Vehicle to Grid Energy Buy Back Final Project Report

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Objective:

Address unprecedented strain on the global power grid

Tap into unused energy stored in the batteries of electric vehicles

Solution:

Vehicle to Grid (V2G) Technology

Our application will serve as an interface between user and grid

Unused energy can be transferred back to the grid for compensation

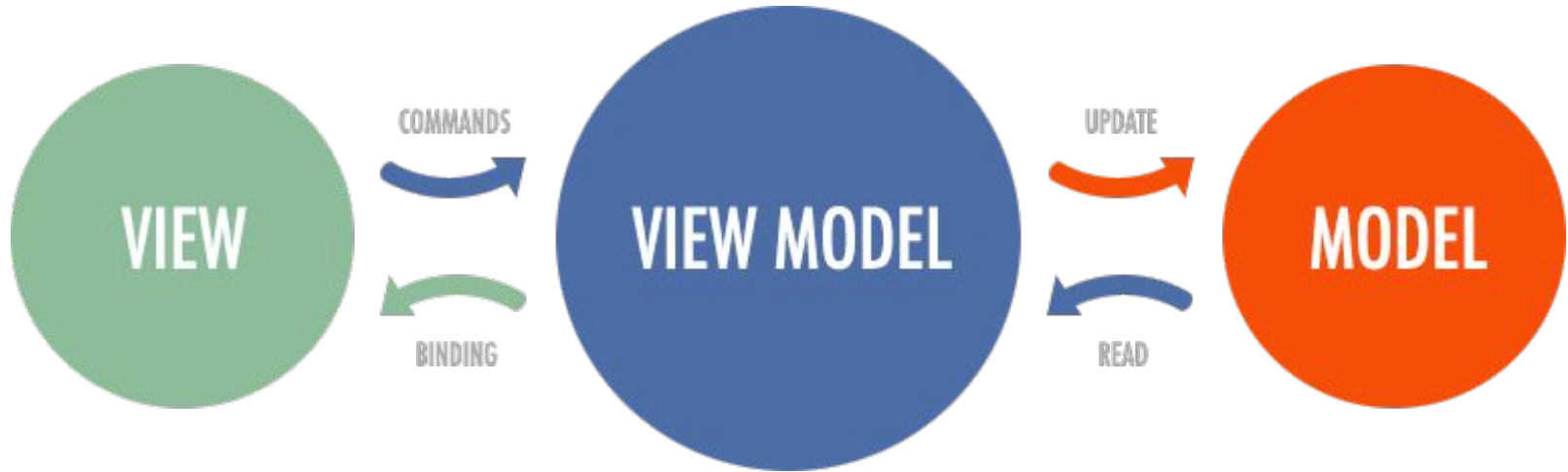# Application Design:

iOS mobile application
(Xcode)

Swift

Firebase

Application Design Cont.

Application Architecture

Use Cases:

- Register/Update Profile
- Locate Charging Stations
- Identify Grid Need
- Track Vehicle Charge Levels
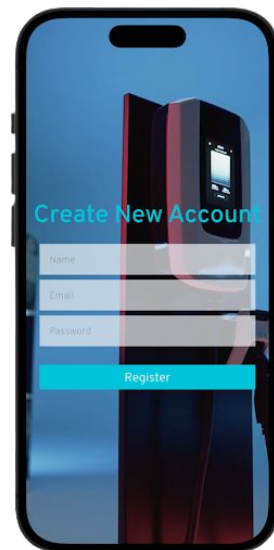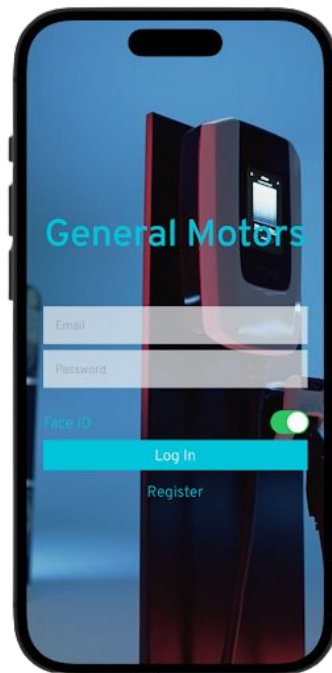- Payment

Support Actors:

Application Functionality:

LoginView:

- Input user information is verified, then the user is allowed to log in
    - Firebase Authentication

RegisterView:

- Checks to see if user with the same email is already in the system, and adds the user to the system if not
    - Firebase Authentication
- Non-sensitive user information is stored
    - Firestore Database

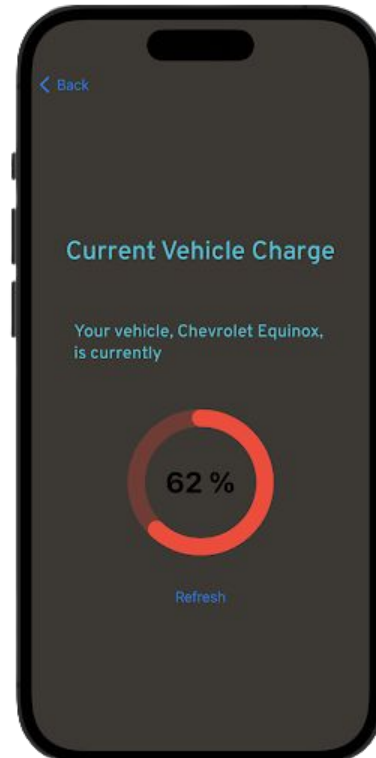# Application Functionality

MainView:

- Hosts buttons to allow user to navigate to other screens
- Displays current grid need status
    - National Renewable Energy Laboratory (NREL)
- Allows user to log out

