MioCar Application Planning and Cost Model

Harjot Gill

Mentor: Dr. Chris Nitta and Dahlia Garas

Computer Science/Institute of Transportation Studies

UC Davis

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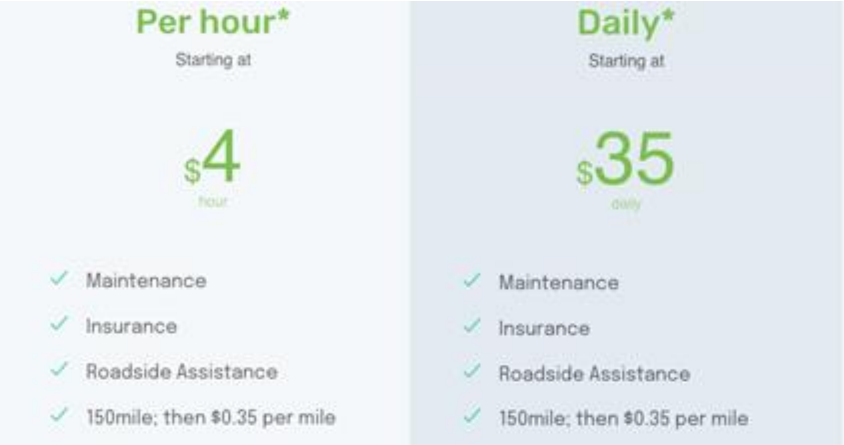
Background

- MioCar is a non-profit organization in California focused on providing affordable transportation.
- Offers a 100% EV car-sharing service in Richmond, Stockton, and Tulare County geared towards communities with limited access to transportation .
- Established in 2019, the service is accessible to anyone over 21 years old with a license and good driving record

Image source: https://calcog.org/wp-content/uploads/2020/10/MioCarCharge-600x455.png



Per hour*	Daily*
Starting at	Starting at
$4 hour	$35 daily
✓ Maintenance	✓ Maintenance
✓ Insurance	✓ Insurance
✓ Roadside Assistance	✓ Roadside Assistance
✓ 150mile; then $0.35 per mile	✓ 150mile; then $0.35 per mile

