



Industry Sprint

BUILDING A SAFER, GREENER & MORE EQUITABLE WORLD FOR **EVERYBODY**

BRAINSTATION X GM 24 HOUR INDUSTRY PROJECT

Meet the Team

Team 10



Ben



Deepak



Ellen



Gabriela



Katie



Reynaldo



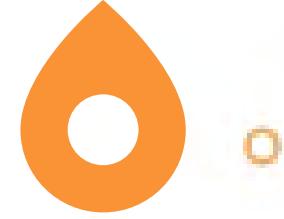
Roshini

Agenda

Market Research



Data Modeling



UX Design



Web Dev



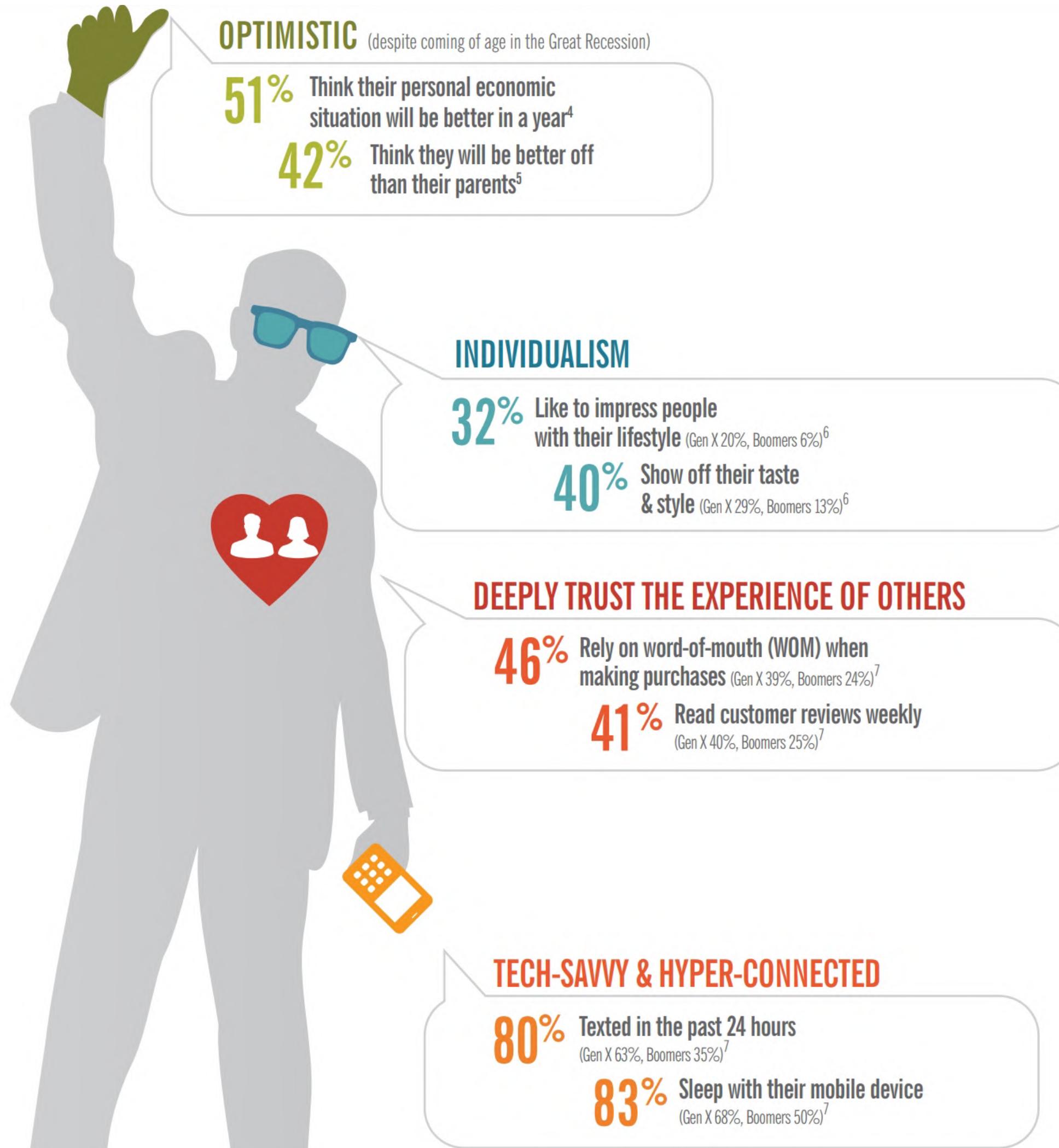
Market Research

The Challenge:



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How might we track & support our journey to
Goal Zero to build a safer, greener, more
equitable world for everybody?



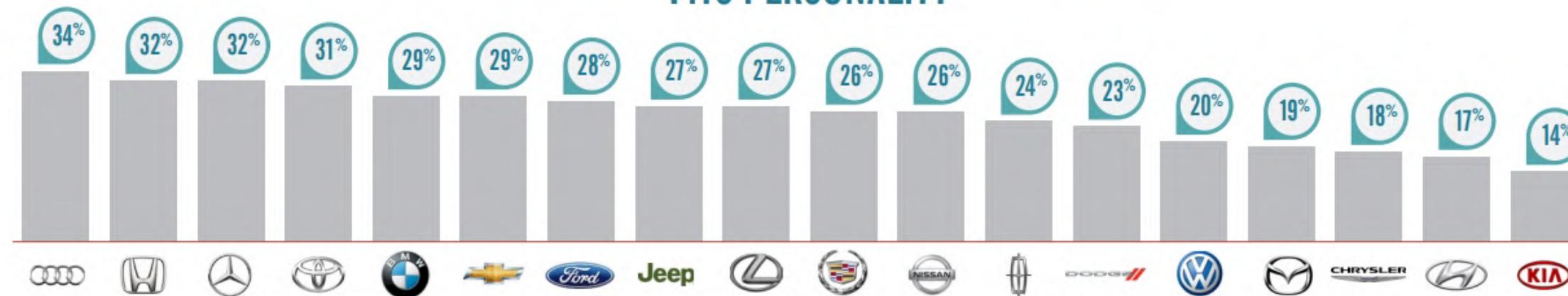
BRAND FAMILIARITY*

(VERY/EXTREMELY FAMILIAR)



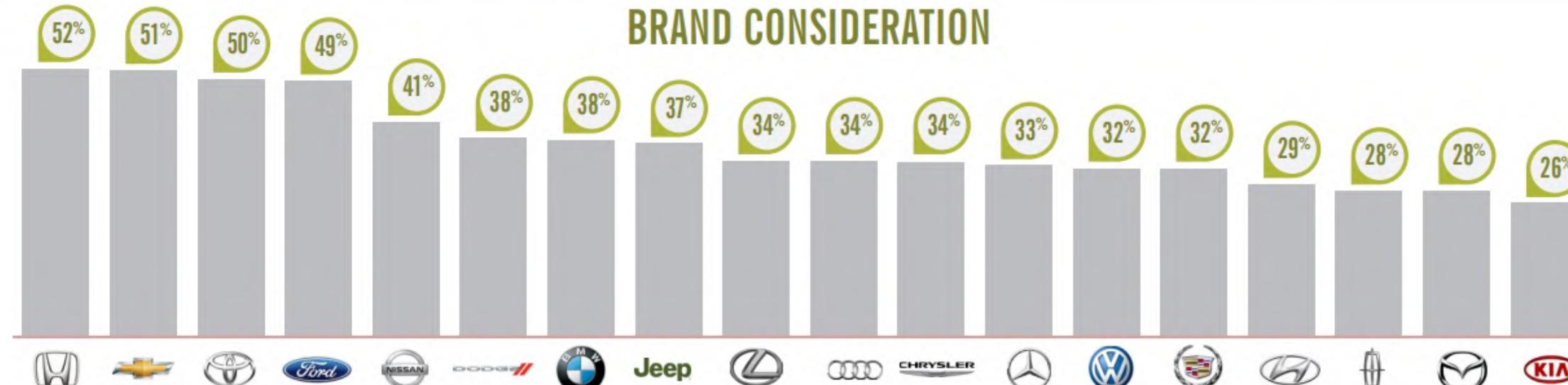
Millennials are equally familiar with domestic and import brands. They are the only generation with an import in their top 3 most-familiar brands.⁹

FITS PERSONALITY



Millennials feel that luxury and import brands suit their personality. They connect with brands they view as “practical,” yet “luxurious,” “sophisticated,” and “stylish.”⁹

