UNIVERSITY MALAYSIA TERENGGANU
FACULTY OF COMPUTER SCIENCE AND MATHEMATICS

[CSM 3114]
FRAMEWORK-BASED MOBILE APPLICATION DEVELOPMENT

Report Project 2
[Smart Parking Mobile App]

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Executive Summary

The Smart Parking Mobile App is a revolutionary solution aimed at enhanced the parking experience for the users in urban environments as the challenge of urbanization continue to escalate. Efficient parking management is increasingly critical, and our mobile app addresses this need by harnessing cutting-edge technology to provide users with the real-time parking information.

The key features of this app is real-time parking availability. The app furnishes users with up-to-the-minute information on parking availability, facilitating the efficient location of the nearby parking spaces. This app also has notifications and alerts system. Users receive timely notifications about their parking sessions, including reminders before expiration and options for extending parking duration. Smart Parking app also user-friendly interface and boast intuitive, ensuring a seamless experience for both novice and experienced users.

The benefits for Smart Parking App is the time efficiency. The app significantly reduces the time spent searching for parking, resulting in quicker and more convenient parking experience. The user also can get benefit in cost saving because the efficient parking utilization helps the user avoid fines and unnecessary expenses associated with parking violations. Other than that, it helps in environmental impact. This app contributes to sustainable urban mobility by minimizing unnecessary driving in search of parking, thereby reducing the carbon footprint. This app is data-driven insights. By collecting data on parking patterns, this app offers valuable insights for urban planners and municipalities to optimize parking infrastructure.

The Smart Parking Mobile App caters to urban dwellers and commuters seeking convenient and efficient parking solutions. It is also designed to benefit businesses and commercial establishments looking to enhanced customer parking experiences.

Use Case

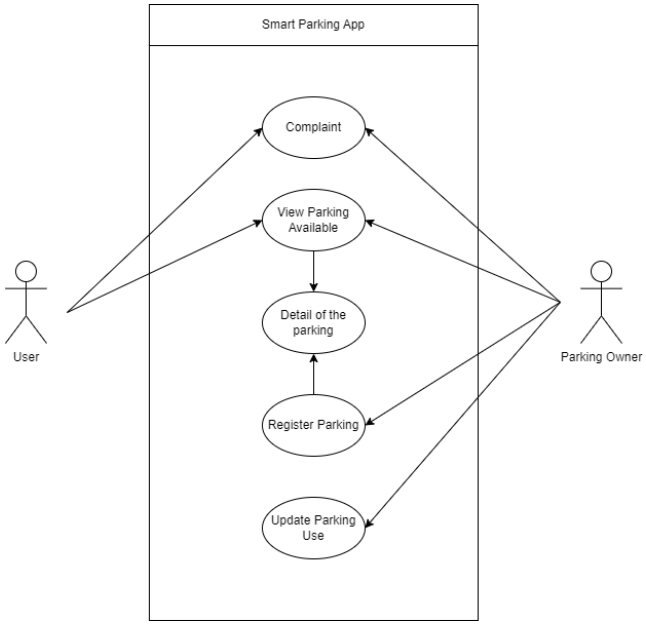

Figure 1

The Figure 1 show the use case diagram of Smart Parking Mobile App. There is two actors for this app, User and Parking Owner. To know the actor is the users or the parking owner is login session. If the actor login, the actor will be a parking owner. If the actor skips the login session, the actor automatically the users. The Users can access the View Parking App. This use case is for searching the parking depend on the location the users key in. View Parking Available also show the parking available next to the parking name. When the actor click the parking, the actor can see the detail of the parking in Detail of the Parking. The other use case the users can access is complaint. Complaint is the place that the user can complaint the problem of the parking. The users need to choose the parking and type the complaint. After that, the complaint will show at the complaint interface. For the Parking Owner, this actor can access all use case in the app. First use case is Register Parking. In Register Parking, the actor can register their parking in the app. The data need to register is name of parking, address/location, description and total number of the parking. After the registration, the actor can see the detail of the parking at Detail of the Parking. The actor also can delete the Parking in this use case. Second is Update Parking Use. The actor needs long press the parking choose and update the number of parking use. The Parking Owner also can access View Parking Available and Complaint with the same features.