https://miocar.org/?p=13470

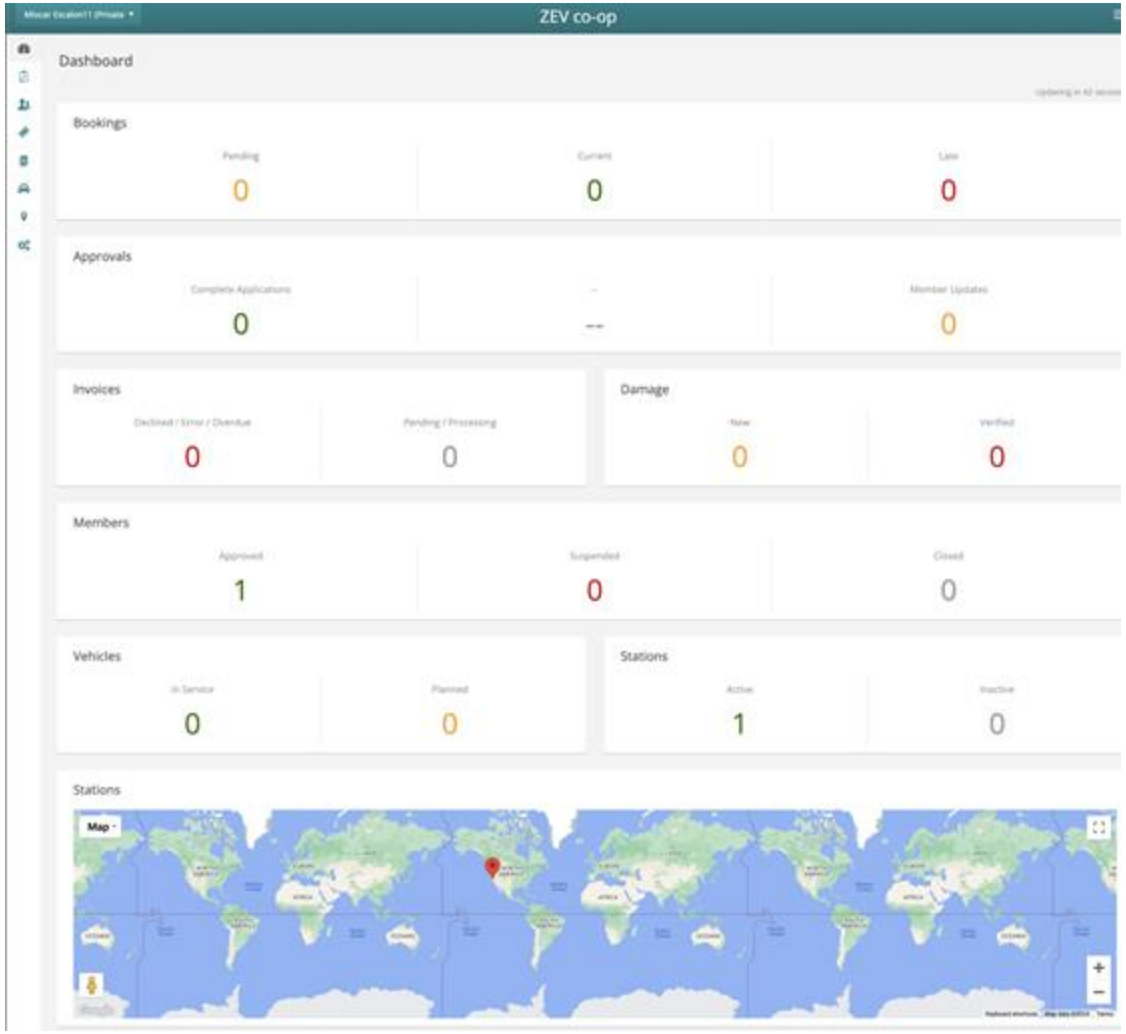
Pressing Issues

- After meeting with MioCar we obtained a list of processes that were done by hand including
  - Manual Entry of Booking data and License during signup
  - Putting vehicles out of service manually for cleaning (weekly per vehicle)
  - Tedious maintenance

- Additional features for the Frontend app
  - Displaying vehicle availability times and status
  - Mostly minor improvements

Research Question

- How can we improve the applications that MioCar runs on and what would be the cost?