BRAND CONSIDERATION



Millennials are the only generation with an import as the top brand considered, yet they are equally as likely to consider domestic and import brands.⁹

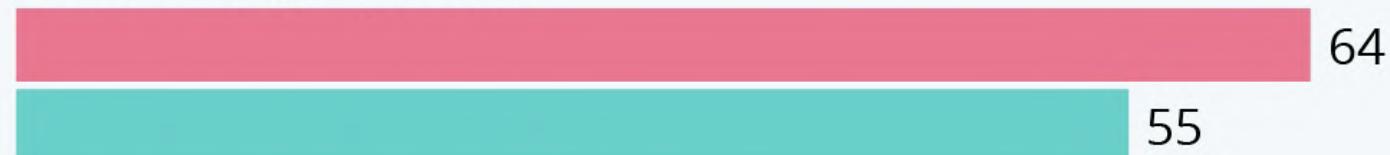
Source: Cox
Auto

Young Generation Focused on Climate

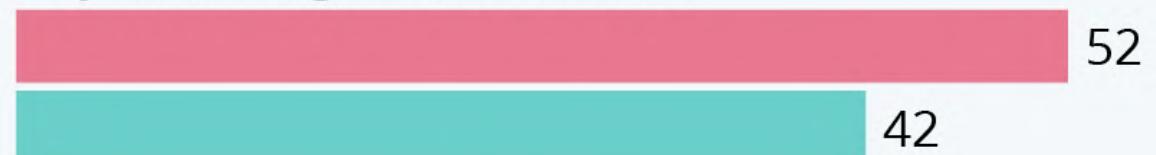
Percentage of young U.S. adults who believe in each climate-related goal

■ Millennials ■ Gen Z

Reduce single-plastics



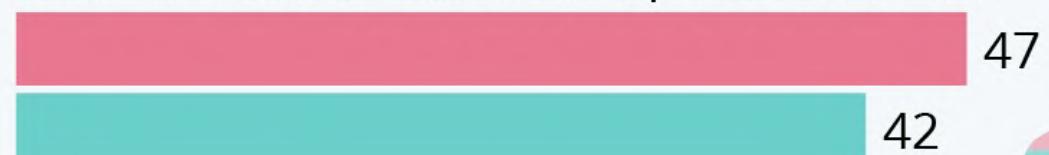
Buy more organic, local food



Stop, reduce fast fashion



Consider environmental aspects of brands



Sources: Deloitte, Bloomberg



statista

Incentive Theory

Our behavior is dictated by a desire for external rewards



Data Modeling

Modeling Process

Sample Dataset

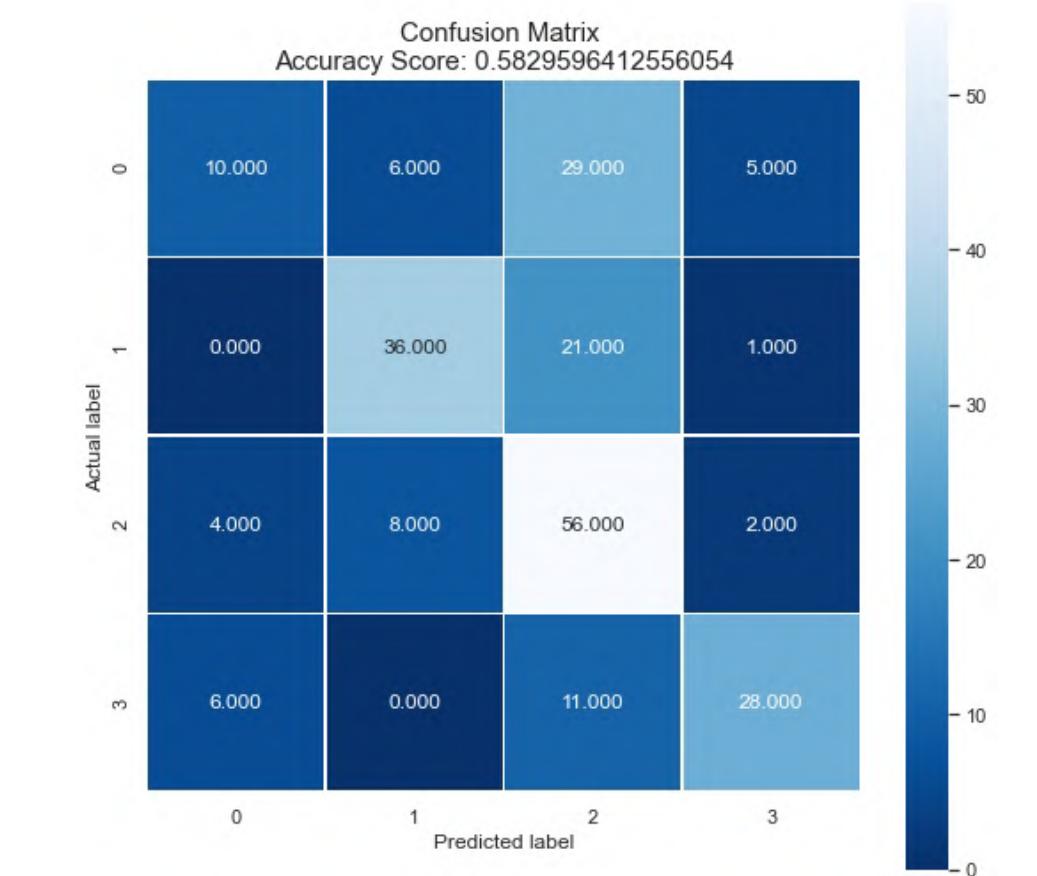
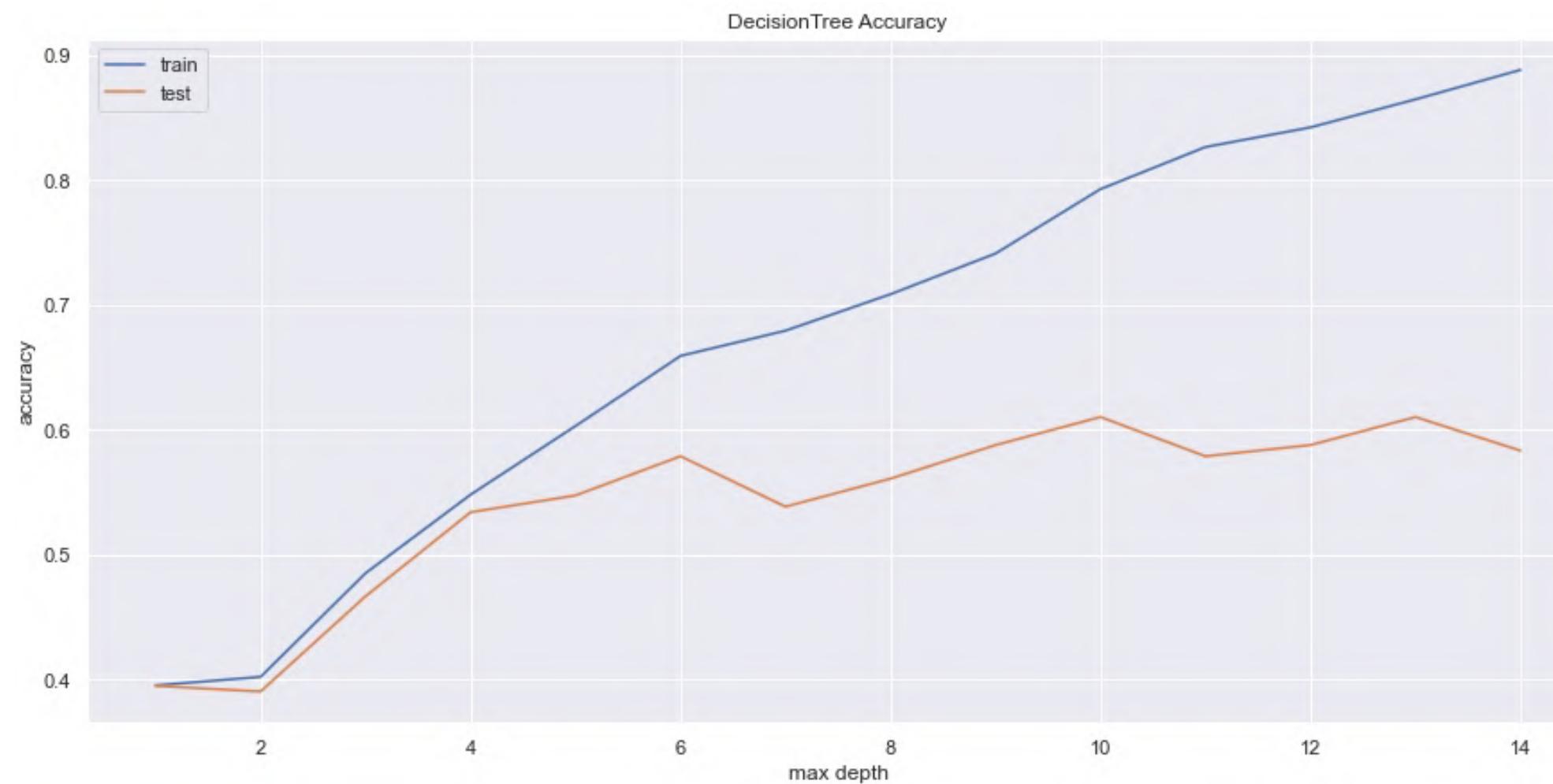
Dataset for modeling risky driver behaviors based on accelerometer and gyroscope.

