Vehicle Sharing Platform like Drivezy

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Abstract - *Car Sharing is normally known as carpooling, ride sharing or lift sharing. With the tremendous rise in vehicles at public places, it led to an elevation in traffic and travelling hours. Using privately owned vehicles, has led to an increase in daily expenses and also harming the environment in various ways. In regard to this, the industries are looking for a feasible solution which will satisfy all the constraints. With this motive, we are aiming to build a user friendly and efficient application to provide the needful services.*

Key Words: **Car Sharing, Flutter, Google Map, Google Places, Widgets, Geofire, Geolocation, Scaffold**

1. INTRODUCTION

Population growth increasing population density, particularly in metropolitan areas, has brought about a growth in the number of vehicles on the roads, by a few percentage points per year. Car Sharing offers a sustainable and effective solution to all these problems [8]. Car sharing provides a benefit in terms of reduced vehicle ownership and improved mobility which in turn reduces traffic congestion, wear and tear of roads [7][21]. Additionally, it also decreases air pollution and consumption of non-renewable resources which are declining at rapid pace, so as to preserve them for future generation. Every hierarchy of people can afford it. It also reduces the travelling cost and commutation period which can support every pocket hierarchy. Carpooling is preferably chosen for long journeys over short ones with the formality and regularity of arrangements with dynamic schemes [6][9].

Amongst all the frameworks, we opted Flutter to develop this application as it supports both the major platforms, Android and iOS with a single code base thereby allowing startups to save a high cost on development services. Flutter has an efficient yet portable GPU rendering UI that allows it to work on multiple interfaces. It is an open-source SDK (Software Development Kit) launched by Google to develop vigorous, accessible and high-performing mobile applications. It is based on Dart which is Google's in-house language[4].

Benefits of building application using Flutter framework are as follows :

- Low-cost Application Development
- Open Source
- Outstanding catalog of flutter's widgets
- Single code base for multiple operating systems
- Backed by advanced API that enables faster, cleaner and smoother app animations
- Plugins are easy to avail
- Fast App Development with Hot Reload
- Reusability of code
- Well- equipped with Native Advanced RISC Machines (ARM) [10]

2. LITERATURE SURVEY

A. Existing System

Shared mobility is a term used for indicating demand-driven vehicle-sharing arrangement where travelers portion a vehicle either simultaneously or over a period of time. The passengers usually make a contribution towards ride and fuel cost. It may be formal, using an organised car share scheme, or

informal - friends or colleagues working together. The user needs to get registered in the application. Once the user registers, he/she can enter location and ride details to rent a car out of the available list of cars. Later, once the user is done with the ride, the payment can be done either with cash or cashless. The user can rate the ride service by giving feedback on the application [1][3][4][5][12].

B. Major issues in the existing system

- Few drivers are not licensed
- Security of customer and driver information
- Lack of inadequate insurance coverage
- Multiple Affiliated drivers
- Unethical extra charges at odd hours (demanded exclusively by drivers)

HOW FLUTTER WORKS ?

Flutter uses Dart language to build applications. The feature of reusability of code is achieved here as few base codes are readily available. The frontend and backend development of Flutter based applications can be done simultaneously.

The prime feature of Flutter is "Hot Reload". Hot Reload leads to faster execution of applications when it is reloaded after changes. This feature isn't enabled in other frameworks which delays the project development.
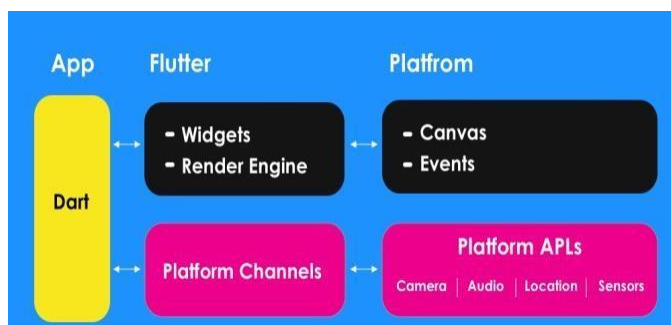
Flutter application is composed of widgets which are rendered into the Canvas and directed to the Platform. This Platform shows the events and sends it back to the application. The Widgets, Render Engine are capsuled together and similarly, Canvas and Events are capsuled together as Platform. The APIs communicate with each other to transfer data through PlatformChannels which further gets displayed on the application [11]. Flutter widgets are built using a modern framework. Widgets describe the skeleton or look of the application about what it should look like during current configuration and state. When a state of widget changes, it rebuilds its description, which in order to determine the minimum changes required to change from one state to the next, the framework differs against the preceding description. This application includes both Stateful and Stateless widgets as there is call flow and data flow of information amongst various widgets [14][15]. The most frequently used widgets in the application are mentioned below:

- Scaffold : Implements basic material design visual layout structure
- AppBar : To create a bar on the top of the screen
- Text : To display bunch of characters on screen
- Image : To display pixel images on screen
- Container : Capsules various widgets Floating
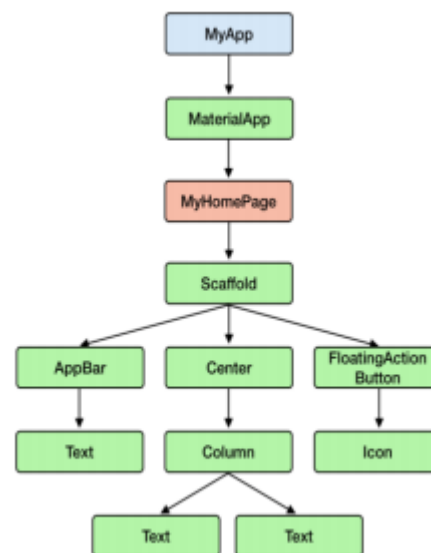- Action Button : Button to promote primary action in the application

Chart -1: Name of the chart

3. PROPOSED METHODOLOGY

This project aims to build an application using the Flutter framework as it supports cross platform development, where the users can book a vehicle according to his/her parameters. The list of available vehicles will be available on the user's screen using Nearby Google API. Later, the user can choose pick-up & drop-off details and book the vehicle. The payment gateway - Razorpay will be implemented as it supports multiple payment options. A certain set of guidelines needs to be accepted by the driver as well as the user's end. The user who is registering his vehicle for rental purposes needs to submit all the legit documents which will be accepted only after manual verification. We will be using the Firebase Realtime Database to store and retrieve the necessary data in realtime. As data is persisted

locally and even when offline, real time events continue to fire to give users a responsive experience[15][16].

Features of our proposed system :
- User friendly sign-up/registration portal
- Real time tracking of vehicle
- Display ETA (Estimated Time of Travel)
- Cancel the ride w/o any hassle
- Timely notifications are sent to booked users
- Customer Service Helpline Facility
- SOS Button for emergency
- Add frequently visited location to favourites
- Add a custom tip for driver based on services provided
- Extra charges applied in case of any vehicle damage

A. ARCHITECTURE

Architecture is a set of rules and methods that describe the functionality, organization and implementation of the system. The Dart ecosystem uses packages to manage shared software such as libraries and tools. Dart package is a directory containing a pubspec file. The pubspec contains some metadata about the package. Additionally, a package can contain dependencies, apps, resources, Dart libraries, tests, images, and examples[11][12].
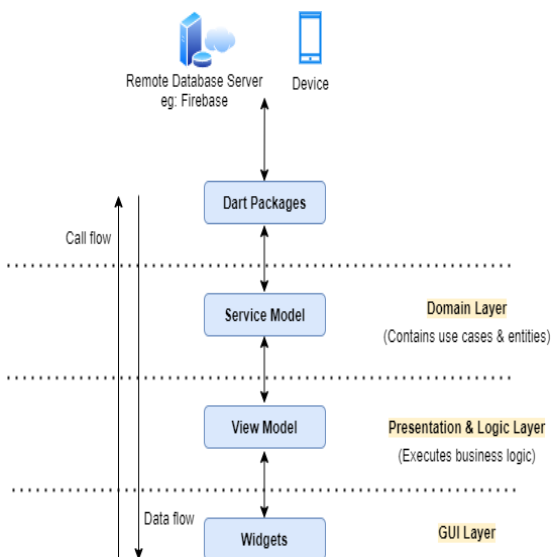

A. WORKING OF OUR APPLICATION :

1. User arrives on landing page
2. New users can register and registered users can sign-in
3. User can also edit profile (if needed)
4. If a user wants to register an owned vehicle, the owner can enter vehicle details which will be verified after a certain period.
5. If a user wants to rent a vehicle, then once the required ride details are entered, a list of all available vehicles will be displayed.
6. Once the user selects a vehicle, a confirmation page with all the ride & vehicle details will be displayed.
7. Upon confirmation, the payment can be done through the inbuilt Razorpay payment gateway.
8. Once the entire booking process is completed, the user can check the status of ride details in his profile section.
9. Once the entire booking process is completed, the user can check the status of ride details in his profile section.