Application Functionality
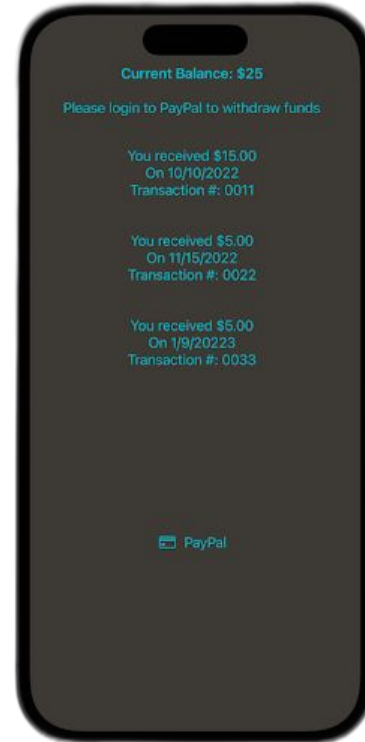
VehicleChargeView:

- Shows the user the level of charge of their vehicle
    - Mocked Apache Kafka Connection

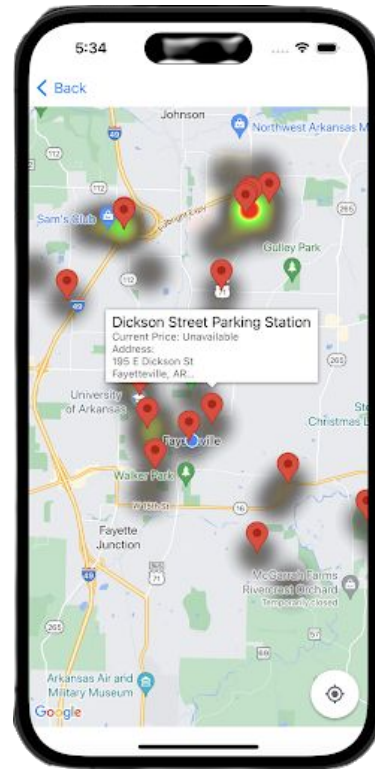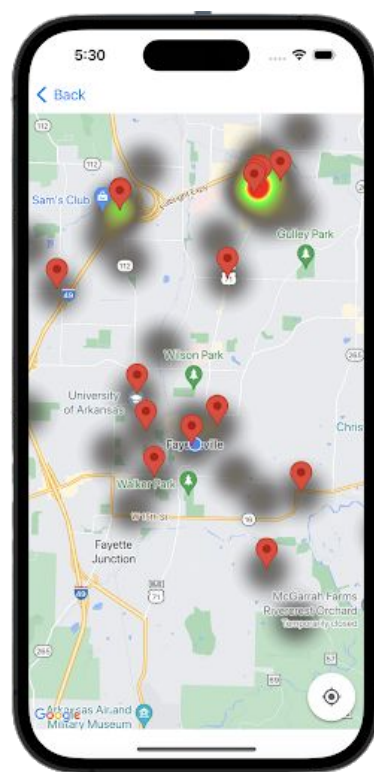# Application Functionality

PaymentView:

- Shows a log of all transactions facilitated for the logged in user by our application
  - PayPal API

Application Functionality

MapView

- Displays map showing user's location
    - Google Maps API
- Locations of charging stations nearby
    - National Renewable Energy Laboratories API (NREL)
- Areas of high grid need using mocked real-time data and actual historical data
    - NREL (for historical data)
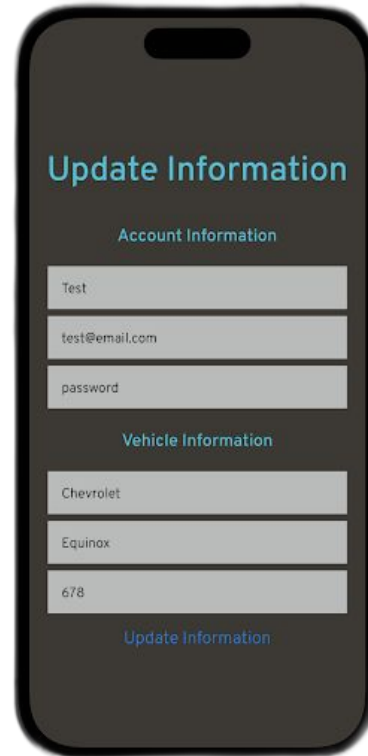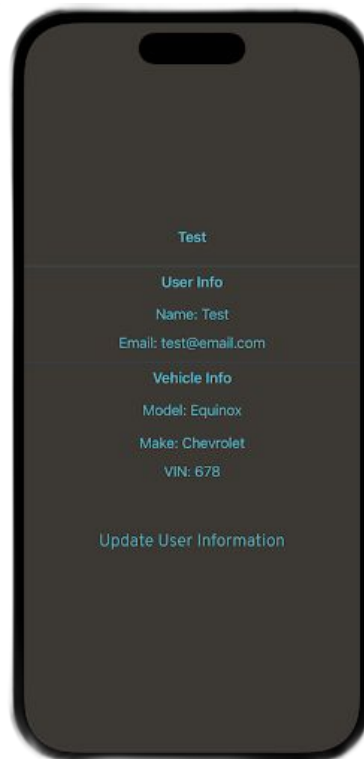- Detailed station information
    - OpenChargeMap

Application Functionality

UserAccountView:

- Shows all information relating to the logged in user stored in our database
  - Firestore Database

UpdateView:

- Allows the user with the opportunity to update their account information
  - Firestore Database

Example Use Case:

UI Screens Flow:
- LoginView
- MainView
- VehicleChargeView
- MapView
- PaymentView

Demo

Thank you :)