Driver Behaviors: Sudden Acceleration (Class Label: 1), Sudden Right Turn (Class Label: 2), Sudden Left Turn (Class Label: 3), Sudden Break (Class Label: 4)

Target(Class)	GyroX	GyroY	GyroZ	AccX	AccY	AccZ
1	-0.923664122	3.694656489	0.824427481	0.162597656	-0.086669922	-0.969482422
1	-0.908396947	4.534351145	0.832061069	0.17578125	-0.100585938	-1.013183594
1	0.786259542	3.969465649	0.58778626	0.322753906	-0.140380859	-0.911621094
1	0.335877863	4.564885496	-0.251908397	0.480224609	-0.226806641	-0.936767578
1	3.351145038	2.694656489	-0.106870229	0.426025391	-0.25390625	-0.950195313
1	-1.503816794	3.183206107	-1.65648855	0.383789063	-0.141601563	-0.919677734
1	1.358778626	8.72519084	-0.946564885	0.404785156	-0.257324219	-0.862548828
1	-1.083969466	4.106870229	-0.625954198	0.346923828	-0.106201172	-0.969970703
1	0.053435115	5.083969466	-2.221374046	0.276611328	-0.257568359	-1.008300781
1	-1.106870229	3.65648855	0.778625954	0.158935547	-0.111572266	-0.971435547

Models Created	Test Accuracy
Decision Tree	58%
KNeighborsClassifier	53%
Logistic Regression	42%
Linear SVC	40%

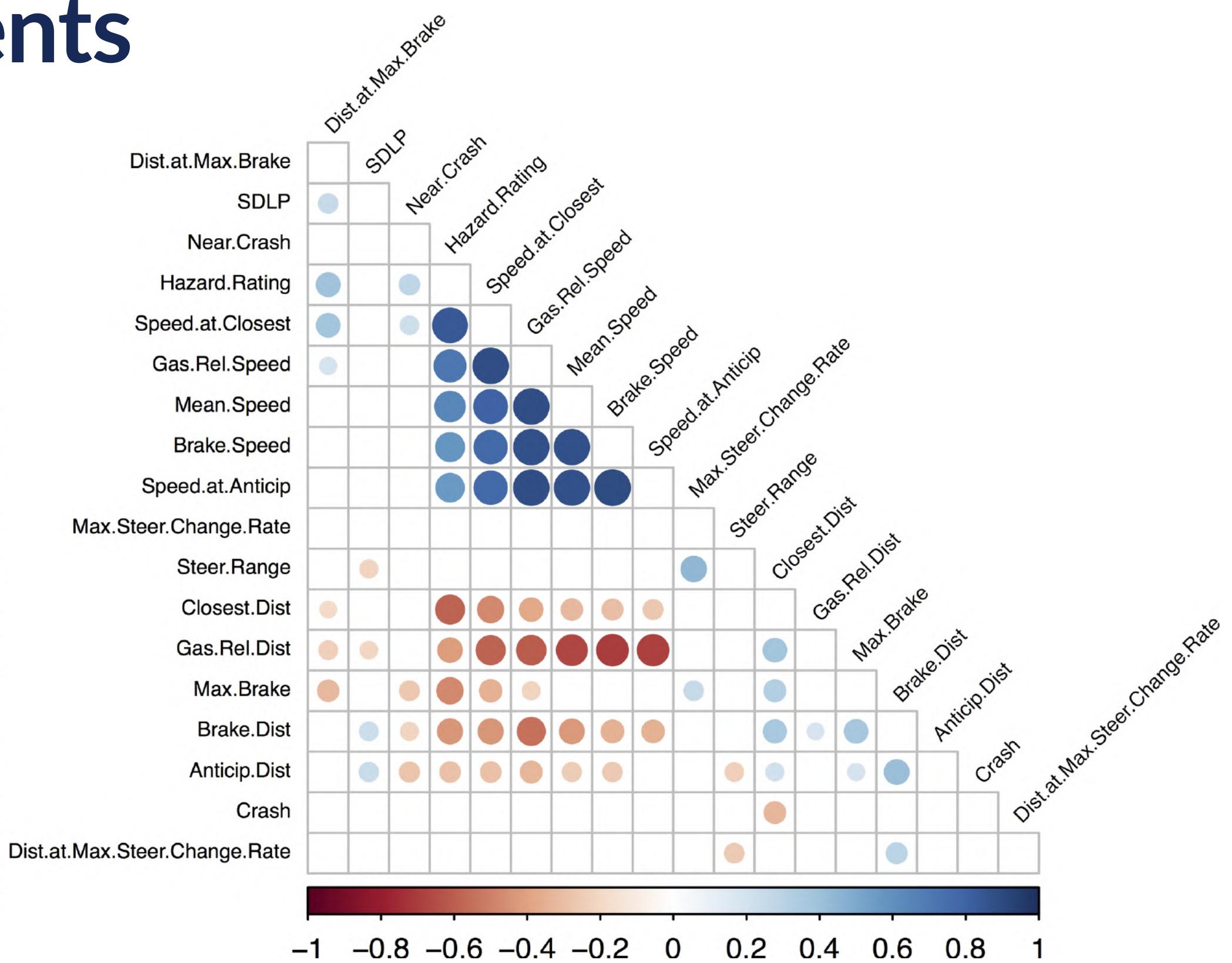
Modeling Takeaways



Ideal Data Requirements

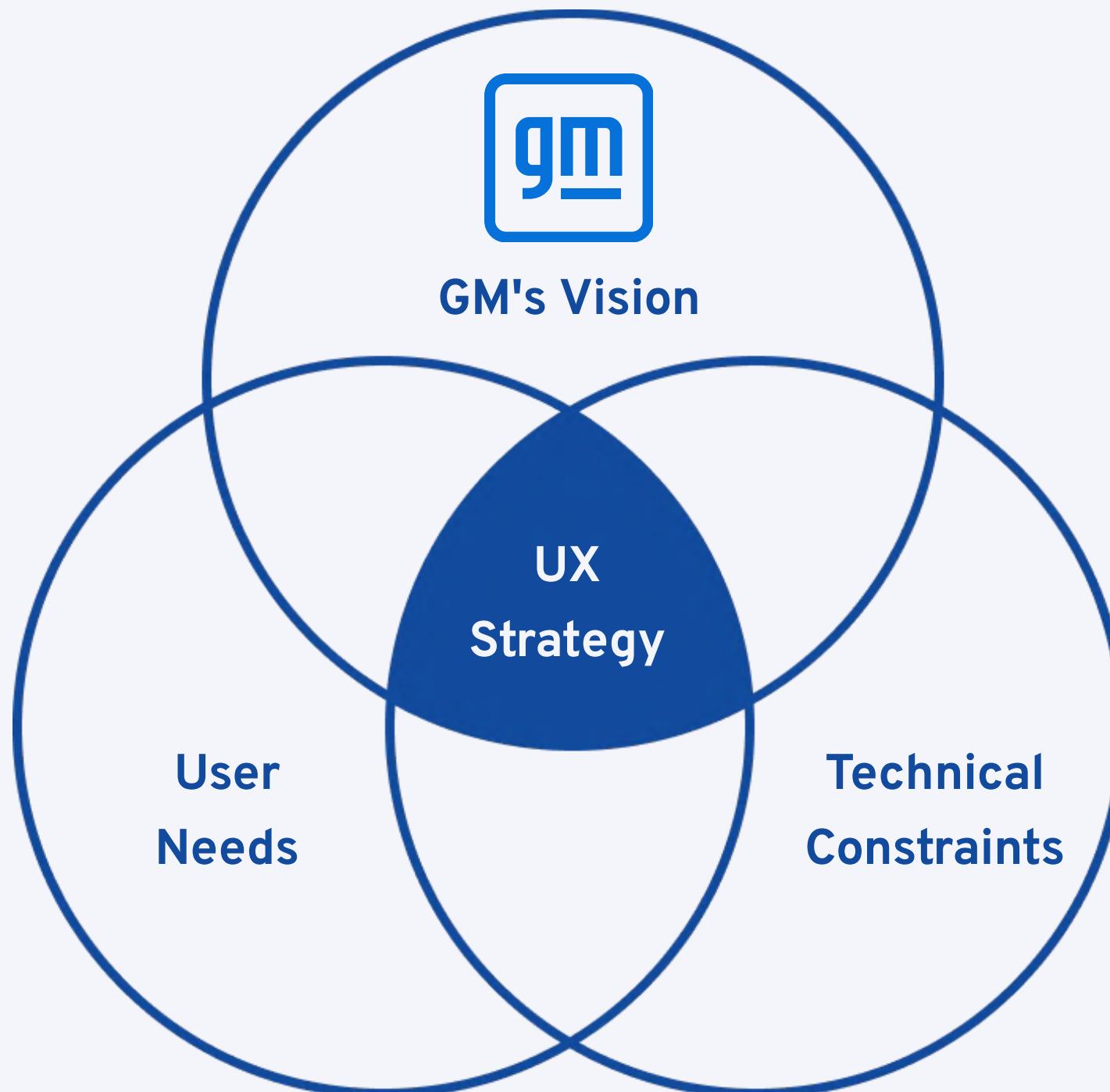
Table 1. Influential Instant Driving related Variables from OBD