Miocar Escalon11 (Private ▾

ZEV co-op

Dashboard

Updating in 42 seconds

Bookings

Pending	Current	Late
0	0	0

Approvals

Complete Applications	-	Member Updates
0	--	0

Invoices

Declined / Error / Overdue	Pending / Processing
0	0

Damage

New	Verified
0	0

Members

Approved	Suspended	Closed
1	0	0

Vehicles

In Service	Planned
0	0

Stations

Active	Inactive
1	0

Stations

Image of a dashboard for the Backend Application used by MioCar currently

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Methodology

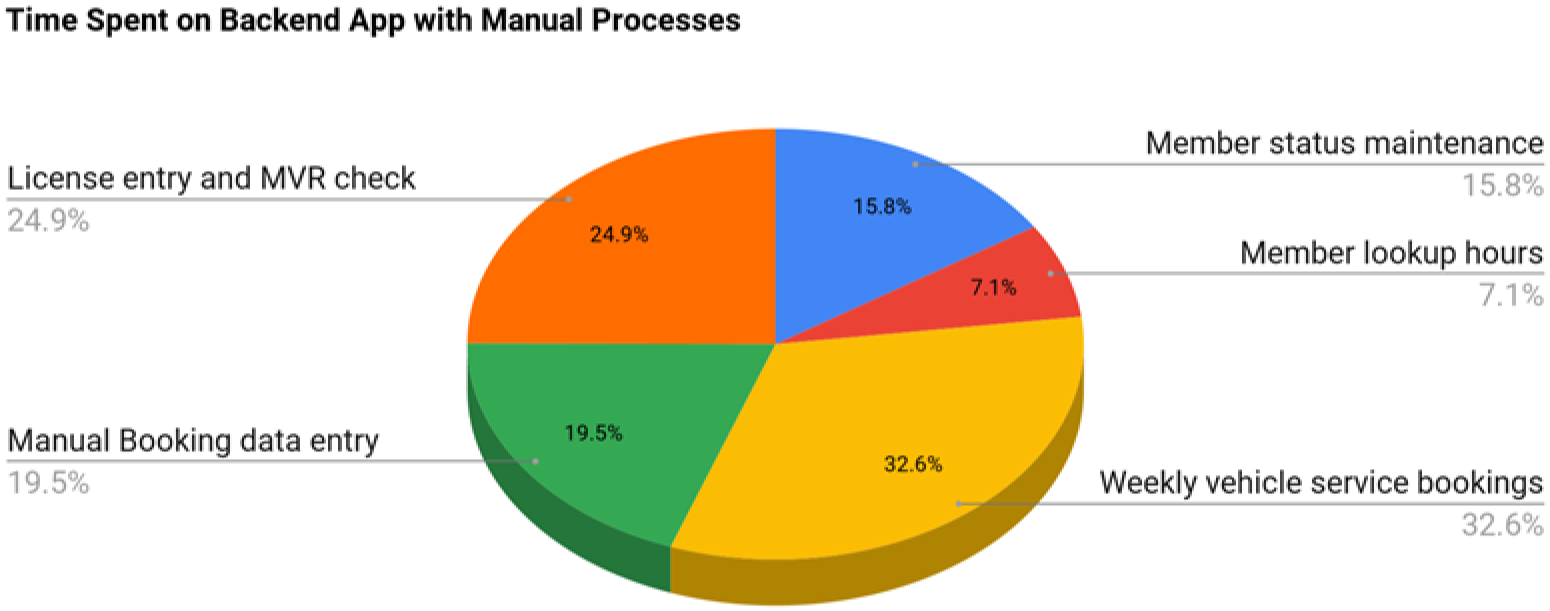
- Conduct comprehensive analysis on MioCar’s needs and objectives:
  - Improvements for a new backend and frontend application
  - We primarily focused on enhancing backend interactions.

- Creating a cost model for:
  - New Application
  - Current Application
  - Alternative solutions

- Next Step: Preliminary Planning and Research
  - Investigate current backend services and APIs

Current Approach Costs

- Some processes can be fully automated
  - Booking data entry
  - Weekly service Bookings
  - License data entry
- The rest of these processes can be expedited for safety and security reasons



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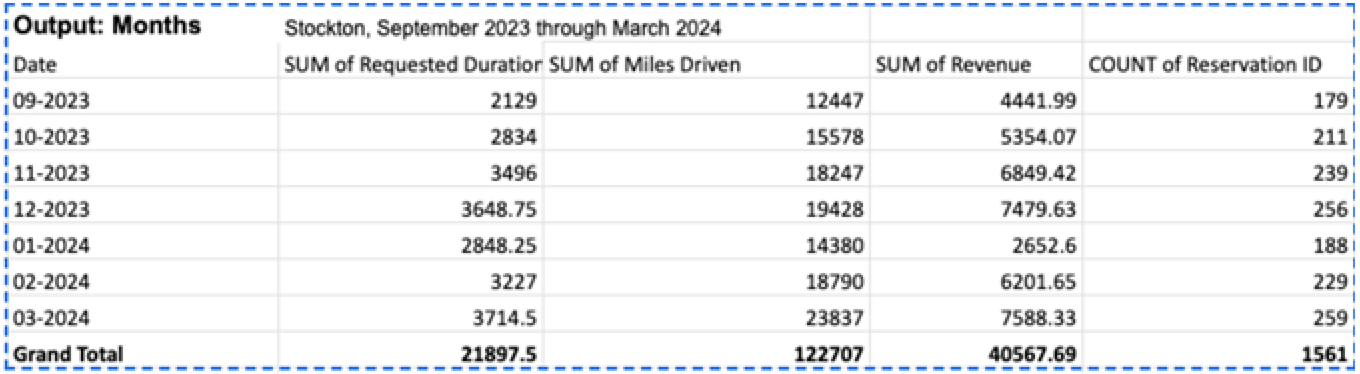
Creating an Application

