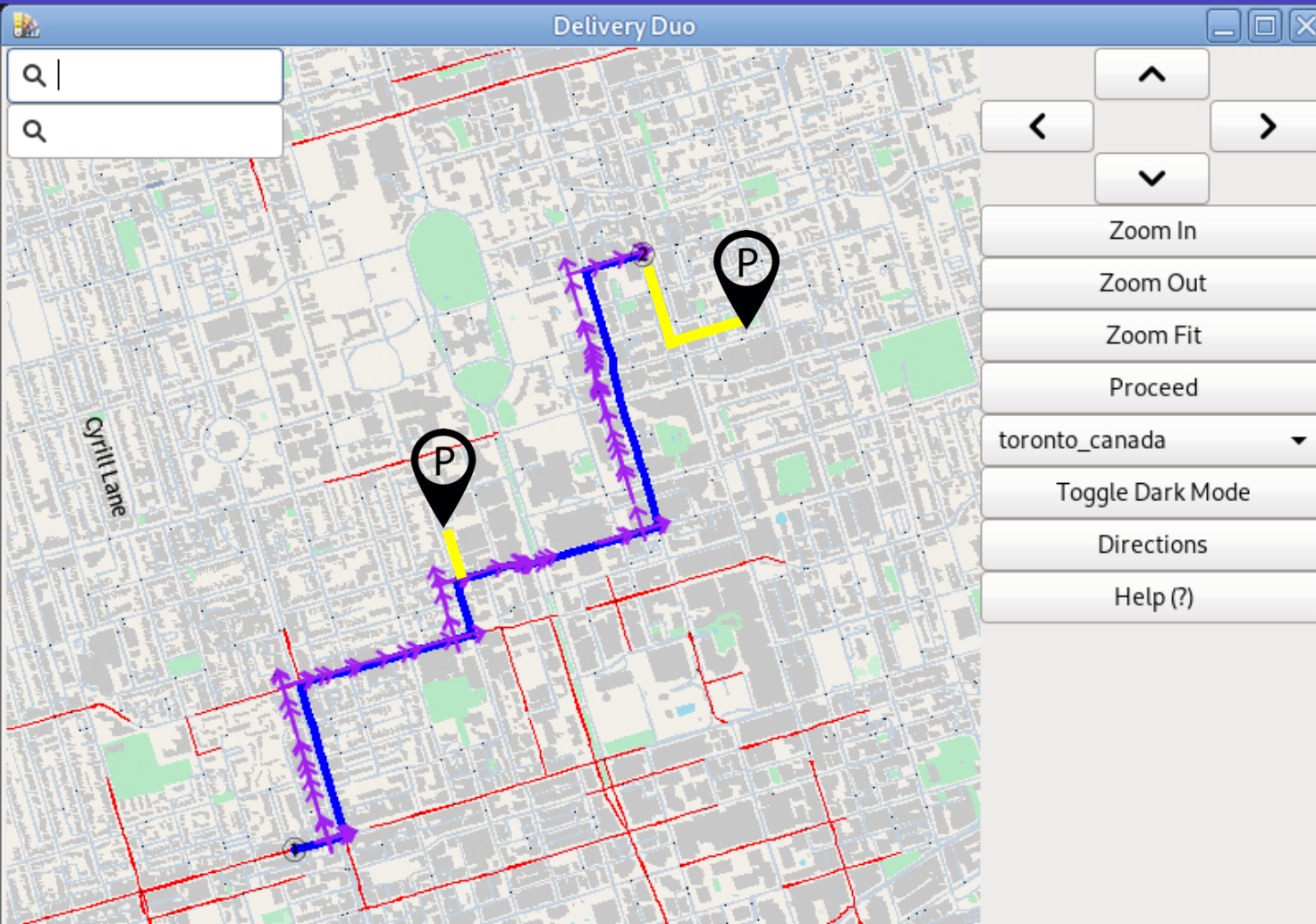
*Stop Circling. Start Earning.*



- Prioritize zones with easier, faster parking
- Avoid parking tickets, stress, and delays

