Charging map for electric vehicles

We are data chargers

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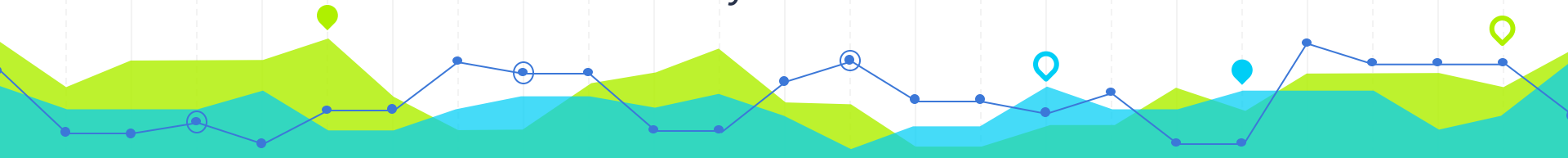


PROBLEM TO SOLVE

Alternative fuel vehicles, including electric vehicles (EV), are becoming increasingly prevalent and are projected to increase significantly. EVs increased by 2 million to 5.1 million in 2018 alone ("Global EV Outlook 2019," May 2019). Charging station infrastructure has not kept up.

Need to provide system for alternative fuel vehicle owners to more easily find fueling stations when driving and planning trips.

TARGET AUDIENCE

- General Public / Drivers of EVs
- Businesses with EV Fleets (e.g., delivery companies, taxi companies, etc.)
- Governments with EV Fleets
- Owners of EV Stations / Networks

FUNCTIONALITIES OF THE SYSTEM

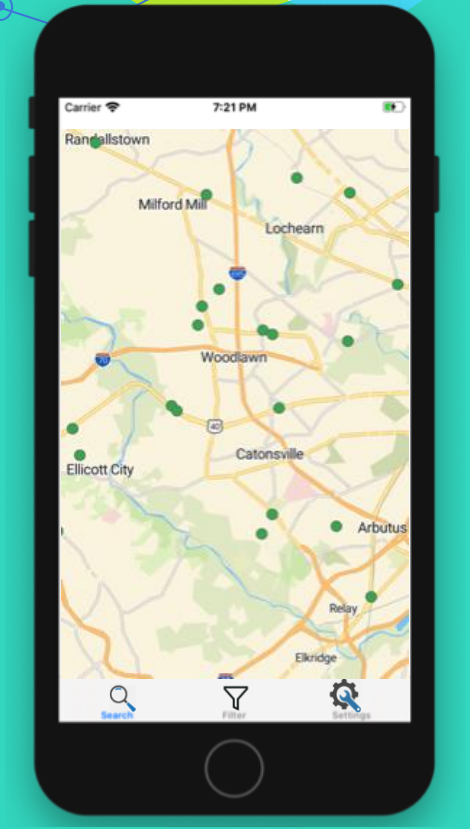
- Directions to user-specified destination
- Long trip planner
- Charging stations suggestions and reviews
- Indicating current discounts or coupons offered by Stations
- Suggestions for nearby activities
- Favorite and recent chargers
- Ability to share the direction with friends and family
- Monitoring and notification of the charging process

DATA REQUIREMENTS

- Electric vehicle (EV) charging station location data will be obtained using the National Renewable Energy Laboratory (NREL) Alternative Fuel Stations API
- In order to determine the appropriate route data from the Google Routes APIs will be used
- User data

FRONTEND IMPLEMENTATION

UI MOCKUPs – Main Screen



- Green Dots represent Charging Stations
- Map centers at your current location
- Standard Map Zoom and Panning using pinch-zoom and swiping

Option Buttons:

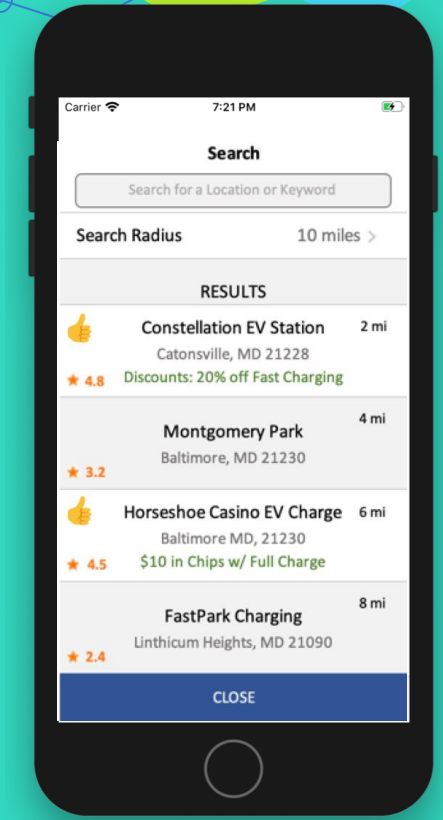
Search: Enter a destination for routing that will detail all the stations along your route or within a specified search radius

Filter: Limit to particular stations based on a variety of criteria (charging level, payment type, network, current discounts)

Settings: Set your EV Model, battery range per charge, etc.

FRONTEND IMPLEMENTATION

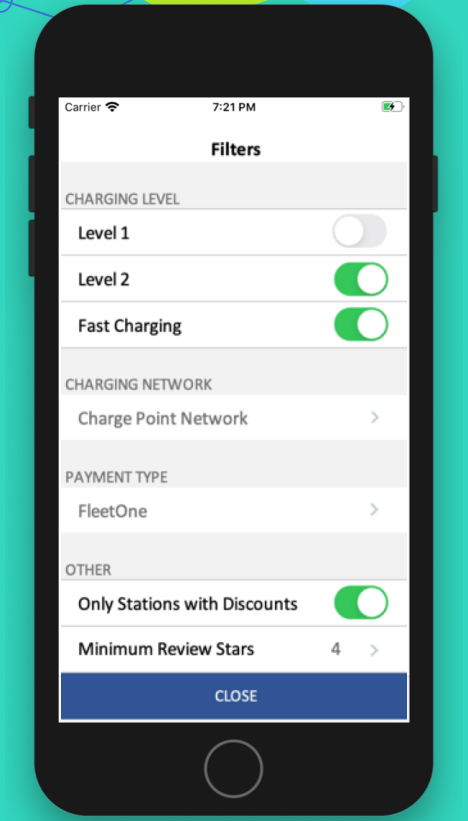
UI MOCKUPs – Search Screen



- Search for a Location or Keyword and set a Search Radius
- Results display Station Details, Review Star Rating, and any active Discounts or Promotions
- Selecting a Station will provide the ability to navigate to the Station, add a Review, set as Favorite, and redeem a Discount
- Search results are automatically limited Stations meeting the active Filters set on the Filters screen

👍 Indicates Stations User marked as Favorites

FRONTEND IMPLEMENTATION
UI MOCKUPs – Filters Screen

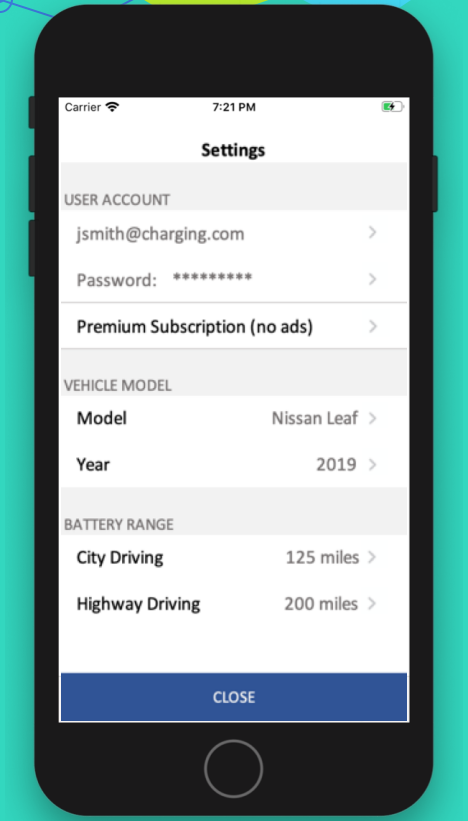


Filter based on numerous criteria:

- Charging Levels available
- EV Charging Networks
- Fleet or Payment Types accepted
- Only Stations with Active Discounts
- Based on Review Ratings (stars)
- Only Favorite Stations (not shown)

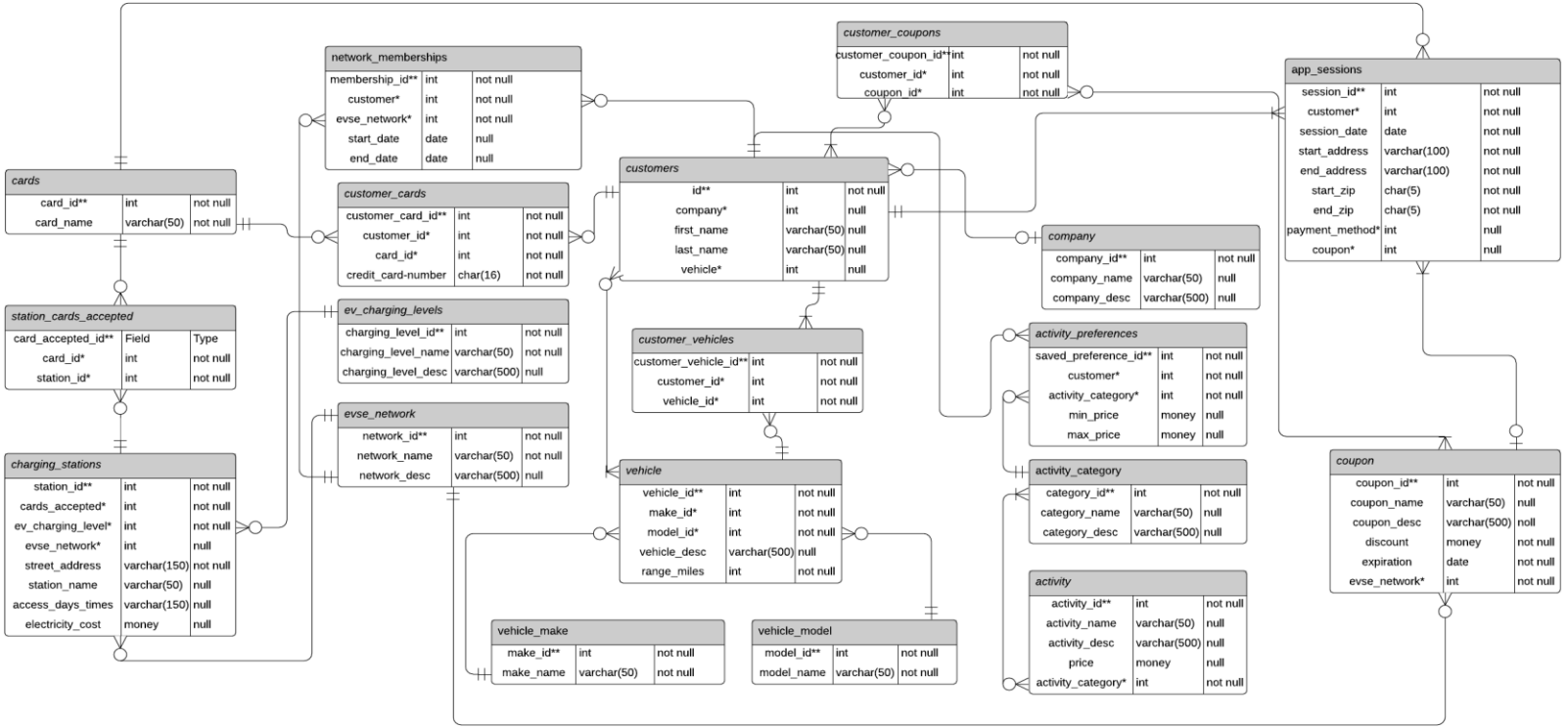
FRONTEND IMPLEMENTATION

UI MOCKUPs – Settings Screen



- Allows user to change their Subscription Level, including Free (with ads), Premium (no ads), and special Fleet subscriptions
- User's Vehicle Model can be set from the pre-populated selection list
- Selecting the Model will automatically populate the Battery Range from our database. Battery Range is used in route planning to ensure distances between Stations are within the range.
- User can modify the Battery Range settings if their vehicle does not achieve manufacturer estimates
- All application settings and preferences are saved on our servers making it easy for the user to transfer to a new phone or device

BACKEND IMPLEMENTATION
ER DIAGRAM



BACKEND IMPLEMENTATION
EXAMPLE DATABASE TABLES

CHARGING STATIONS

SQLQuery1.sql - DE...KF89OI\ebarn (53))*

```
select * from station.charging_stations;
```

100 %

Results | Messages

	station_id	cards_accepted	ev_charging_level	evse_network	street_address	station_name	access_days_times	electricity_co
1	1	1	2	1575836120	620 ncTGbcL	City of Sacramento - Capitol Parking Garage	MO: 07:00am-6:00pm; TU: 08:30am-8:00pm; WE: 12:0...	0.11