- Computing
  - Needed for running the code for the apps business logic
    - Processing user input, generating responses, etc.
    - Deploying APIs
- Storage
  - Storing logs, backups, and static assets
- Database
  - Reusing the database that ZEVCoop provides is an option
  - Stores relational data, like members, bookings, vehicle information, etc.

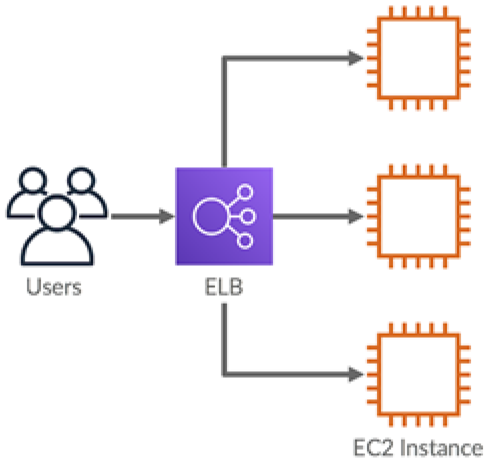


Output: Months	Stockton, September 2023 through March 2024			
Date	SUM of Requested Duratior	SUM of Miles Driven	SUM of Revenue	COUNT of Reservation ID
09-2023	2129	12447	4441.99	179
10-2023	2834	15578	5354.07	211
11-2023	3496	18247	6849.42	239
12-2023	3648.75	19428	7479.63	256
01-2024	2848.25	14380	2652.6	188
02-2024	3227	18790	6201.65	229
03-2024	3714.5	23837	7588.33	259
Grand Total	**21897.5**	**122707**	**40567.69**	**1561**

Creating an Application cont.

- Data Transfer
  - How much data is being retrieved and sent?
    - This is data that also relates to the calls made to the hardware backend which was not accounted

- Elastic Load Balancing (ELB)
  - As the application scales, ELB may be implemented
    - Evenly distributes compute instances to ensure no single instance/server is overwhelmed, providing high availability and reliability.



Developing an extension

- Tampermonkey is a popular browser extension that allows you to manipulate the behavior of the webpage
  - Used in Amazon internally for quick feature additions without changing source code