Variables	Type	Variables						
		Behavior Analysis [11]	System designing [10]	Accident risk accessing [39, 40]	Driving event recognition [18]	Gas emission /Fuel-usage [19]	Behavior improvement [14]	Unsafe driving monitoring [15]
Location		*	*	*	*	*		*
Speed	Bidirectional	*	*	*		*		*
Engine load	Unidirectional (+)	*						
Throttle position	Bidirectional	*				*		
Engine temperature	Bidirectional		*			*		
Engine speed	Bidirectional	*	*			*		*
Miles per gallon	Unidirectional (-)							*
Battery voltage	Bidirectional		*					
Diagnostic trouble codes	Unidirectional (+)		*					
Turns	Unidirectional (+)			*				
Orientation change	Unidirectional (+)			*				
Sudden break	Unidirectional (+)			*	*	*		
Acceleration	Unidirectional (+)				*			*
Deceleration	Unidirectional (+)				*			*
Positive kinetic energy	Unidirectional (+)				*			
Fuel usage	Unidirectional (+)				*	*		
Emissions	Bidirectional				*			



UX Design

The UX Strategy



GM's Vision

- Achieve a world with zero emissions, zero crashes, zero congestion
- Track & communicate improvements made toward goal zero
- Predict how much time it will take to get to goal zero

User Needs

- Practice safe driving habits
- Reduce emissions & make an impact environmentally
- Find quickest routes to destinations & charging stations

Technical Constraints

- Needs user to allow access to their data & location
- User will need to have an up to date vehicle with dashboard & connection to the app

Samantha Williams

The New Electric Car Owner



Occupation

Senior Tech Recruiter



Location

Vancouver, British Columbia



Age

29



Home

Single

About Samantha

Samantha is a tech recruiter living in Vancouver, BC. She commutes to and from work, previously taking public transportation daily. However, due to the pandemic - she no longer feels safe travelling on the crowded trains during rush hour. Now that everyone is moving back to the office again, she decided to purchase a vehicle to commute in. Since she is very conscious about her environmental impact, she purchased an electric vehicle. Samantha is often busy due to her work schedule, however she still wants to make a difference in the environment and wants to know that she is helping.

"I want to know that I'm still doing my part to contribute to the environment, even though I now own a vehicle. "

Behaviours

- Commutes to and from work in her electric vehicle
- Stays up to date with electric vehicle maintenance through text and call reminders
- Researches "how-to" guides for new car owners

Pain Points

- Does not know if she is doing enough to reduce carbon emissions
- After purchasing an electric vehicle, is unsure what else she can do to continue reducing emissions
- Unfamiliar with the best driving routes as a former bus commuter

Goals & Motivations

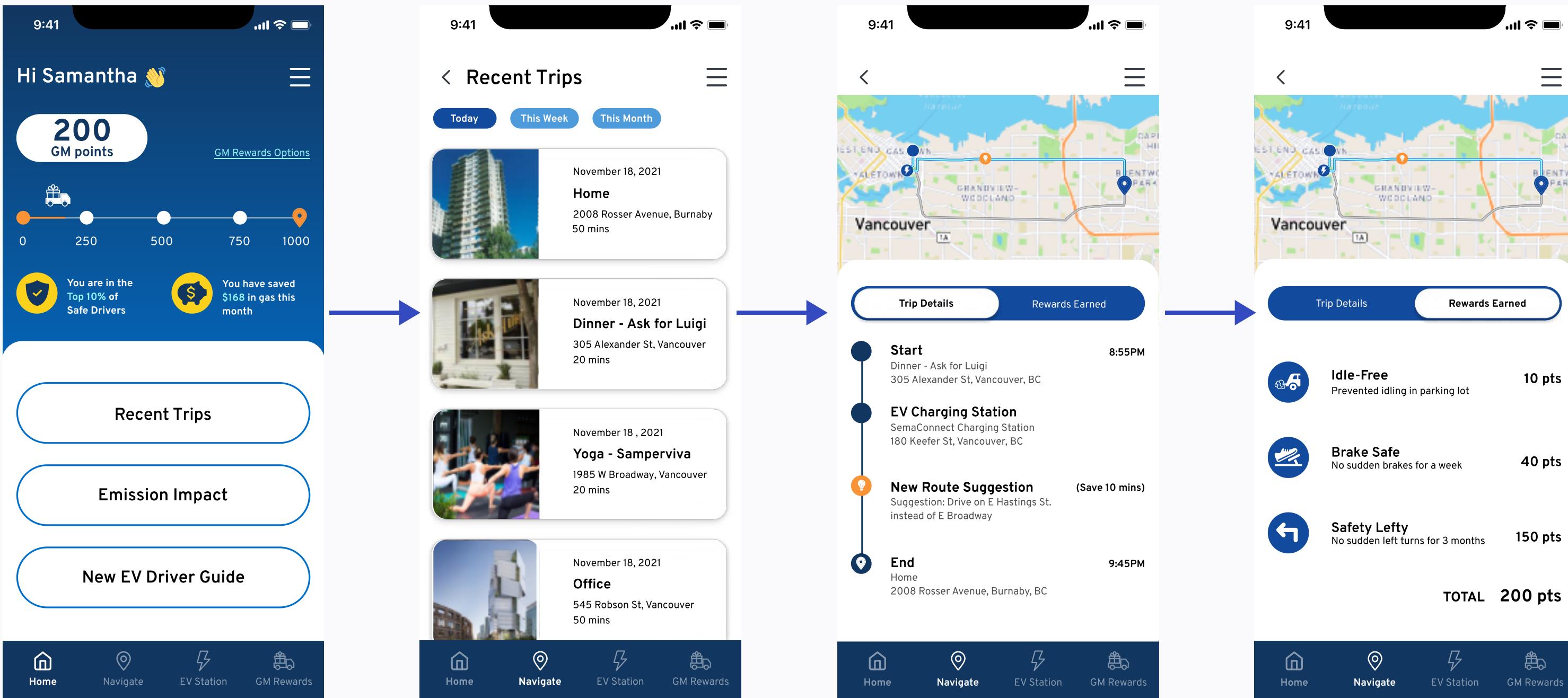
- To own a car but still know she is contributing her part to supporting the earth's climate
- Wants to find the quickest routes to and from work, while also finding convenient charging stations
- To be a responsible driver as a new electric vehicle owner



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**How might we encourage millennials to improve
their driving in order to achieve GM's Goal Zero?**