2	2	4	1	1576364280	976 eDfrgFYgW	Los Angeles Convention Center	MO: 12:00am-5:00pm; TU: 08:00am-8:00pm; WE: 08:0...	0.11
3	3	3	2	1576286690	405 YOpq	LADWP - John Ferraro Building	MO: 08:30am-11:00pm; TU: 12:00am-6:00pm; WE: 12:...	0.11
4	4	5	2	1576402313	511 OJCaYfBsL	Cherokee & Hollywood Parking Garage	MO: 07:00am-8:00pm; TU: 12:00am-12:00am; WE: 08:...	0.11
5	5	4	2	1576429507	458 kk	CITYOFSANTAROSA	MO: 08:00am-6:30pm; TU: 07:00am-8:00pm; WE: 07:0...	0.11

APP SESSIONS

SQLQuery1.sql - DE...KF89OI\ebarn (53))*

```
select * from app.app_sessions;
```

100 %

Results | Messages

	session_id	customer	session_date	start_address	end_address	start_zip	end_zip	payment_method	coupon
1	1	81	2019-10-10	586 bOTnr	629 Ce	30143	88862	4	4
2	2	92	2019-09-24	763 IUWy	303 aWXXaX	78275	43266	1	9
3	3	43	2019-07-16	744 ZuI	872 KkzZF	72945	76355	5	54
4	4	83	2019-09-13	526 ieslQ	726 mDLCUNxVX	57892	84264	5	61
5	5	82	2019-01-03	708 VjTWG	655 gUDCq	55170	48903	1	48

MARKETING STRATEGY

CUSTOMER	APPROACH
General Public / Drivers of EVs	☐ Content marketing ☐ Paid media advertising ☐ Social media marketing ☐ Search engine optimization ☐ Referral programs for existing customers ☐ ASO (App store optimization)
Businesses with EV Fleets (e.g., delivery companies, taxi companies, etc.)	☐ Participation in networking events and specialized tradeshows ☐ Digital marketing channels (SEO, SMM, PPC, etc.) ☐ Become a federal contractor
Governments with EV Fleets	
Owners of EV Stations / Networks	