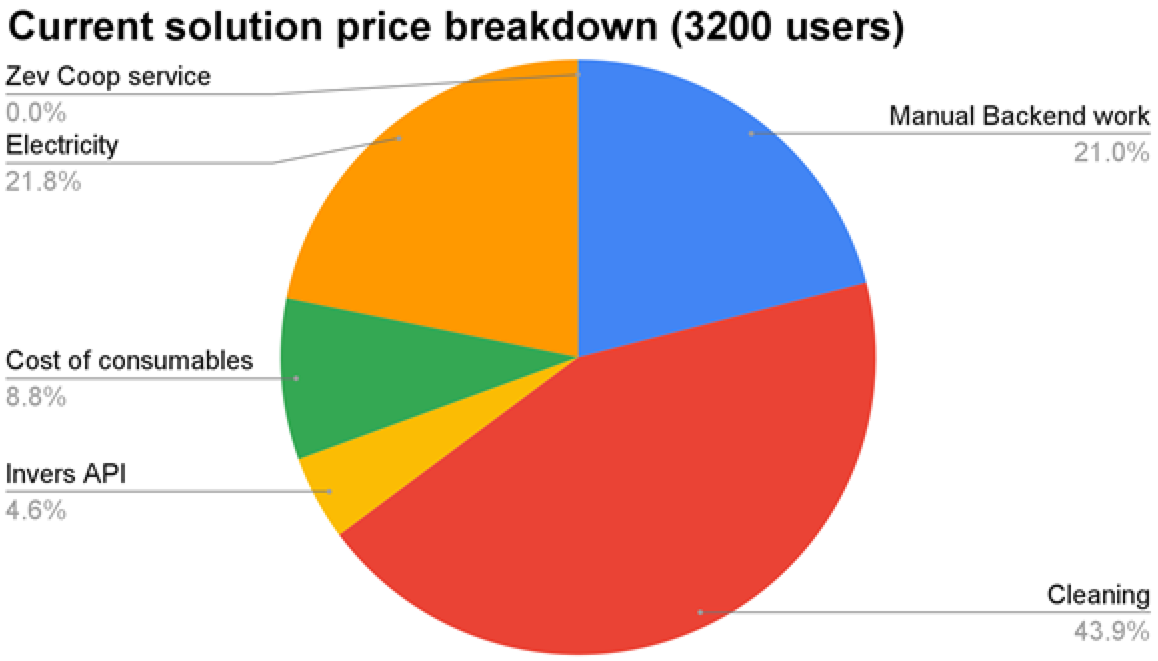
Pros

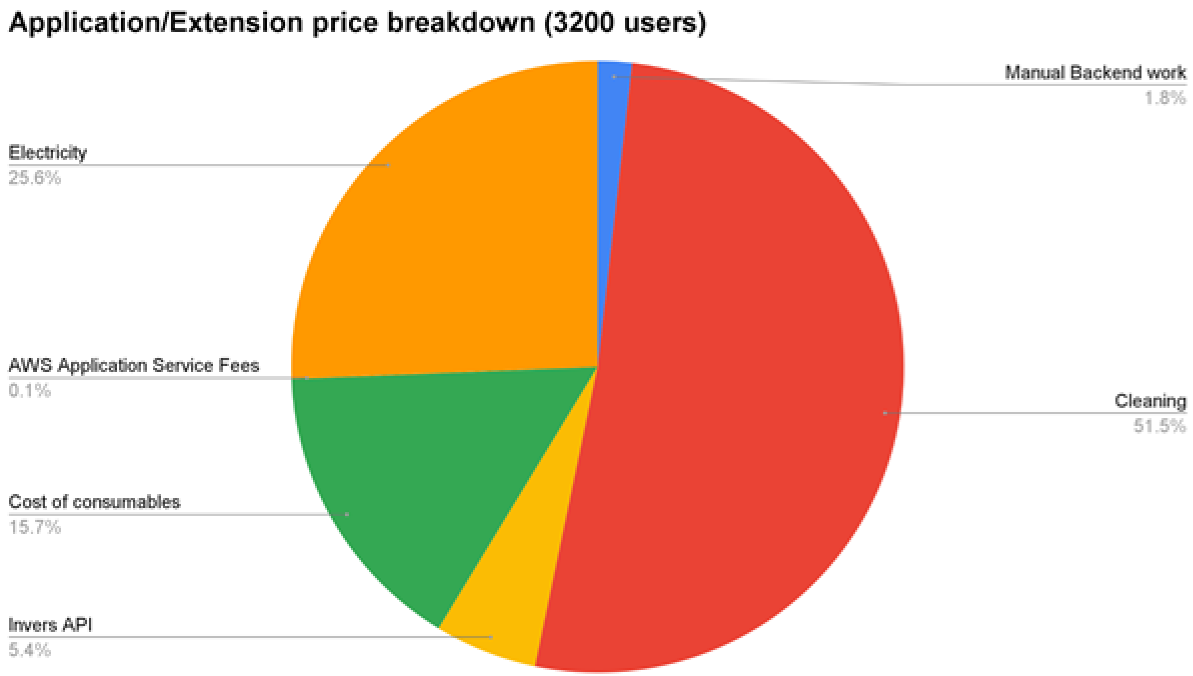
- Works on most major web browsers
- May take two weeks to implement, while an App will take at least 5 months for ground up development
- Features can be pushed quickly and concurrently

