Development of Mobile App for Cab Booking and Rental using Flutter SDK

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Abstract - *This project deals with creating an application for cab booking and checking the availability of vehicles. Cab booking app provides reliable cab booking facility to people equipped with smart phones. Cab apps act like a bridge between the cab operators and the users who book a cab. Apps like these bring together the cab operators/cab owners and the customers. To utilise the cab booking service, consumers must connect to the app using a login id/phone number and password. Using the app creates a relationship between the support staff (including the Admin) and the customers.*

Admin focuses client happiness and offers them services for booking a cab by acquiring information such as their journey date and time, origin, pick-up point, destination, and as a result, the customers are given an estimated fare for their journey. The admin is also in charge of monitoring smooth functionality of apps for both users and drivers. The application's administrators have extensive authority to monitor and allocate the driving force. For this application, we'll keep track of some model names, registration numbers, available cabs, daily rent rates, each cab driver's profile for security reasons, and the amount to be deposited accordingly. Cab Booking and Rental app using Flutter SDK is a project whose motive is to develop an app for cab booking and rental with improved User Interface and to ease the difficulties which users faced earlier while using such apps.

Key Words: **Cab, Flutter, App development, Cab booking Application, Dart** .

1.INTRODUCTION

Cab booking app is a mobile application that allows customers and taxi drivers to book rides. This software uses a GPS technology to link customers and taxi drivers, allowing passengers to book a cab using their smartphone. The app displays nearby taxis to his location to passengers. The primary goal of this project is to make taxi services more feasible than they were previously. All you need is a smartphone and access to the internet. If you are a passenger, you may request a taxi with only one click on the button. If you're a driver, you may accept or deny requests with another click. This work will not be controlled by a third party. Customers may easily book a car online, and cab booking agencies can track their bookings online as well. Customers may see available cabs, view profiles, and book cabs using this app. The majority of individuals rely on cab services for their everyday transportation requirements. We can also check which cars are available for booking.

2. LITERATURE REVIEW

Cab Services App is a cutting-edge solution for resolving our day-to-day transportation issues. The features, challenges, implementation, and development of the cab booking application are discussed in a paper by Amit Vashistha, Rohit Goyal, Aman Chaudhary, and Prabu S. Cab service software aims to make booking cab rides simple, economical, and pleasant for everyone with a smartphone. The app also gives you options for the sort of taxi you'd like to take. This is assured by the fact that there are several cab service providers from which the consumer may choose the one that offers the greatest services at the lowest price. This app enables consumers in several cities in India with a free online (internet-based) cab booking service. It serves as a link between cab drivers and customers/users/people who want to book a cab. This app also gives a fantastic opportunity for tour operators, who can make use of the feedback they receive from customers who used taxi services through the app. [1]

The simplicity of utilizing Android -based apps is mentioned in a study by Yash Shah, Jinal Shah, and Krishna Kansara. The technology employed is Kotlin, which is solely used for developing Android apps.

There are still certain security flaws that security attackers can exploit. App Repackaging is one of the most prevalent security risks. Proguard is a command-line utility for shrinking, optimising, and obfuscating Java code. It has the ability to optimise byte-code and discover and delete unnecessary instructions. ProGuard with Kotlin aims to assist android app developers in securing their apps against this type of attack. [2]

The core of the software - Flutter - is composed mainly of widgets, which can be either stateful or stateless. Stateless widgets have no internal state that can be changed after they've been constructed, but stateful widgets can be changed dynamically by changing their internal state without having to re-initialize. The Flutter framework generates states for its widgets that may be read synchronously when the widget is formed and changed at any time during the application's lifecycle. Managing widget states is complex and unmaintainable without a correct framework. Because Flutter's UI is a widget tree, changing the state of a parent causes all of its children to be re-rendered, which has performance implications. A paper by Shady Boukhary, Eduardo Colmenares titled 'A Clean Approach to Flutter Development through the Flutter Clean Architecture Package' mentions that the Flutter Clean Architecture provides a method by which to both structure and application architecturally and to solve the State Management Problem. The architecture's primary goal is to provide separation of concerns and scalability.[3]

The manual attendance system by recording student attendance in books has several drawbacks, such as time efficiency, where attendance depends on the number of students in the class. In addition to these weaknesses, students take advantage of loop-holes to commit fraud, for example, students leaving absences to their friends and other examples such as filling out absences for last week's lecture meeting. The paper titled 'Design and Development of Attendance System Application Using Android-Based Flutter' by Giri Wahyu Wiriasto, Ramadan Wibi Surya Aji, and Djul Fikry Budiman aims to minimize the drawbacks in the present attendance system by introducing a mobile application that scans the QR code generated by the lecturer and uses Geolocation for marking the attendance of a student. Every student is provided with a unique login id and password to access the app. [4]