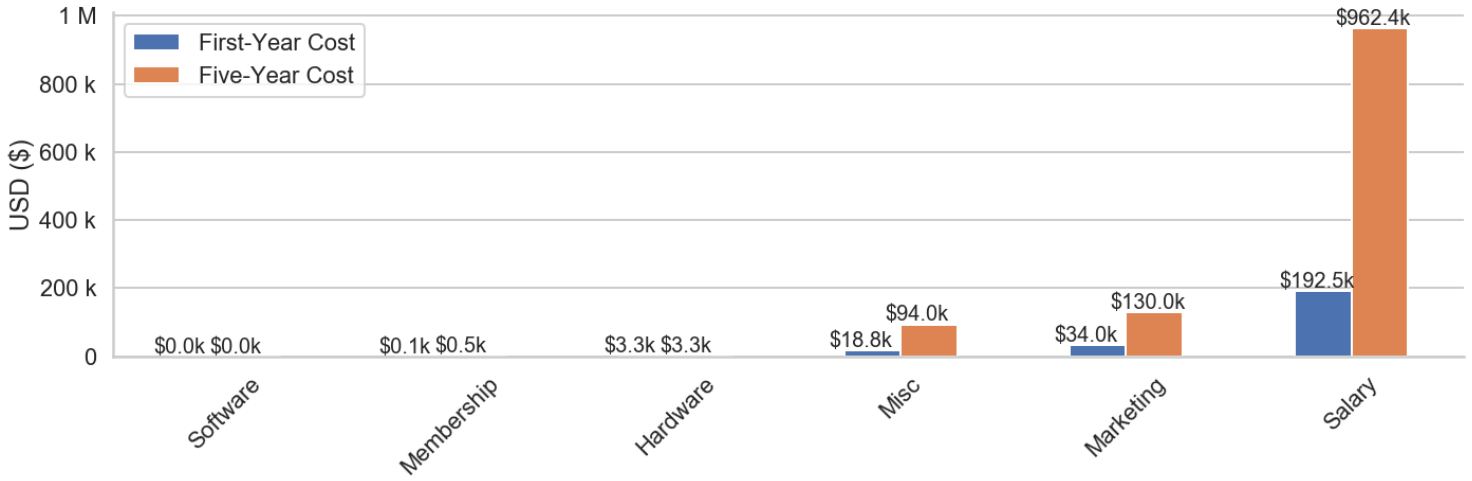
TIMELINE


Everything is ready for development
Mar 31
App is ready
June 01
Start of investment return
Sep 30
Week 1
5
9
13
18
21
25
29
33
37
Jan 15
Research
Servers installation
Building Awareness
App development
Beta testing
Promotion

COSTS

EXPENSE	Flat fee	Annual fee	First year cost	Five year cost
Server	$ 1,344.00	-	$ 1,344.00	$ 1,344.00
Back-up Server	$ 1,344.00	-	$ 1,344.00	$ 1,344.00
Storage for the servers and UPS (Rack)	$ 127.99	-	$ 127.99	$ 127.99
Prevents power supply from being interrupted (UPS)	$ 499.95	-	$ 499.95	$ 499.95
Apple Developer Account	-	$ 99.00	$ 99.00	$ 495.00
Google Developer Account	$ 25.00	-	$ 25.00	$ 25.00
Power to the servers and UPS	-	$ 2,621.00	$ 2,621.06	$ 13,105.31
Hardware Engineer Salary	-	$ 101,553.00	$ 101,553.00	$ 507,765.00
Mobile App Designer Salary	-	$ 90,919.00	$ 90,919.00	$ 454,595.00
Software (Apache, MySQL database, php engine, Ubuntu, Python)	-	-	-	-
Marketing expenses	$ 10,000.00	$ 24,000.00	$ 34,000.00	$ 130,000.00
Office space and internet	-	$ 16,188.00	$ 16,188.00	$ 80,940.00
		TOTAL	**$ 248,721.00**	**$ 1,190,241.25**