PLUGINS AND APIs IMPLEMENTED :

• FLUTTER GOOGLE MAP: The plugin handles access to the Google Maps servers, map display, and response to user gestures such as clicks and drags. Markers on map can also be added. They provide additional information for map locations, and the user can easily interact with the map[13].
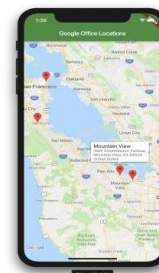
• GOOGLE PLACES API :

The Places API is a service that returns information about places using HTTP requests. Places are bounded within these API geographic locations, or well-known points of interest. This service can be used in several ways to get information about places[13].
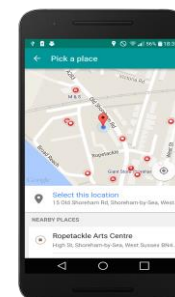

• GEOCODING API :

The Geocoding API provides geocoding and reverse geocoding of addresses. Geocoding is the process of changing addresses into geographic coordinates.

One can use this to position the map or place markers on a map. Reverse geocoding converts geographic coordinates into a human readable address.

• **GOOGLE DIRECTION API :**
The Directions API is a service that computes paths between locations. You can search for directions for several modes of transportation, including transit, driving, walking, orcycling. It calculates the direction using HTTP request which leads to returning the most efficient route possible. While deciding the efficient route, API considers distance, number of turns and many more as the affecting factors.
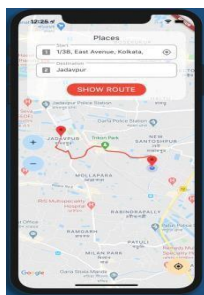
• **GEOFIRE :**
GeoFire is an open-source library that allows users to save and process/manipulate a set of keys depending on their geographic location. GeoFire uses the Firebase database for data storage. It updates queries in real time. GeoFire selectively loads the data which are near certain locations only, keeping your applications light and responsive, even with extremely large datasets.

C. WIREFRAME DIAGRAM :
A wireframe diagram is a pictorial representation of the functionality of the application.
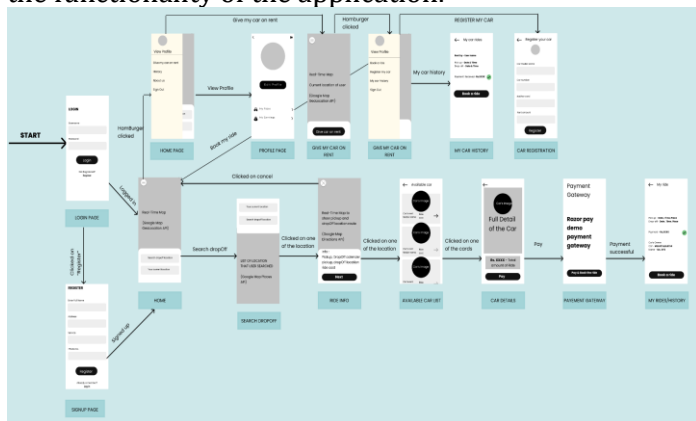
D. SCREENS :
Following are the screens of our hopOn (VehicleSharing Platform) application :

Fig 1 : Landing Page
(Click on GO button)

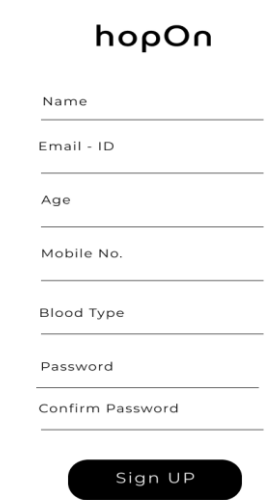Fig 2 : Login Page
(Enter credentials to log in)

Fig 3 : Registration Page
(For new user, this page be displayed)

Fig 4 : User choice page
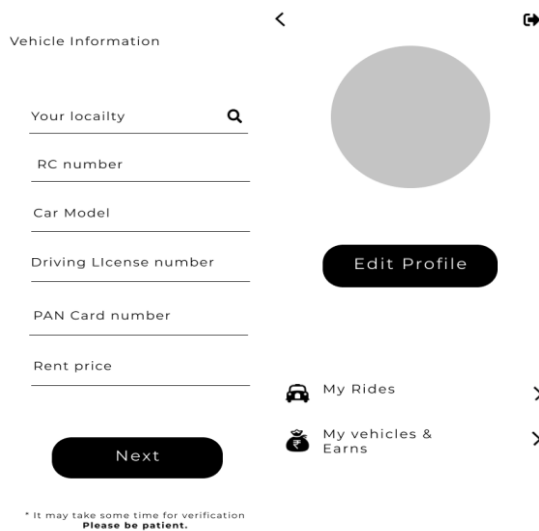(This page is displayed will after user logs in)