Cons

- Difficult to maintain overtime
- Inconsistent experiences due to varying browser versions
- Sensitive to updates
- Significant security risk
- Limited scope

Solution Price Comparison





- Unnecessary manual labor costs reduced by **92.6631%**
- Roughly **$28,000** saved in labor cost
- Running cost is roughly the same for extension and a new app

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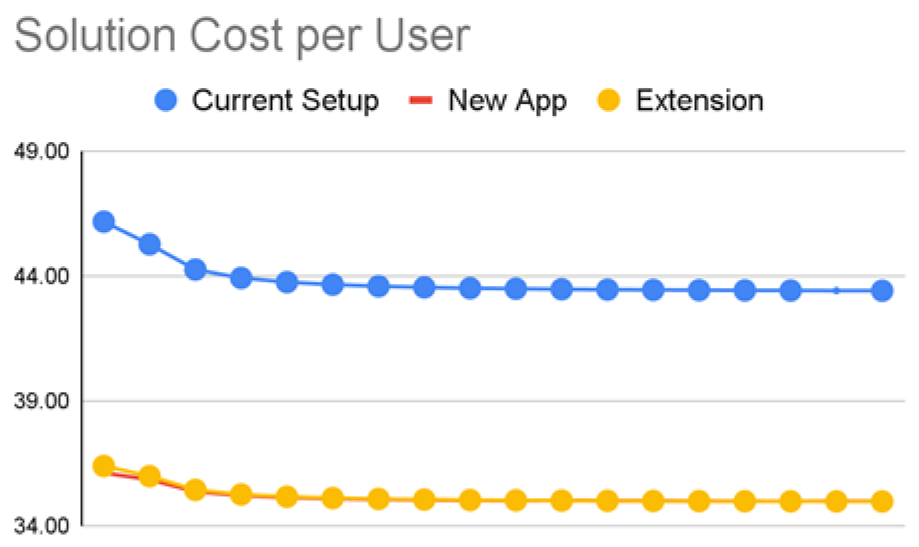
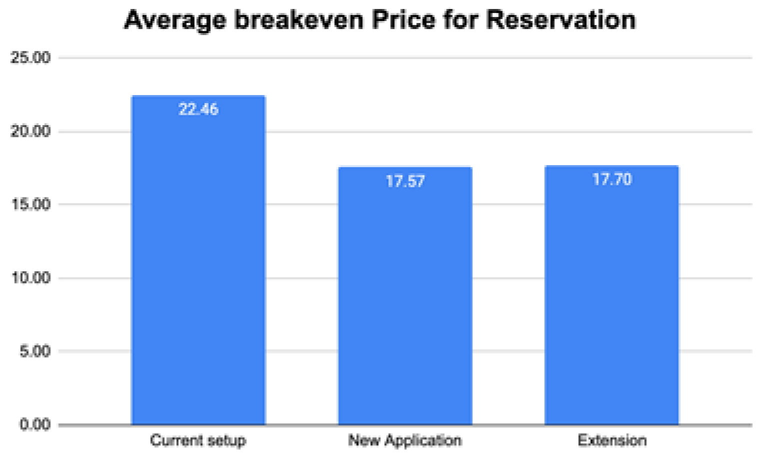
User based Modeling