COSTS BY CATEGORY



POINT REVENUE
TWO TYPES OF REVENUE

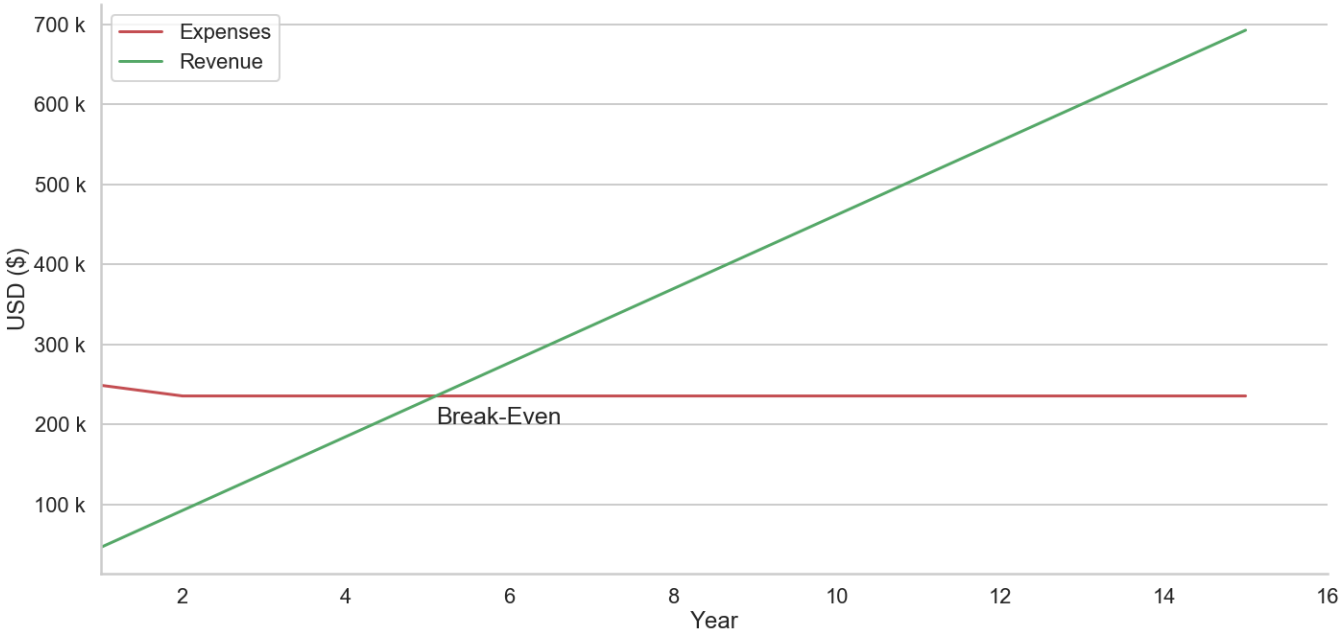
DOWNLOAD REVENUE

- 33% of users pay to remove ads
- $2 per download

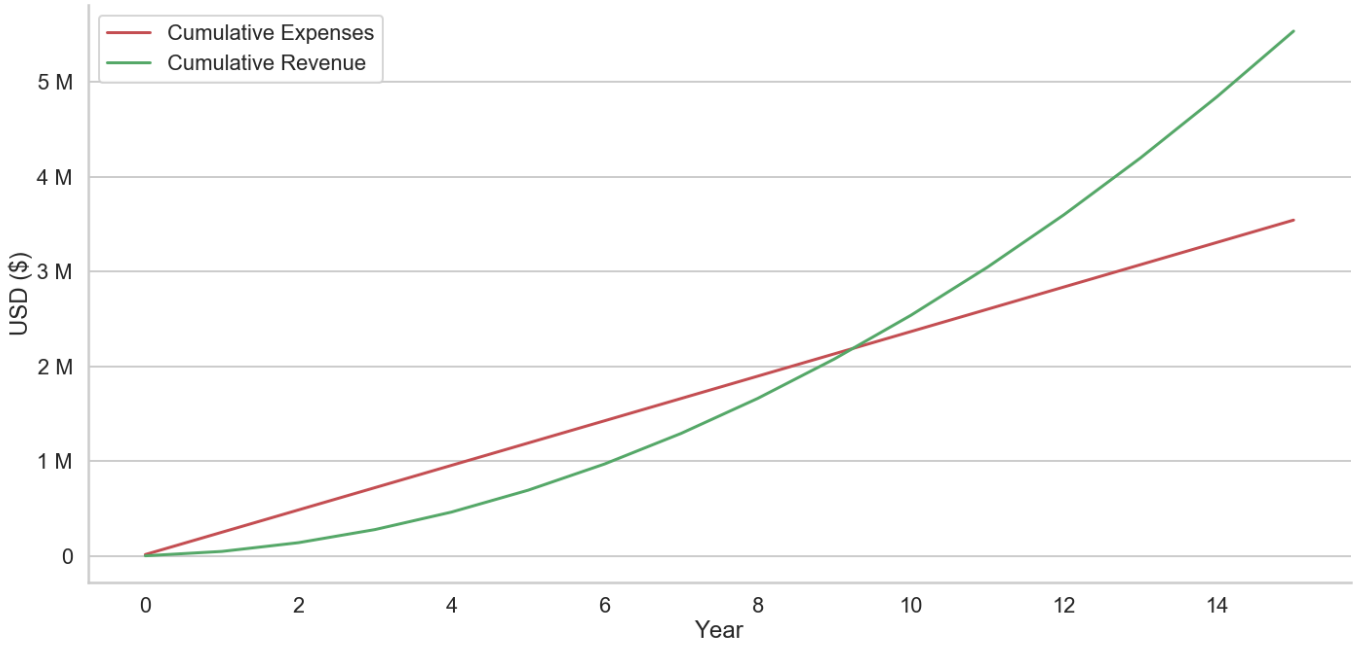
AD REVENUE

- 67% of users do not pay to remove ads
- We earn $1 per every thousand banner ads shown
- 1 banner ad is shown per minute of app use
- Users use app 2x per week for 23 minutes per session