Task Flow

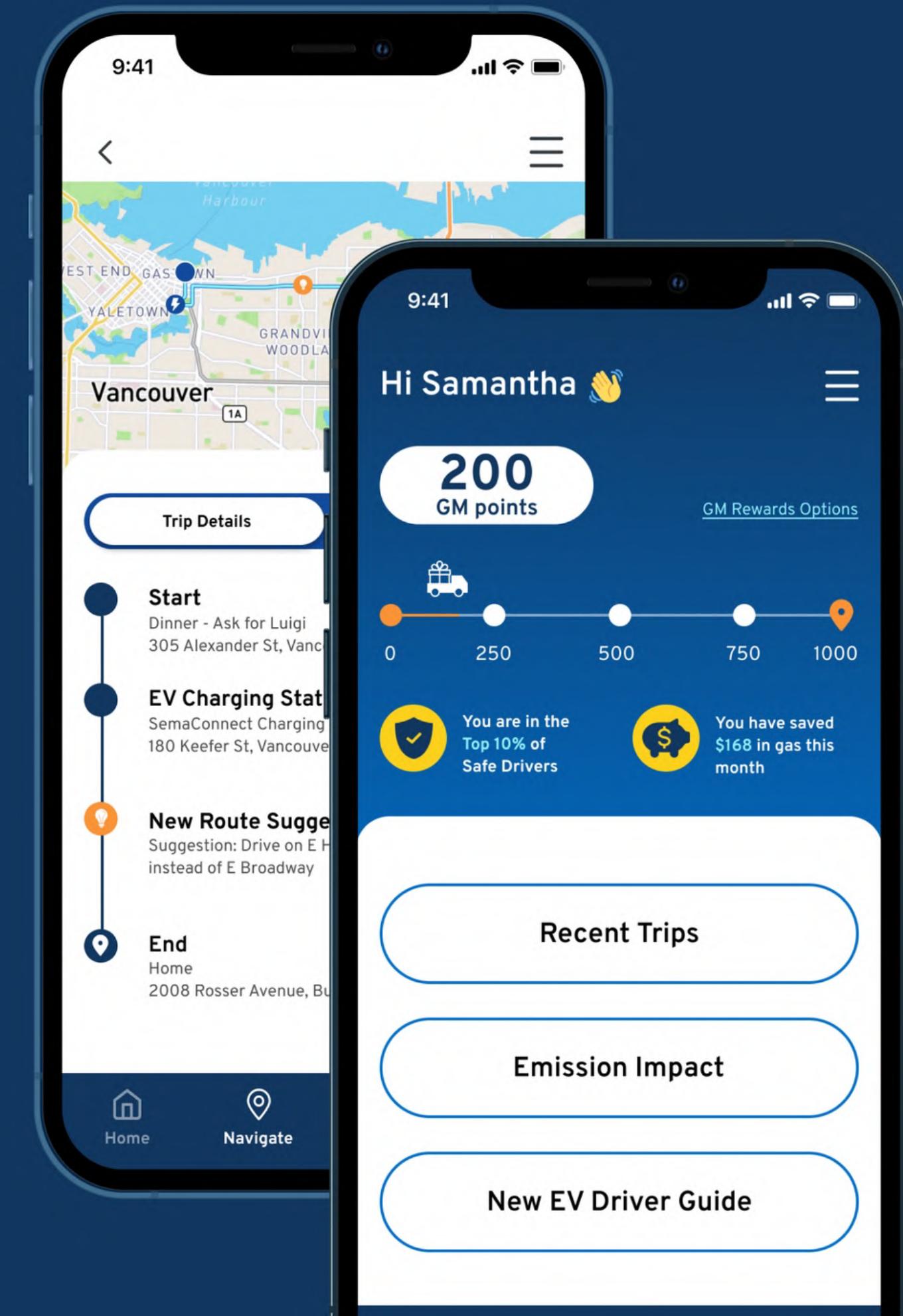




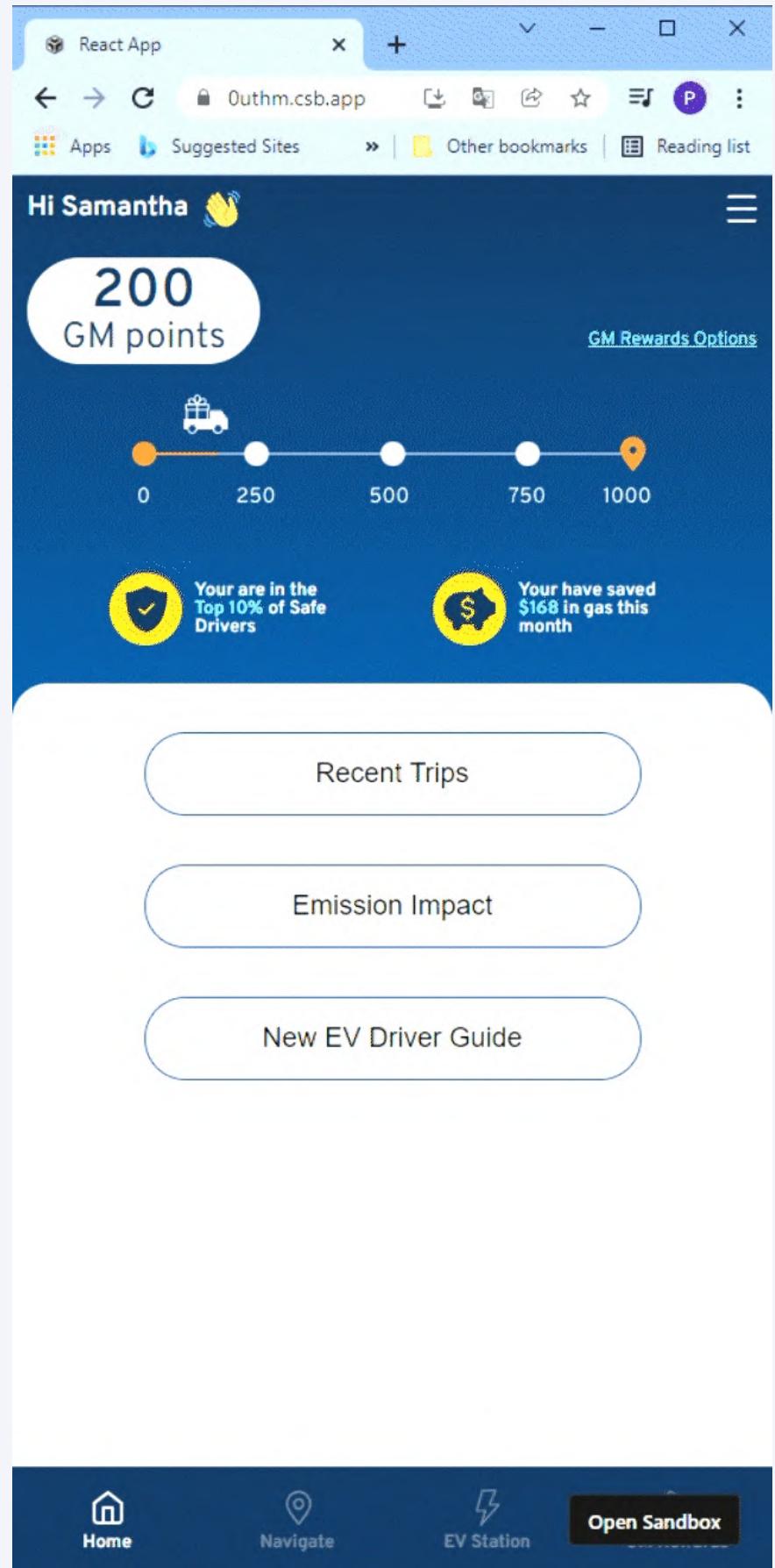
Hi-Fi Prototype

Let's take a look at our solution to help build a safer, greener & more equitable world for everybody.

