Flutter Mobile Application for Car Parking

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Abstract: *Car parking has become a serious issue in today's congested areas due to a lack of parking facilities. In most metropolitan places, finding a parking spot is extremely tough and irritating, especially during rush hour. In order to resolve these issues the proposed application makes it simple to reserve a parking space. This programme allows users to view various parking spots as well as determine whether or not there is available space. If the booking space is available, he can reserve it for a certain time frame. Additionally, this system provides users with additional functions. The effective management of available parking spaces is demonstrated, and the system might be expanded to conceal additional regions and venues.*

Keywords: Android Application, online reservation, parking management slot allocation, smart parking.

1. INTRODUCTION

In the 12 months of 2012, 159 million new car registrations were announced, but in the 12 months of 2002, there were at least 58 million new car registrations, predicting a 100% boom in 10 years. Cannot be (Statistical Yearbook India, 2016). Based on the above information provided by the Ministry of Road Transport and Highways in India, today's transportation infrastructure and vehicle parking are considered insufficient to maintain the flow of vehicles on the road. Therefore, problems such as congestion of visitors and lack of parking space are inevitable. The biggest problem highlighted is the difficulty of parking, as the unnamed boom of visitors to India brought pollutants and terrible roads. There are types of parking lots, including off-road parking lots and on-road parking lots. One of the most popular lifestyles is called off-road parking found in large malls, theatres, and large offices. Off-road parking parks the car more systematically to get the most out of the parking lot, while on-road parking parks the car on the street in a disorganized or chaotic way. The misuse of the land will be severe. Satisfactory urban navigation and increasing social and environmental costs. This paper focuses on the problems customers face when trying to find an area at the same time as a parked car and shows the difference in the GUI.

Nowadays parking problem is faced thanks to parking lot falling in need of the present requirements within the country because the total number of vehicles exceeds the entire number of heads per family. In Indian cities, the parked cars claim tons of space which results in congestion and traffic problems. Thus, fundamentally parking may be a problem of space. With the population over our country there increases the transportation in cities, the demand for parking spaces is additionally increased. this is often especially because the infrastructural growth of our cities is unable to stay up with the development and non-availability for spaces to park the opposite aspects of urban life have begun to spill over in sort of congestion, fuel loss, dispersed land use and low air quality thanks to the scarcity in parking spaces. It is, therefore, strongly desired to supply an efficient strategy to deal with these concerns there are several ways of managing the parking problem. One approach is by increasing the parking lot but this may cause huge investment.

However, the good managing will be a wise method for the existing parking spaces. The Internet is widely used over the globe.by making use of the internet, the people can manage the parking system. In this proposed system we can access and book the parking slot where ever it is available in the mobile phone and it is user-friendly, the overall system design consists of the following modules which provide a complete solution for the problems faced due to parking and searching for the availability faced by the users.

2. LITERATURE REVIEW

According to the results of a survey conducted in March 2017, KAU students 337, 84% participants have a hard time finding a parking space chew. Based on the findings, the Mobile Booking Application for students to book stacked parking slots before entering classes. Advanced Sensor Technology and Mobile Communication Technology. This paper is a mobile application that can support the KAU community. Easy to find and book parking. This saves time before entering class. In this document, a mobile client app running on a prototype system smartphone consisting of a backend system. The application also interacts with the area network Sensors connected to the Arduino platform. This allows the user to make a reservation on and submit and cancel the reservation on.

An Android Application for Parking Management and Dissemination System", IJARCET, Volume 4 Issue 3, March 2019. The Mobile Device Management (MDM) protocol provides a method for transferring devices to the system administrator Control commands for managed iOS devices

running iOS 4 or later, macOS devices running macOS 10.7 or later, and Apple TV devices running iOS 7 (Apple TV software 6.0) or later. The MDM service allows IT administrators to view, install, and remove profiles. Remove passwords and perform a secure wipe on managed devices. The MDM protocol is based on HTTP, Transport Layer Security (TLS), and push notifications. The associated MDM registration protocol allows the initial registration process to be delegated to another server.