The Common Structure of tree widgets used when designing and developing application

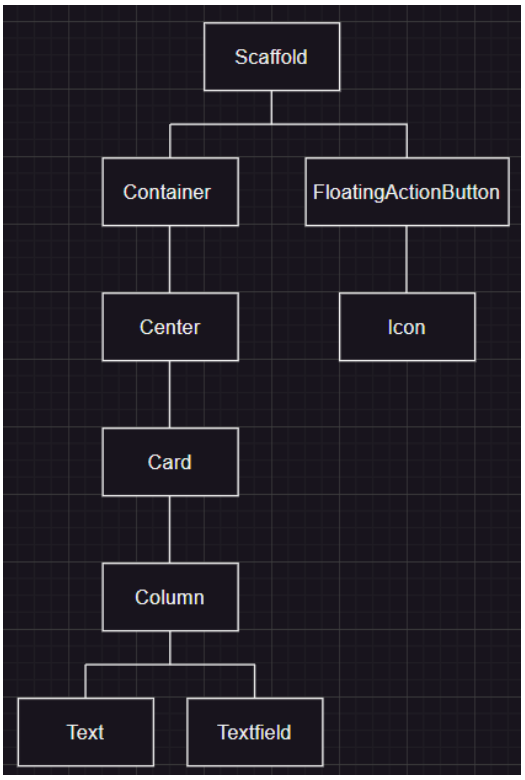

Figure 2

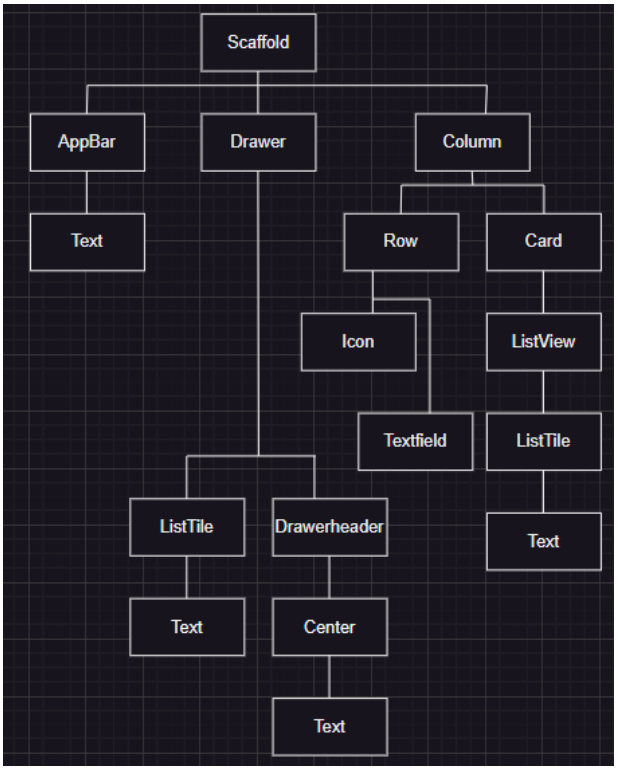

Figure 3

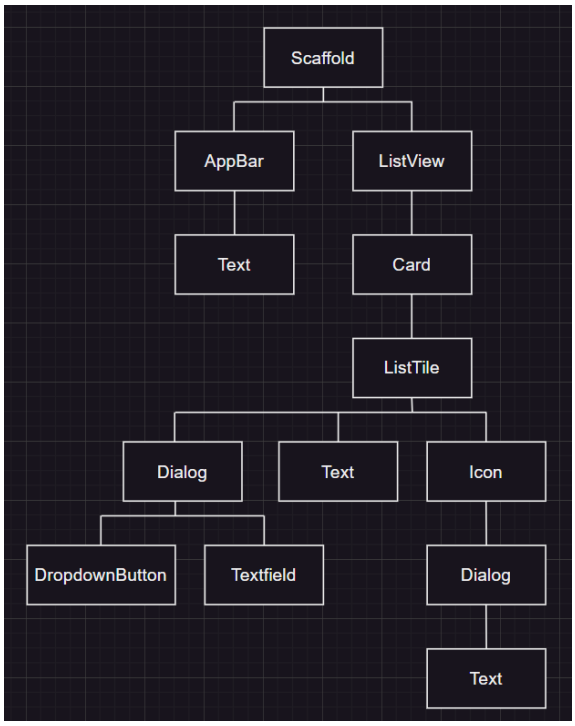

Figure 4

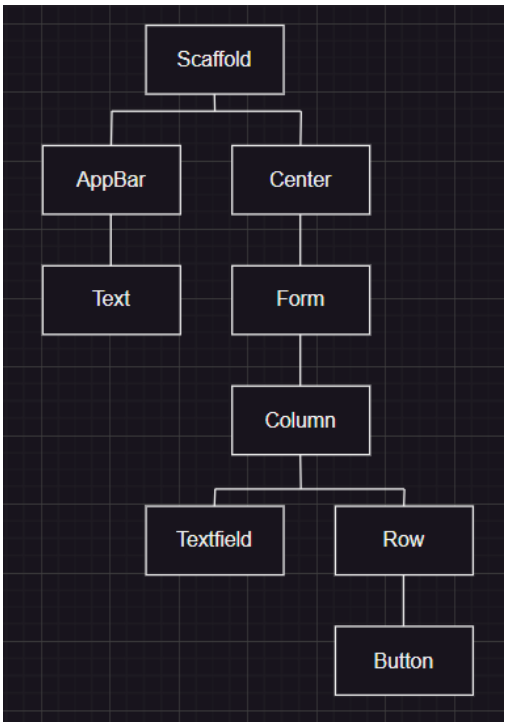

Figure 5

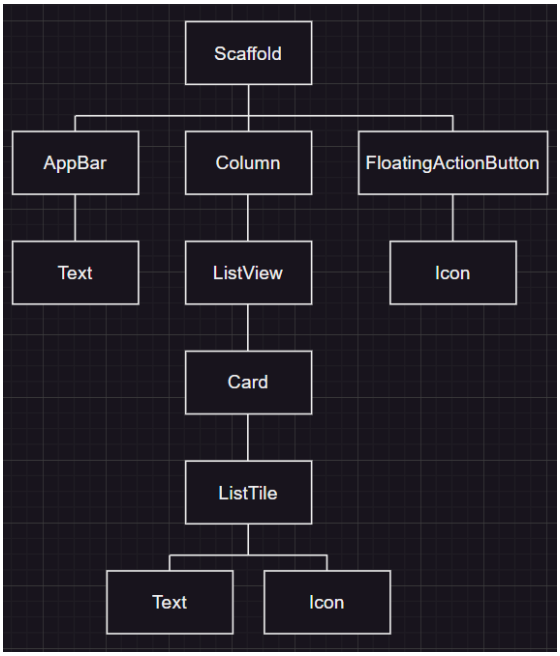

Figure 6

Figure 2 until 5 are the widget tree for the application. Figure 2 is widget tree for login and register page. Figure 3 is All Parking page widget tree. Figure 4 is widget tree for your parking page. Figure 5 is a widget tree for register parking page. Figure 6 show the widget tree for complaint page

Flutter Widget and features adopted in the application

Flutter Widget adopted in the application:

- Container
    - A box model for containing other widgets and customizing their appearance
- Row and Column
    - Widgets for arranging children in a horizontal and vertical line
- ListView
    - Display a scrollable list of widgets
- Card
    - Material Design card that displays content and actions on a single topic
- AppBar
    - A material design app bar that typically contains the app's name and navigation
- Scaffold
    - Basic structural layout for a Flutter app, providing a top-level container for UI elements
- Text
    - Display a styled text
- Image
    - Display image
- TextField
    - A text input fill
- Button Widgets
    - Widgets for handling user interaction
- Drawer
    - A slide-in menu panel typically used for navigation
- Dialog
    - Display pop-up dialog
- SnackBar
    - A small message at the bottom of the screen
- Form