Prototype Link



Web Development



Bringing our Ideas to Life

From Prototypes to a Digital Experience

- Layout based on Hi-Fi Prototype
- Collaboration Tool: CodeSandbox
- Native Mobile Application built in React.js
- Multi-page application
- Main viewpoint: mobile screen-size (iPhone11 -375px)

Codesandbox Link

Next Steps & Key Learnings

Next Steps

- Discuss go-to-market strategy
- Obtain GM user data to make data model more robust
- Develop key partnerships with participating brands for rewards
- Measure app download and app usage amongst millennials post-launch





Key Learnings

- Set up realistic expectations
- Communicate early and often
- Do not doubt what you and your team can achieve in a short amount of time

Thank you

Appendix - Data Science

Resources

- https://drive.google.com/drive/folders/1zJtV9ib0BDFsyJi0_Xj5_HgYHp6FbCaP
- <https://youmatter.world/en/are-electric-cars-eco-friendly-and-zero-emission-vehicles-26440/>
- <https://www.rac.co.uk/drive/advice/emissions/11-ways-to-reduce-your-car-emissions/>
- <https://www.gm.com/>
- <https://data.mendeley.com/datasets/jj3tw8kj6h/2/files/243293bb-af31-490f-862c-903b779b62d3>
- <https://blog.treasuredata.com/blog/2021/02/26/how-millennials-and-customer-data-are-changing-the-car-buying-experience/>
- <https://www.carzone.ie/news/millennials-set-to-drive-car-ownership-boom-in-2021/2540>
- <https://www.duffandphelps.ca/insights/publications/m-and-a/millennials-and-auto-trends-report/millennials-value-car-ownership>
- https://www.greencarreports.com/news/1122677_step-aside-boomers-new-electric-car-buyers-in-northeast-may-be-millennials
- https://www.sciencedirect.com/science/article/abs/pii/S1369847821002138?dgcid=rss_sd_all
- <https://www.coxautoinc.com/wp-content/uploads/2017/11/MillennialsBrochurePhase2-KAPAGES.pdf>
- <https://pdfs.semanticscholar.org/0217/7c78d00711bc5434b35ca0ff2a107f03a504.pdf>
- <https://www.verywellmind.com/the-incentive-theory-of-motivation-2795382>
- DRIVE LINK : <https://drive.google.com/drive/folders/1B6-CVuywHCSOjYg8c1kM9uVDwYNMsayP>

Appendix - UX Design

UX Materials & Assets

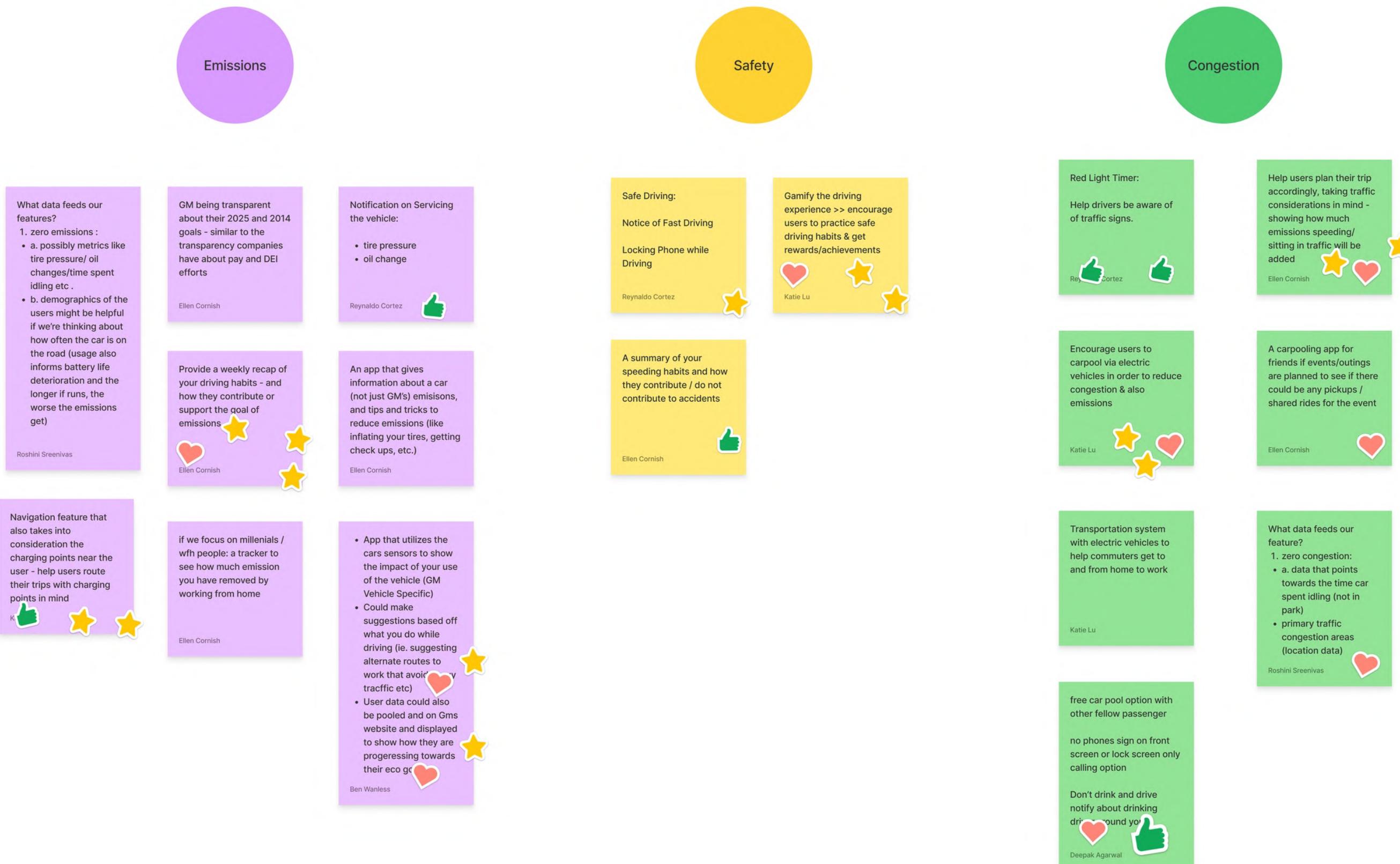
FigJam File Link

- Team Ideation Process
- Team Ideation - Vote Results

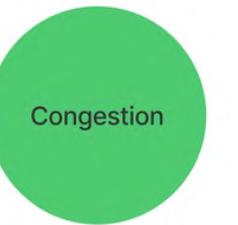
Figma File Link

- Persona
- Task Flow
- Mid-Fi Wireframes
- Hi-Fi Prototype

Team Ideation Process



- Safety**
- Safe Driving:
 - Notice of Fast Driving
 - Locking Phone while Driving
 - Gamify the driving experience >> encourage users to practice safe driving habits & get rewards/achievements
 - Reynaldo Cortez
 - Katie Lu
 - A summary of your speeding habits and how they contribute / do not contribute to accidents
 - Ellen Cornish



- Congestion**
- Red Light Timer:
 - Help drivers be aware of traffic signs.
 - Help users plan their trip accordingly, taking traffic considerations in mind - showing how much emissions speeding/sitting in traffic will be added
 - Ellen Cornish

- Encourage users to carpool via electric vehicles in order to reduce congestion & also emissions
 - Katie Lu
- A carpooling app for friends if events/outings are planned to see if there could be any pickups / shared rides for the event
 - Ellen Cornish

- Transportation system with electric vehicles to help commuters get to and from home to work
 - Katie Lu
- What data feeds our feature?
 - 1. zero congestion:
 - a. data that points towards the time car spent idling (not in park)
 - primary traffic congestion areas (location data)

- free car pool option with other fellow passenger
- no phones sign on front screen or lock screen only calling option
- Don't drink and drive notify about drinking driver around you
 - Deepak Agarwal

Team Ideation - Vote Results

Provide a weekly recap of your driving habits - and how they contribute or support the goal of emissions

Ellen Cornish

Navigation feature that also takes into consideration the charging points near the user - help users route their trips with charging points in mind

Katie Lu

- App that utilizes the car's sensors to show the impact of your use of the vehicle (GM Vehicle Specific)
Could make suggestions based off what you do while driving (ie. suggesting alternate routes to work that avoid heavy traffic etc)
- User data could also be pooled and on GM's website and displayed to show how they are progressing towards their eco goals.