According to an article (2018), Online Parking Reservation System OVPRS; Is a web-based parking reservation system and data `processing system. The driver is no longer in the way Park the vehicle when the system generates a parking space number on the OVPRS platform. System, the prerequisite for OVPRS is the currently supported version of Microsoft Internet Explorer or Firefox. Access to sensitive data in OVPRS is protected by a 12-bit secure socket layer (SSL). ORS also requires that cookies and Java applet scripts be enabled

Automated Vehicle Parking Slot Detection System Using Deep Learning, ICCMC 2020. The Drivers especially folks that can also additionally want to get the parking areas can also additionally locate it not possible to access it on the grounds that there can be different automobiles blockading the manner and but they need to hurry to e-book for parking areas. This is due to the use of paper-primarily based totally that is unsecure and desires self-touch to reserve for parking and it`s additional time consuming, to layout online automobile parking reservation the gadget will offer higher performance in finding parking area and purchasing it.

Design and Fabrication of an Automated Multilevel Car Parking System. Manufacturing Engineering, Automatic Control, and Robotics(2019). Traffic congestion is one of Kampara's biggest challenges due to limited parking. This includes an increase in the world population and the accompanying increase in the number of vehicles on the road. The main cause of traffic congestion. A parking reservation system has been introduced to reduce the need for tidy parking spaces and congestion. This system allows the driver to park availability information.

Cloud Based Smart Parking System", 2nd International Conference on Inventive Communication and Computational Technologies (ICICCT), 2018.Parker is a mobile parking app that solves the challenge of finding a parking spot. This smartphone application includes features such as easy access price, time limits, operating hours, and parking regulations, allowing users to park their cars safely and without anxiety. Parker makes use of mobile payment solutions such as Park Mobile, Passport, and Pay-by-Phone, all of which allow for a secure transaction. This mobile parking app also gives users real-time directions. It will direct the user to a parking space

that is available. When a parking space becomes available, the programme will notify the user and display it on the screen.

Smart parking systems: comprehensive review based on various aspects, 2021. In today's technology, image processing systems are widely used in a variety of fields. According to the article Intelligent Parking Management System Based on Image Processing, a car park system that used image processing was able to provide more efficient and effective parking enforcement as well as improved public service. The major goal of this essay was to use image processing technology in parking systems to eliminate traffic congestion, waste of time, and reduce car emissions and pollution. It detects the availability of parking spaces by detecting the green circular image drawn on each parking place using a camera and image processing. The green dots on the parking space will appear more clearly and vividly if the RGB value of the image is changed.

3. IMPLEMENTATION

Unlike a traditional SQL database, which stores data in columns and rows in a table using SQL. Each data that is stored in documents and collections format is stored in Cloud Fire store, which is NoSQL. Every document has a collection of key-value pairs that can be used to retrieve information. Cloud Fire store is designed to hold big groups of tiny documents. The data in the documents is comparable to JSON, however it is limited to 1MB in size. To install flutter plugin to the android studio.

At the bottom setting, click configure then choose plugins. At the top search bar, search for flutter and choose install. First, fill in all of the necessary parameters, such as the device's permissions, the recommended installation directory, a suitable theme name, screen resolution, and screen orientation. Second, double-check the flutter dart file in the side window. To look for errors, enable debugging mode if necessary. To start the debugging process, press the play button.

Third, ensure that the debugging mode on the user's device is turned on; otherwise, the developer will be unable to access the device. Use the appropriate cable to connect the gadget to the computer. Here we had built an mobile application for car parking using
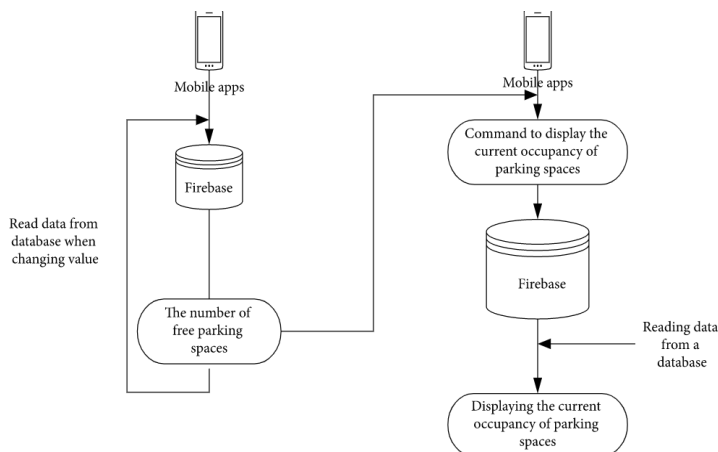
Figure1.1:System Architecture

flutter , flutter is a base to design an application were the Functions of the modules are written using flutter based Dart language, Backend-as-a-Service (BaaS) app development platform Firebase offers hosted backend features such a real-time database, cloud storage, authentication, crash reporting, machine learning, remote setup, and static file hosting.