# Our Solution: Live Parking Availability

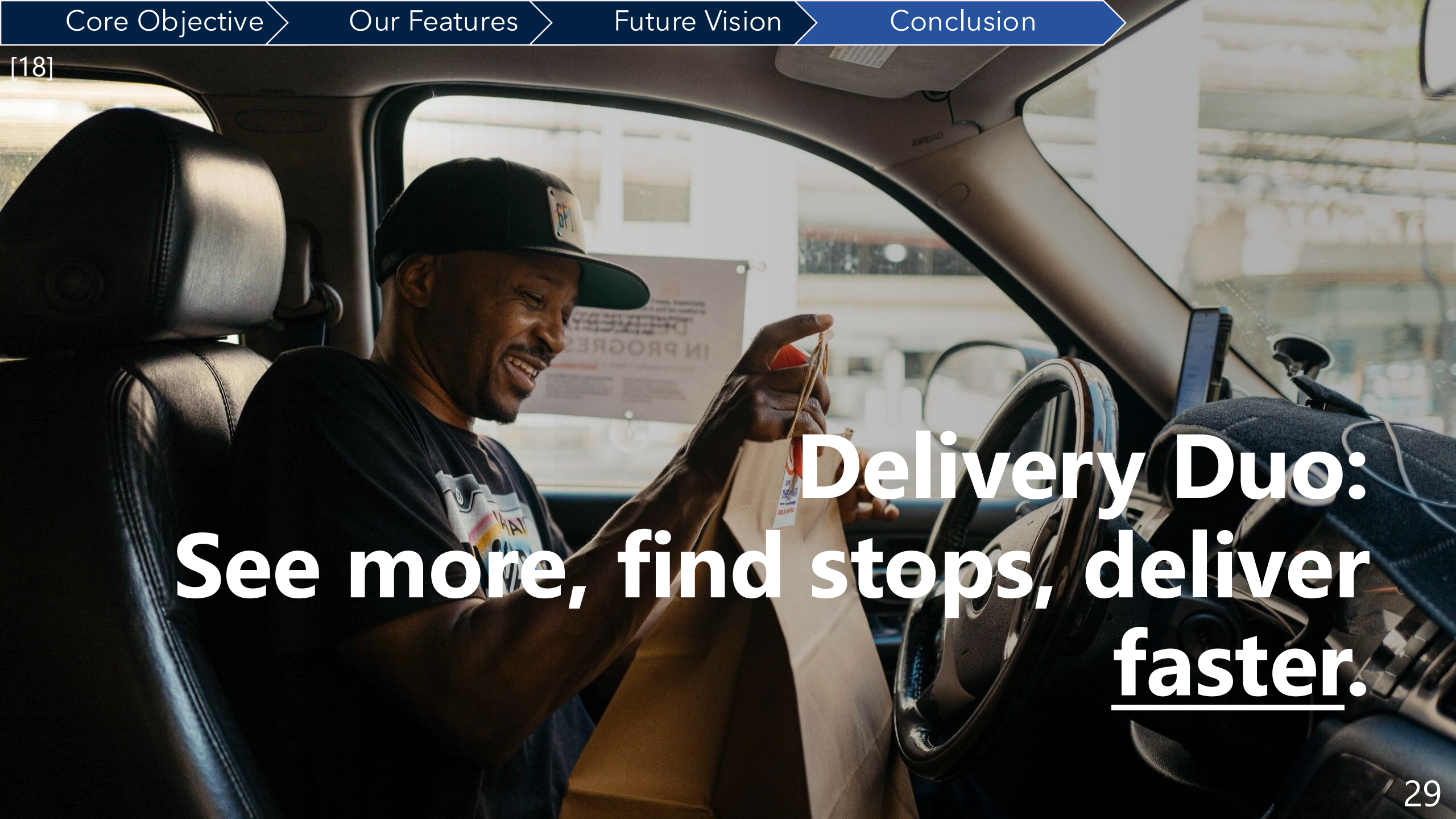
*Stop Circling. Start Earning.*



- See real-time parking within walking distance near your delivery drop-offs



[18]

A man wearing a black cap and a dark t-shirt is sitting in the driver's seat of a car. He is smiling and holding a brown paper bag with both hands. The car's interior, including the steering wheel and dashboard, is visible. The background shows a blurred street scene with buildings and a sign that says "IN PROGRESS".

**Delivery Duo:  
See more, find stops, deliver  
faster.**



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- Delivery drivers may accept deliveries from multiple sources at once (Uber Eats, DoorDash, etc.)
  - Our delivery app can plan a route that allows drivers to pick up and deliver various orders as efficiently and quickly as possible!
- Can you generate an image that would pair nicely with this text on the slide?"
- [10] A. Yassine. ECE297. Class Lecture, Topic: "M4: Representing the Solution and Meta-heuristics." University of Toronto, Mar. 27, 2025. [Online]. Available: [https://q.utoronto.ca/courses/376139/pages/lecture-22-m4-solution-representation-and-hill-climbing?module\\_item\\_id=6648120](https://q.utoronto.ca/courses/376139/pages/lecture-22-m4-solution-representation-and-hill-climbing?module_item_id=6648120). [Accessed Apr. 29, 2025].

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- [16] O. Waberi, "A Toronto councillor thinks delivery drivers on motorized bikes and scooters should have licence plates. Some residents don't agree," Now Toronto, Apr. 12, 2023. [Online]. Available: <https://nowtoronto.com/news/a-toronto-councillor-thinks-delivery-drivers-on-motorized-bikes-and-scooters-should-have-licence-plates/>. [Accessed Apr. 29, 2025].
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