Ben Wanless

Gamify the driving experience >> encourage users to practice safe driving habits & get rewards/achievements

Katie Lu

Help users plan their trip accordingly, taking traffic considerations in mind - showing how much emissions speeding/sitting in traffic will be added

Ellen Cornish

Encourage users to carpool via electric vehicles in order to reduce congestion & also emissions

Katie Lu

Samantha Williams

The New Electric Car Owner



Occupation

Senior Tech Recruiter



Location

Vancouver, British Columbia



Age

29



Home

Single

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"I want to know that I'm still doing my part to contribute to the environment, even though I now own a vehicle. "

Behaviours

- Commutes to and from work in her electric vehicle
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- Researches "how-to" guides for new car owners

Pain Points

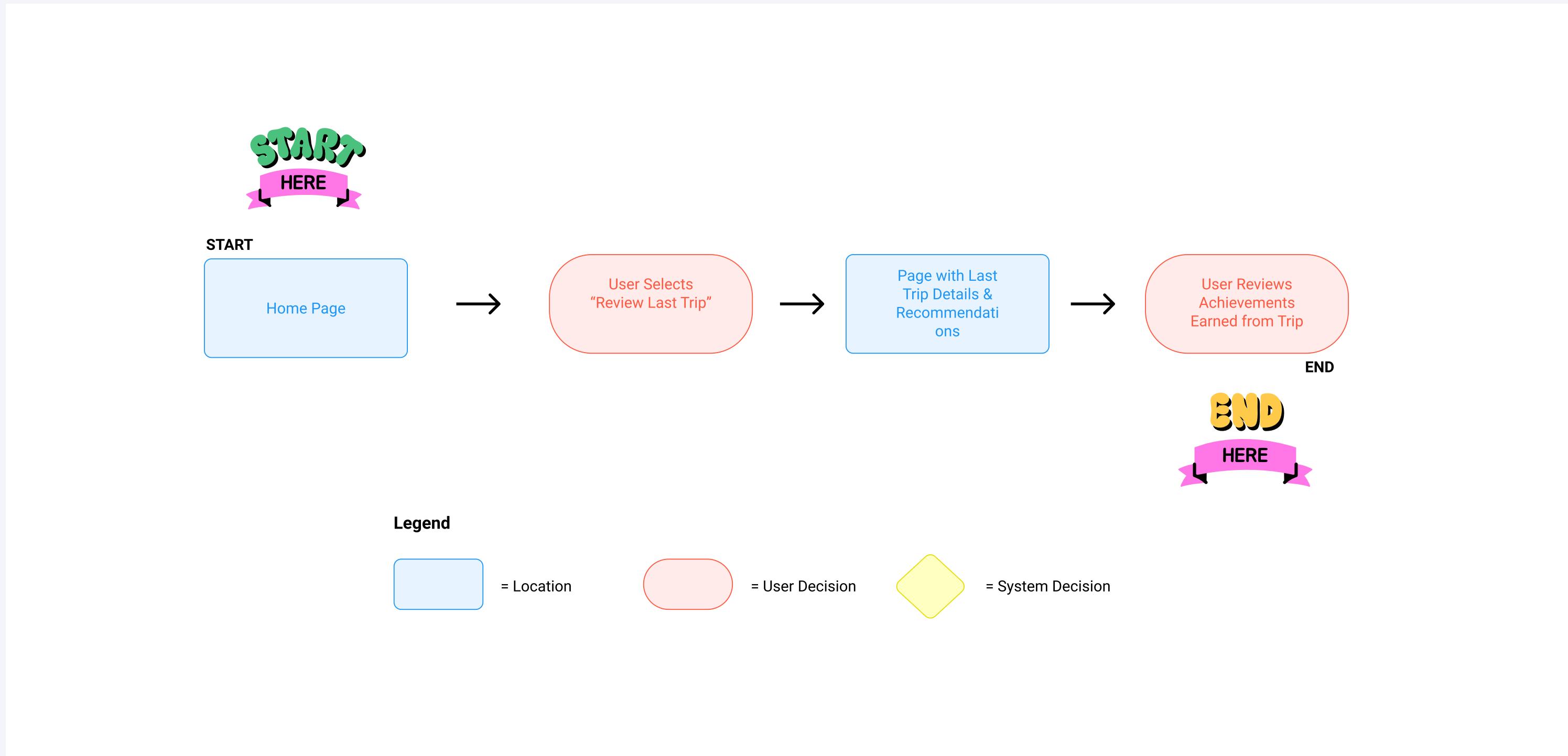
- Does not know if she is doing enough to reduce carbon emissions
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Goals & Motivations

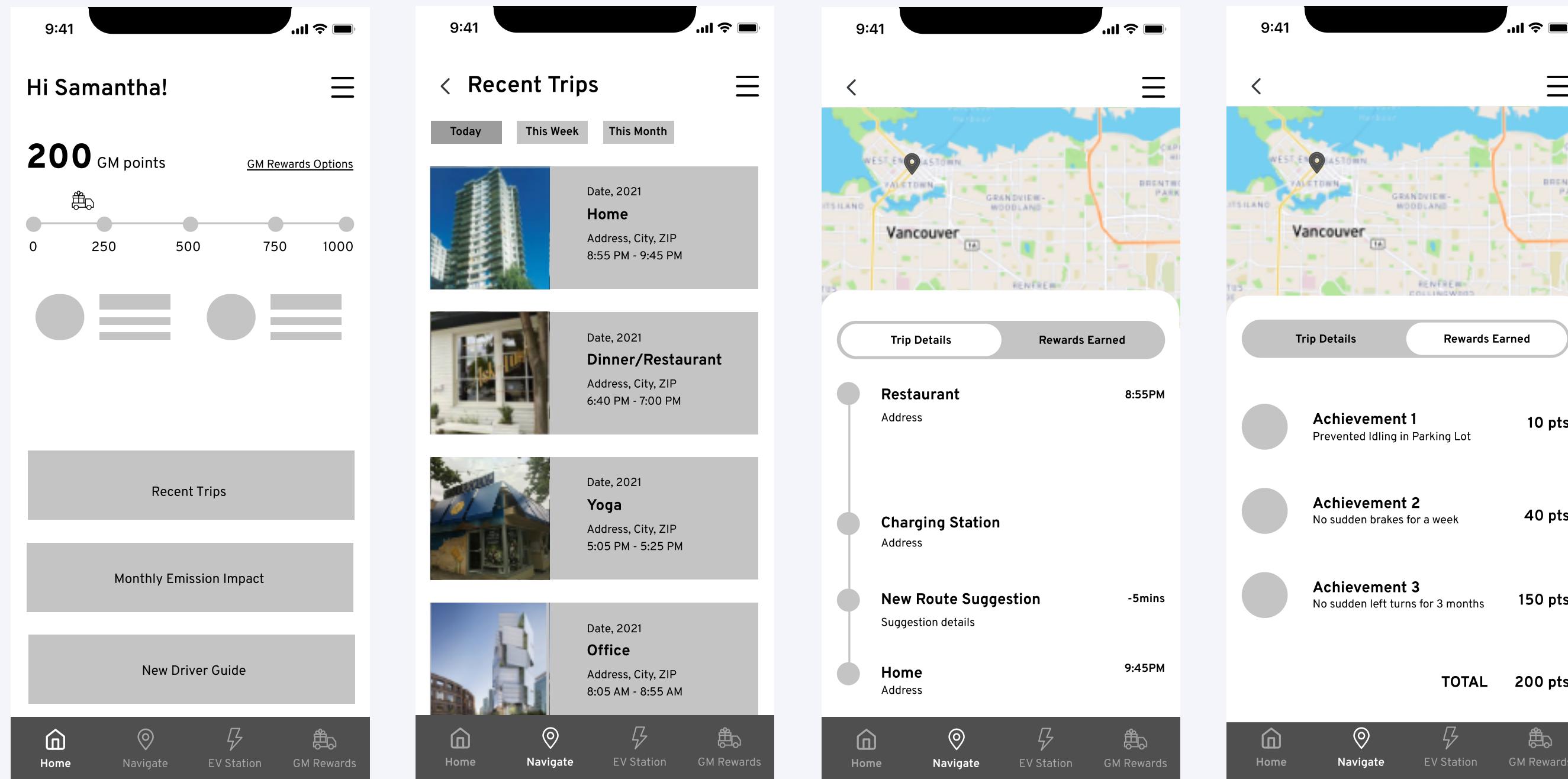
- To own a car but still know she is contributing her part to supporting the earth's climate
- Wants to find the quickest routes to and from work, while also finding convenient charging stations
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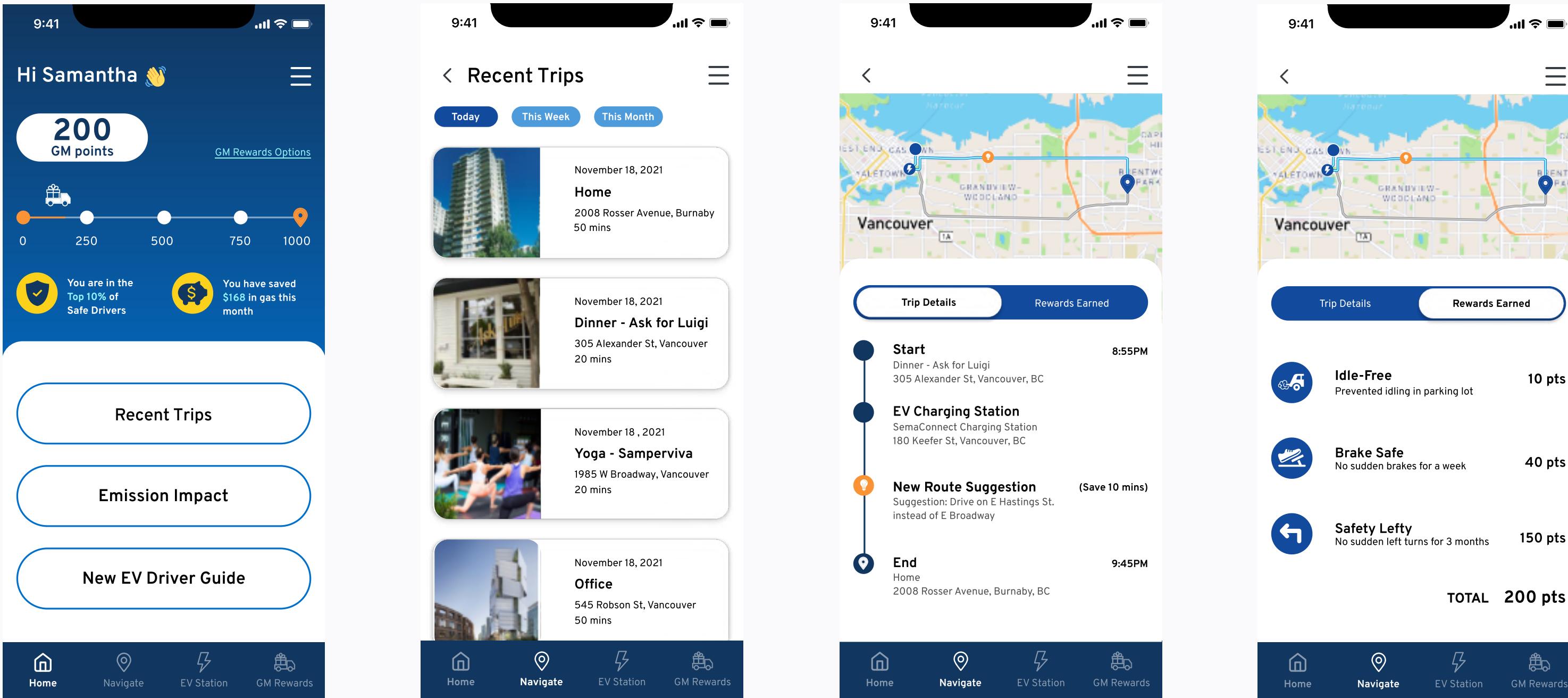
Task Flow