Flutter Architecture :

A. Flutter Engine:

It's a portable runtime for high-quality mobile applications. It's built using the C++ programming language. The flutter core libraries, which contain graphics and animation, network input output and file, plugin architecture, accessibility support, and a dart runtime, are used to create flutter applications. Skia, an open source Google graphics library, can be used to render low-level images.

B. Foundation Library

Packages are the building blocks for developing a flutter application, and they are located in the foundation library. Dart is the programming language that these libraries are written in.

C. Widgets

The widgets are the foundation of the Flutter framework. Everything is a widget, I flutter. Widgets are essentially user interface components that are utilised to form the application's user interface. In flutter, the application is a widget. The programme is the top-level widget, and its user interface is created by one or more children (widgets), which are then created by their offspring widgets. This virtue of composability aids us in creating user interfaces of any complexity. The widget hierarchy of the hello world application

(built in the previous chapter) is shown in the diagram below.

Flutter Package

A package is a namespace that contains a collection of identical classes, interfaces, and sub-packages. Packages are similar to the various folders on our computers, where we might have movies in one, photos in another, software in still another, and so on. Dart uses Flutter packages to organise and distribute a bundle of functionality. Shared packages, which are offered to the Flutter and Dart ecosystem by other developers, are always supported by Flutter. We can construct the app without having to start from scratch thanks to the packages.

1) pubspec.yaml: This is the project's configuration file, which you'll use a lot in Flutter.

   a) Project general settings such as name, description, and version of the project.
   b) Project dependencies.
   c) Project assets (e.g., images).

A. Different Types of Packages We can divide the package into two types based on its functionality:

1) Dart Package: A dart package, such as a path package, is a general package built in the dart programming language. This package works in any setting, whether it's a web or mobile platform. It also has a dependent on the Flutter framework, such as the fluro package, because it provides some Flutter-specific features.

2) Plugin Package: This is a specific Dart package that includes a Dart-based API and is built on the Flutter framework. It can be used in conjunction with a platform-specific implementation for underlying platforms like Android (using Java or Kotlin) and iOS (using Objective C or Swift).

Dart:

Type inference is a feature of Dart. A variable's data type does not need to be defined explicitly because Dart will "infer" what it is. In Java, a variable's type must be specified explicitly at declaration. String anything, for example. In Dart, however, the keyword is used instead, as in var something. The code treats the variable as a number, string, bool, or object, depending on what it contains. All data types, including numbers, are objects. As a result, if left uninitialized, their default value is null rather than 0.

The return type of a method isn't required in the method signature. The type num declares any numeric element, including real and integer. The super() method is only called at the end of a subclass's Object() function [native

code]. It is optional to use the term new before the function Object() [native code] to create an object. In the method signature, a default value for the provided parameters might be specified. As a result, default values are utilised if one is not supplied in the method call. Runes is a new built-in data type for UTF-32 code points in a string. Emojis and other related icons serve as a nice example.

Dart also comes with pre-installed libraries, the most popular of which are: Dart:core is used to provide core functionality and is included in all dart files. For asynchronous programming, use dart:async. For mathematical functions and constants, use dart:math. For converting between multiple data representations, such as JSON to UTF-8, use dart:convert.

Google Firebase

The Firebase Real-time Database is a database that is hosted in the cloud. It supports JSON-based data storage and data synchronisation with connected clients in real time. During cross-platform application development procedures employing iOS, JavaScript, and Android SDKs, single instances of the Real-time Database serve as clients. It enables programmes to receive the most recent data and updates. Because the Database SDK performs on-disk data persistence, offline applications can stay responsive. It aids in the synchronisation of devices to current server states after connectivity is restored.