A paper by Anagha Praveen, Krishna Nanda, Nayana Rajith, Niveda Giriraj, R.Radhika, Nidhin Mahesh, Vishnu K, Anjali T and Sarath S, titled 'Conference Room Booking Application using Flutter' revolves around the development of a conference room booking application using Flutter SDK. The purpose of developing this app is to reduce the ambiguity when booking a conference room at the last moment. Through this app,[1] the users can book the conference room well in advance based on the availability of the date and time that we have opted for. If the time limit is exceeded for more than 2 hours, a request will be forwarded to the admin for approval. The conference room can be used once the approval has been granted. The admin serves the queued requests on a first-come, first-served basis. The app has two modules (i) Admin module and (ii) User Module. [5].

One of the main aims of this paper is Android Security. It is stated that android is vulnerable to attacks and thus the security of the android applications is an important aspect. This is because android allows IPC (Inter-Process Communication) which will make devices vulnerable to security threats. The Android system is more open, but it also needs to improve the security and reliability of its functioning, which is a major focus of Android system software development. The other aspect covers the android architecture. It consists of Application Layer, APP Framework Layer and Android Runtime Layer, and Linux Kernel. We also look at the cross-platform approaches. This is used for efficiency in producing applications for various platforms. In cross-platform application, it should have features to use all the resources of the device. Maximum allocation and optimization of resources is the prime concern for cross-platform applications. The categories of cross-platform approaches include the web approach in which is based on mobile web browsers and uses HTML, CSS, and Javascript for implementation. The other approach which can be used is the hybrid approach. This approach is an amalgam of the advantages of web approaches and features of the devices. The model-Driven approach is driven by modeling activities where low-level issues need not be dealt with. [6]

This paper compares Android System and IOS System. Android system is more open, but at the same time, it needs to improve the security and stability of system operation, which is also the key point of Android system software development. Thus Java language proves to be an very important tool for improving the

quality of software development. According to the user point of view there is a strong dependence of Java language for software development. The main role of an Android mobile phone application is to ensure that different operations of the mobile phone system, which is an essential component of the smart phone system, are effectively operated. Encapsulation is a major feature of the Java programming language. The application does not require variables or the primary function in Android mobile phone software development. It's mostly made up of objects and basic numeric kinds. Java language is an object-oriented programming language, which has the advantages of C++ language in software development. It also solves the problems that C++ can't understand multiple inheritance and pointer, showing strong functional advantages and simple operation. [7]

ReactJS's straightforward and uncomplicated style allows users to quickly become acquainted with the technology. The expectation of absorbing knowledge is quite easy and allows one to progress without difficulty. The document object approach in React is far more effective and lightweight. It doesn't connect with the program's DOM, but it does respond to the document object model stored in memory. This results in a lightning-fast and powerful application execution. The virtual DOM (virtual document object model) of ReactJS is another important feature. It's similar to the browser's document object model, with the exception that it's stored in memory. [8]

React encourages developers to build user interfaces that follow module standards. We can construct a text form if there are two independent pages with the same function but different properties. When a customer clicks on a link and is sent to another website, the page remains the same according to the differences, re-render the text form. Technical assistance is also required since greater support may help generate stronger relationships with developer communities, which is critical for the framework's reputation to grow. React has excellent technical support and a very reliable API. React's exceptional speed in rendering updated DOM, as well as its rich technical support and long-lasting API, enabling developers to eliminate updating and immigration concerns. Furthermore, after understanding React, developers may construct React Native mobile applications immediately. [9]

3. CONCLUSIONS

Mobile application for Taxi/cab booking is one of the basic needs of the general population nowadays, primarily in metropolitan regions, because this application is gaining popularity among the common people. The client can even take into consideration, the driver or the type of car and other subtle elements while booking the taxicab. The application associates the end client with the driver and builds up a correspondence until the point that the outing is finished. Travel agencies have to register with the service providers through the application and hence are reliable. A two-way application like this also opens doors of reliable employment for the drivers and other taxi service providers who can register with the app, along with the obvious service provided to the direct customers who can book a cab through it. As a result, portable cab booking applications are one such application that may be efficiently used by everyone. There are still many areas in which the application can be improved. The feedback systems can be made better and some features can be added in the future to benefit long-time users and customers. In metropolitan cities, there is a bulk of transport facilities but in small towns, villages, or cities there are no such facilities. So some small places like Vellore and Ooty where there are not many convenient transport facilities available will also be added to the app. This app will help people in traveling from one place to another with ease and more comfort.

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