Mid-fi Prototype



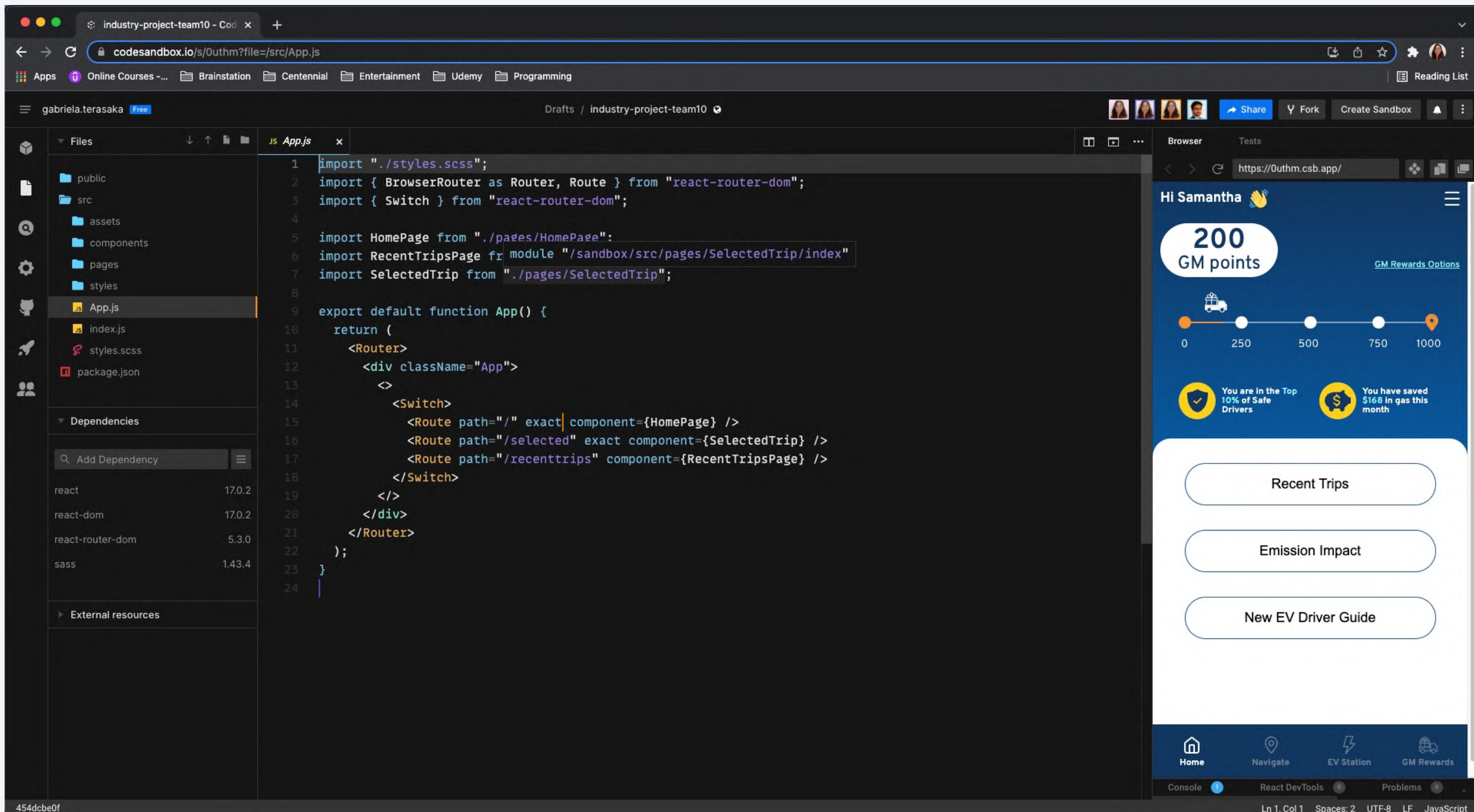
Hi-fi Prototype



Prototype Link

Appendix - Web Development

CodeSandbox



Codesandbox Link

React App

The image displays four screenshots of a React mobile application interface, showing different screens of a driving behavior tracking app.

Home Screen: Shows a welcome message "Hi Samantha 🙌", current GM points (200), a progress bar from 0 to 1000, and two achievement badges: "You are in the Top 10% of Safe Drivers" and "You have saved \$168 in gas this month". It also features three buttons: "Recent Trips", "Emission Impact", and "New EV Driver Guide". The bottom navigation bar includes "Home", "Navigate", "EV Station", and "GM Rewards".

Recent Trips Screen: Displays a list of recent trips for November 18, 2021, including "Home" (2008 Rosser Avenue, Burnaby, 50 mins), "Dinner - Ask for Luigi" (305 Alexander St, Vancouver, 20 mins), "Yoga - Samperviva" (1985 W Broadway, Vancouver, 20 mins), and "Office" (545 Robson St, Vancouver, 50 mins). Each trip has a small thumbnail image.

Selected Trip Details Screen: Shows a map of Vancouver with a route highlighted. Below the map, the trip details are listed: Start (Dinner - Ask for Luigi, 305 Alexander St, Vancouver, BC at 8:55PM), EV Charging Station (SemaConnect Charging Station, 180 Keefer St, Vancouver, BC), New Route Suggestion (Save 10 mins: suggestion to drive on E Hastings St instead of E Broadway), and End (Home, 2008 Rosser Avenue, Burnaby, BC at 9:45PM).

Rewards Summary Screen: Shows a summary of rewards earned during the trip. The total points are 200. The rewards listed are:

- Idle-Free: Prevented idling in parking lot (10 pts)
- Brake Safe: No sudden brakes for a week (40 pts)
- Safety Lefty: No sudden left turns for 3 months (150 pts)

Total Points: TOTAL 200 pts