EXPERIMENTAL RESULTS

A. Sign-in Page

This is the Sign-in page where we can login with Mobile Number and get OTP verification. Here admin and user Sign-in through same page as shown in Figure 1.2.
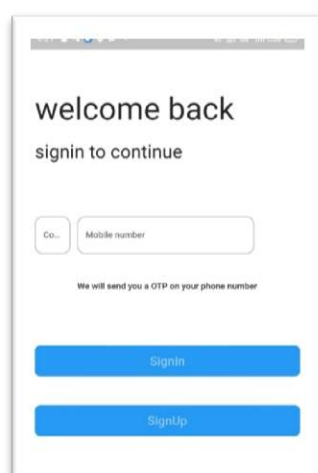

Figure 1.2: Sign-in Page

B. Finding Parking Slot

In this Find Parking Slot as shown in Figure 1.3 the users can see their nearby parking slot and their location using Google API
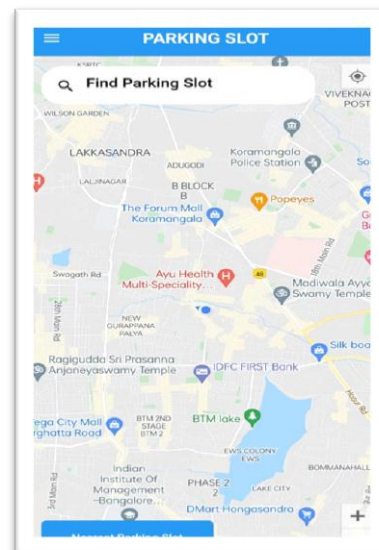

Figure 1.3 Find Paring Slot

C. Profile Page

As shown in Figure 1.4, this is profile page where the details of the users and the booking details can be viewed and edited.
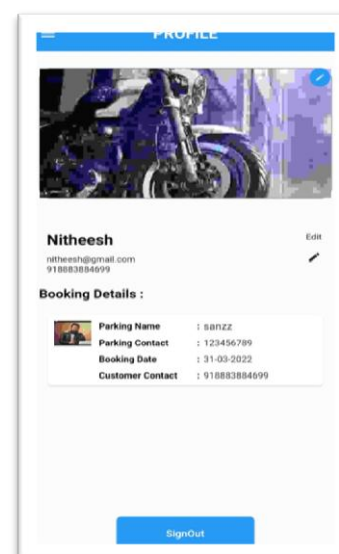

Figure 1.4 Profile Page

D. Admin-Verification Page

As shown in Figure 1.5, this page is used for Admin to check the parking slot status of the users so that admin can verify.
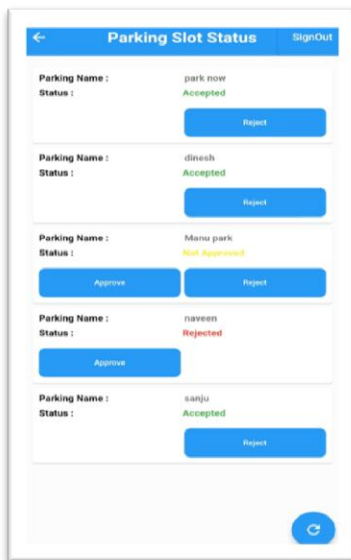

Figure 1.4 Admin-Verification Page

CONCLUSION

As we developed this application in Flutter because Flutter is currently one of the most exciting mobile technologies available. Flutter is the quickest framework for creating cross-platform mobile apps. Flutter has a bright future ahead of it, with a lot of possibilities for developers. Flutter has grown into a formidable framework that can no longer be overlooked. Flutter is the greatest solution for businesses wishing to design apps for both iOS and Android. Flutter is a helpful toolkit that makes developing new applications simple. It's the finest solution for creating apps with a great user interface and strong performance. In terms of speed of implementation, it is a 100 percent promising framework. The proposed gadget lessen power frustration and site visitors via way of means of offering nearest parking region and to be had slot. As clever parking gadget growth the provider ranges in operation, there is lots of scope for improvements and implementation thru facts standardization and management, cellular smartphone integration, hardware and software program integration .So we've got give you an answer that we will construct an android and IOS utility for the customers which include monitoring of parking region, looking for slot and reserving of slot earlier the person reaches the destination. So, this utility may be person-pleasant for the customers so altogether it resolves issues like site visitors' congestion, seek of slots and to find nearby parking slot.

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