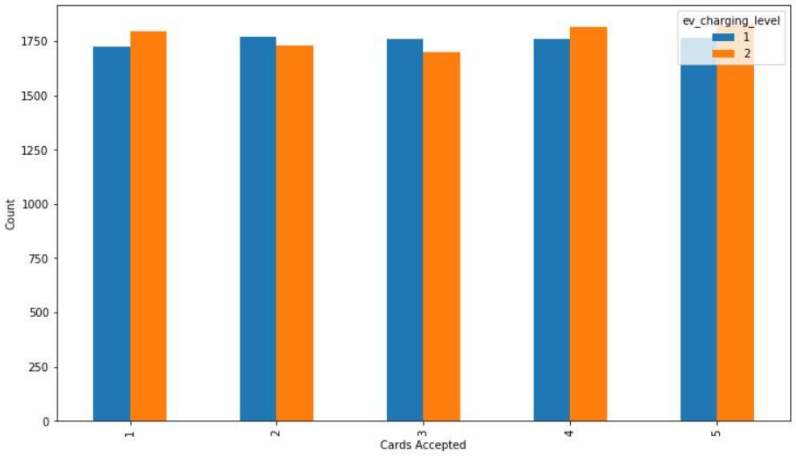
YEARLY EXPENSES VS. REVENUE

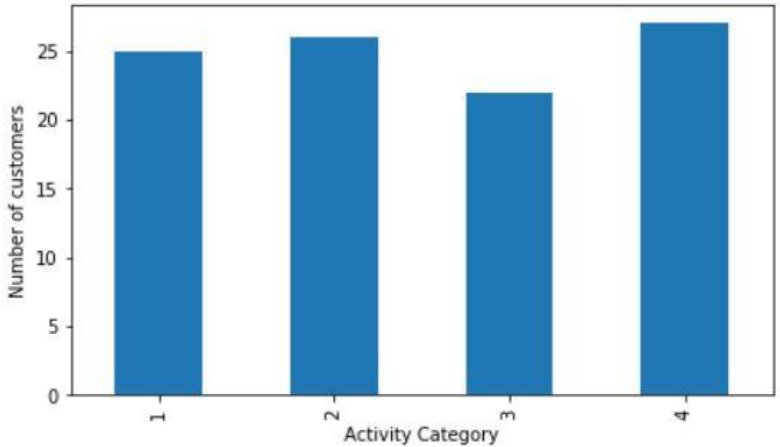


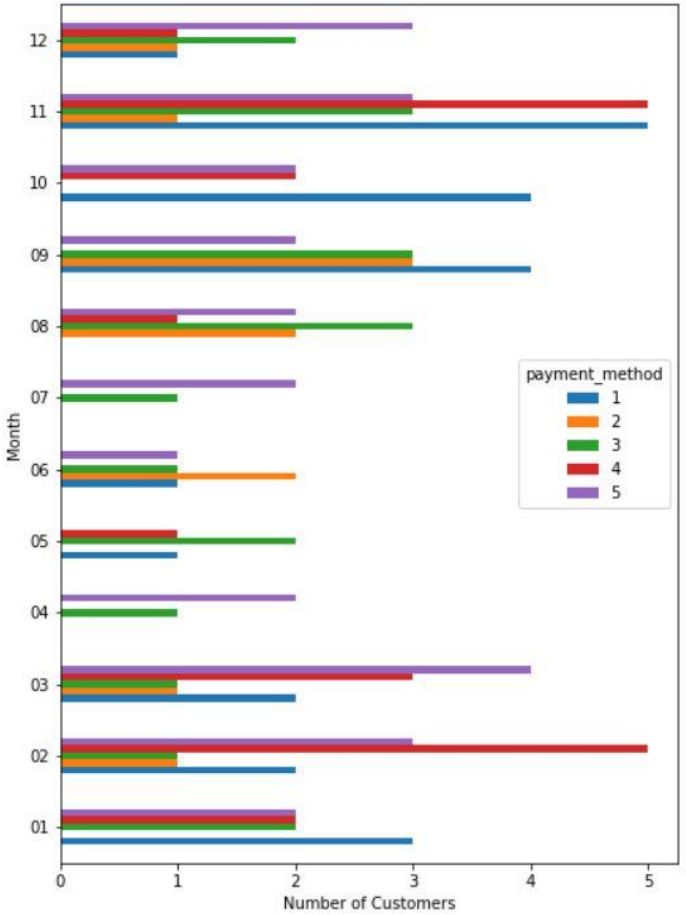
CUMULATIVE EXPENSES VS. REVENUE



ANALYSIS & VISUALIZATIONS ON SAMPLE DATA







RISKS AND SOLUTIONS

- High competition on the market
- Limitation of Data use by owners (Google)
- Data Chargers business and operational issues

THANKS!

Any questions?

REFERENCES

- Electric Vehicle Benefits and Considerations. (n.d.). Retrieved from https://afdc.energy.gov/fuels/electricity_benefits.html
- Global EV Outlook 2019. (2019, May 27). Retrieved from https://www.iea.org/publications/reports/globalevoutlook2019/
- Presentation template by SlidesCarnival

TEAM CONTRIBUTION

- **Emily Barnard** – Expense and revenue calculations, database creation and population
- **Rachel Sandlain** – ERD, developing code to generating fake data
- **David Fahnestock** – Customers/Use Cases, app mockups
- **Harsha Daparti –** Analytics (connection between DB and Python, visualizations)
- **Dmitry Pankratov** - Developing marketing strategy, timeline, risks and solutions, presentation mockups and assembly
- **Group Effort:** business functionalities, app features, target audience, problem statement, what data we need