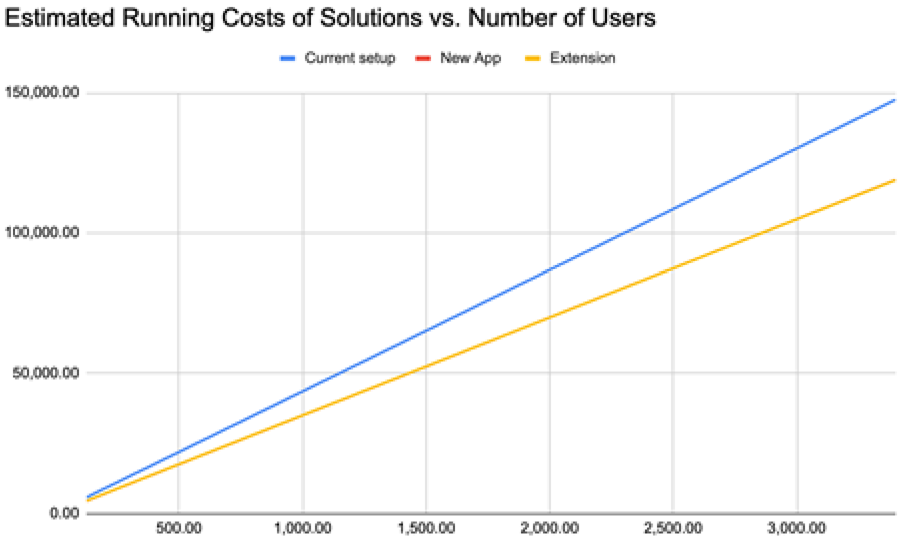
- A new user would cost MioCar ~$42 dollars a month to support
  - compared to ~$36 with an application
- Cost due to labor increases the gap considerably as the business scales
- MioCar can charge ~20% less for reservations to breakeven Breakeven Price for Reservation



Solution Cost per User



Average breakeven Price for Reservation



Estimated Running Costs of Solutions vs. Number of Users

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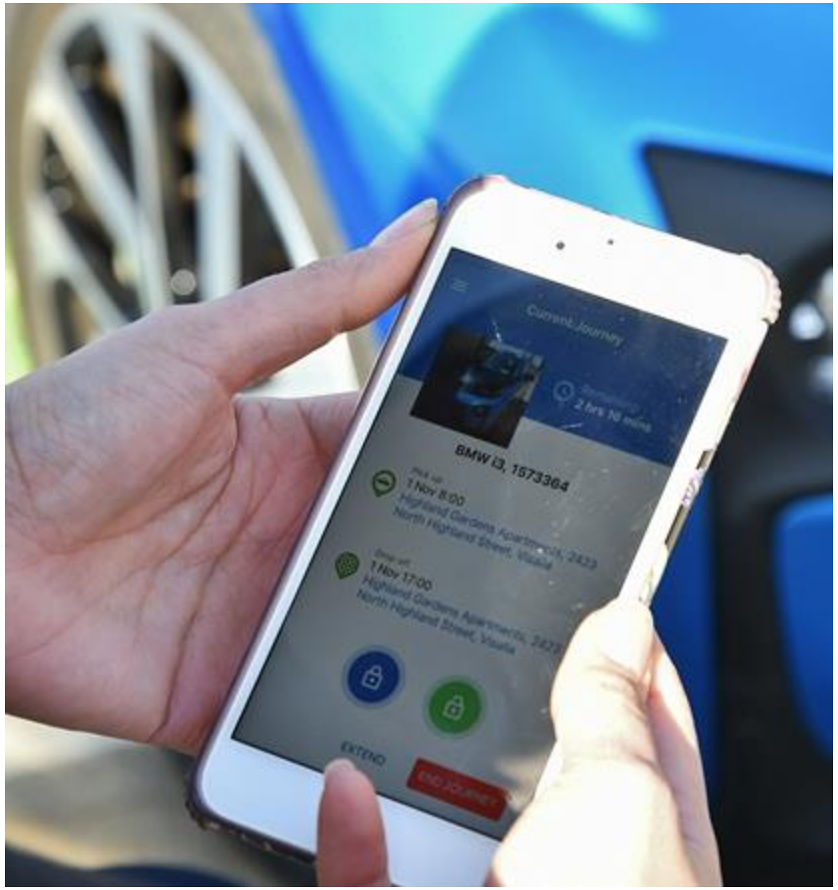
What’s Next?

- Picking a solution to work with
  - Application
    - Designing an API to singularize the point of contact for the frontend and backend application
      - Abstracting complex transactions
      - Simplifying common requests
    - Transition data if needed
  - Extension
    - Master the Tampermonkey framework
    - Implement changes to website overtime

- Directing focus to the frontend improvements



Thank you!

Harjot GIll

Computer Science/ITS

UC Davis

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