Fig 5 : Vehicle details

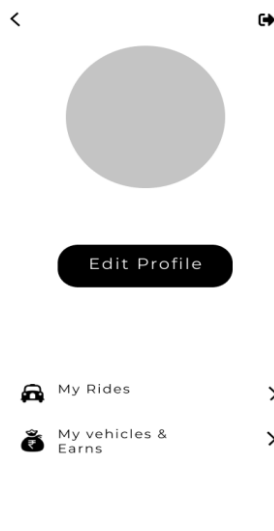(This page will be displayed after the user clicks "Give Vehicle On Rent")

Fig 6 : Vehicle details

(This page will be displayed after user enters vehicle details)

Fig 9 : Ride Details Page
(After user selects a particular vehicle for ride, all details will be displayed)
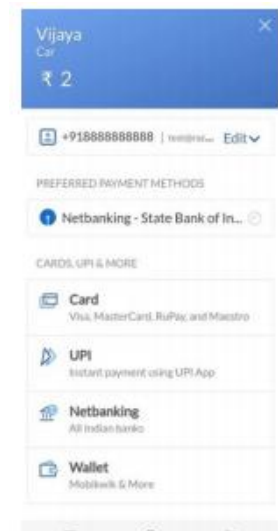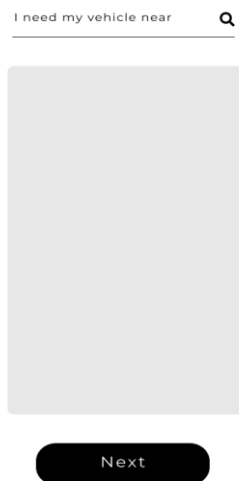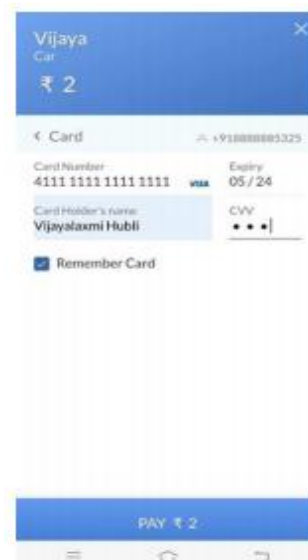
Fig 10 : Razorpay Payment Gateway

Fig 11 : Razorpay Payment Gateway
(User card details page)

Fig 12 : Payment status Page
(Successful payment)

Fig 7 : Book a vehicle list Page
(This page will be displayed after user clicks on "Rent a Vehicle")

Fig 8 : Available vehicles

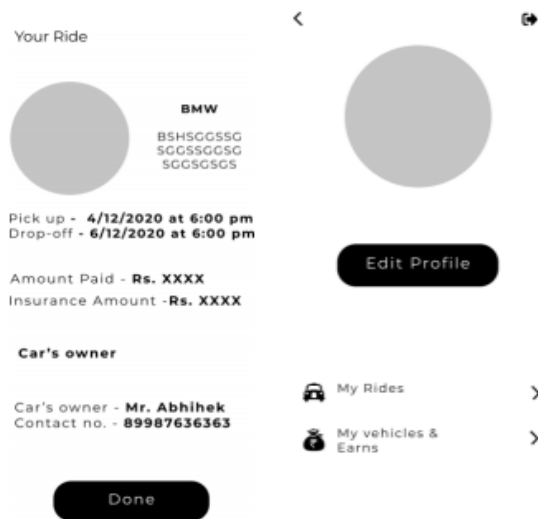(List of all available vehicles in the user's circumference)
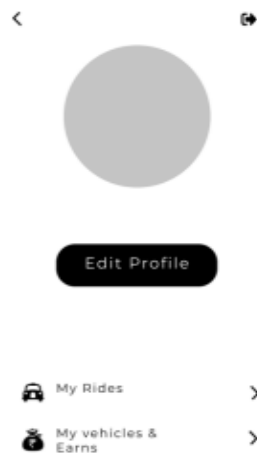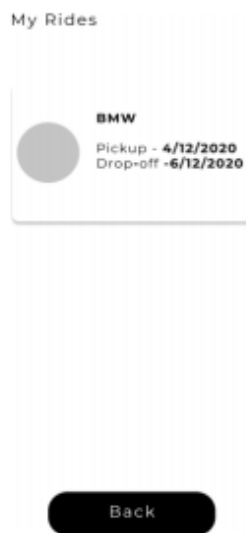
Fig 13 : Ride Details Page   Fig 14 : Profile

Fig 15 : PROFILE → MY RIDES

4. CONCLUSION :

Vehicle Sharing Application sums up as the best solution for the given problem statement. It includes every necessary feature for a user to book a ride without any trouble. Similar valid features are allotted to the driver also for convenient & efficient functioning.

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