    - A container for grouping and validating form controls

Flutter features adopted in the application:

- Hot Reload
    - Allows developers to quickly see the effect of code changes without restarting the app
- Stateful and Stateless Widget
    - Differentiates between widgets that need to be rebuild with new data and those that do not
- Material Design
    - Implements the principles of Google's Material Design for consistent and visually appealing UIs
- Dependency Management with Pub
    - Uses the Pub package manager to manage dependencies and libraries
- Flutter Package
    - A rich ecosystem of pre-built packages for common functionalities
- Flutter theme
    - Allows the definition of a consistent look and feel for the entire application

Sample Interface with explanation

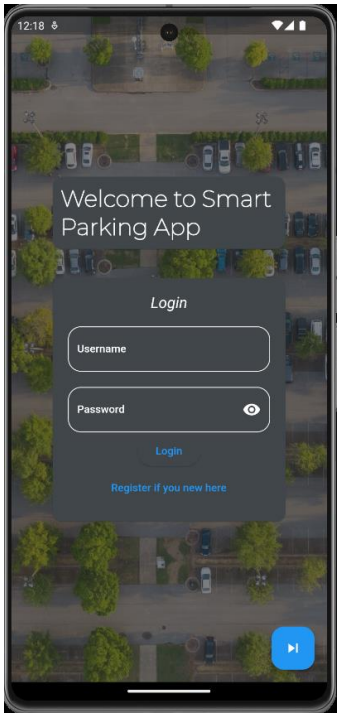

Figure 7

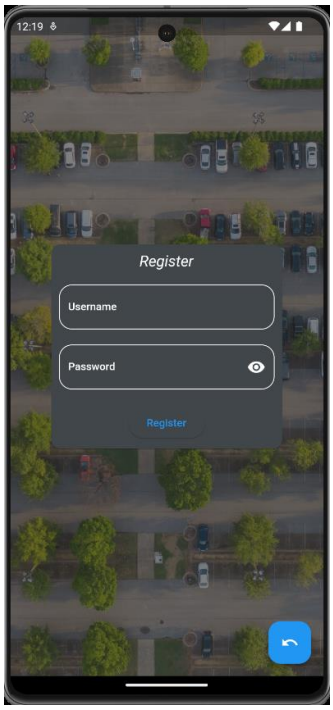

Figure 8

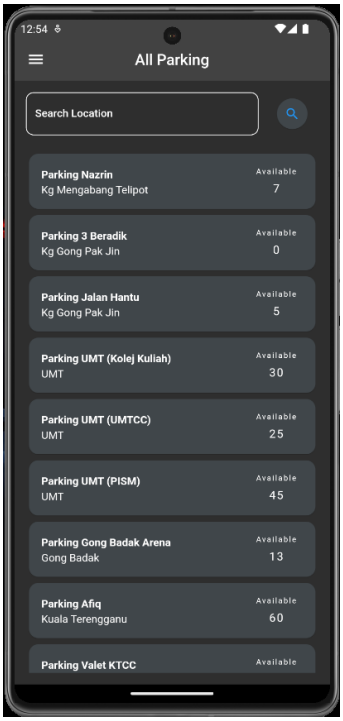

Figure 9

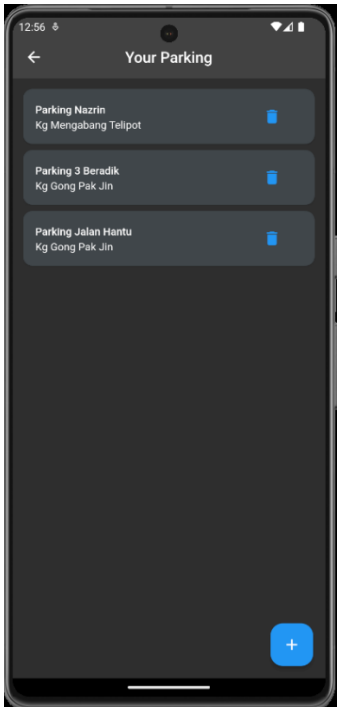

Figure 10

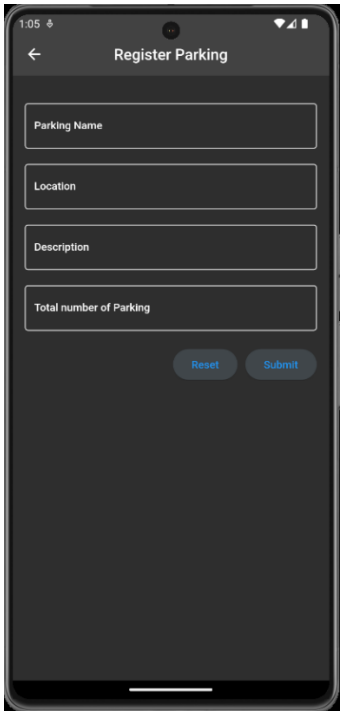

Figure 11

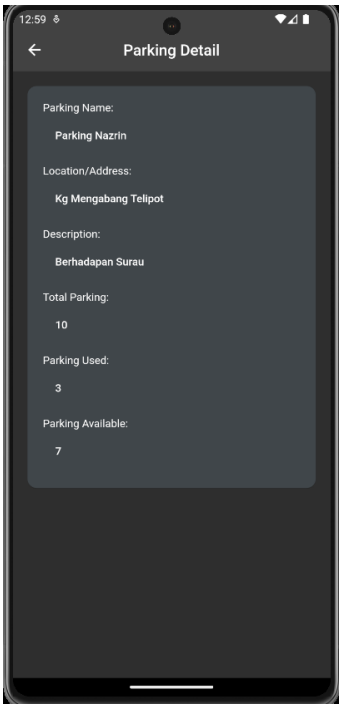

Figure 12

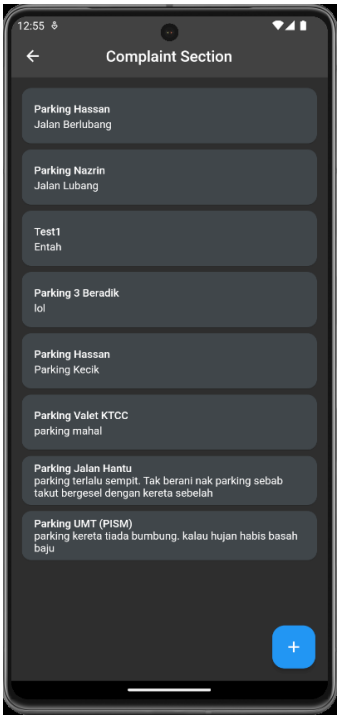

Figure 13

The Smart Parking Mobile App's example user interface is shown in Figures 7 through 13. The login page in Figure 7 allows users to log in to the application. The user also can skip and access the app by skip button at bottom right of the screen. The registration screen shown in Figure 8 allows users without an account to create one by providing their username and password. Figure 9 is entire parking page. This page will display every parking space. The user may enter the location to find parking by using the search bar located underneath the bar. It also indicates how many parking spaces are available. The parking that a user has registered is displayed on the Your Parking page (Figure 10). For the update the number of parking used, it should be implement the use of IoT by using sensor at the parking lot to count the number of entry and exit of the cars. Additionally, this prototype will show the adjustment of the amount of parking uses. This page also can erase parking information. The user can store and register parking information by using the Register Page, shown in Figure 11. The parking detail, shown in Figure 12, includes all the information on the parking option selected. The Complaint Page is Figure 13. The user may make a complaint regarding parking on this website and view all the complaints filed by other users.

Conclusion

The Smart Parking Mobile App is leading the way in revolutionizing urban parking experiences by providing a feature-rich and intuitive solution. The software intends to transform parking by utilizing real-time features, accurate navigation support, and an intelligent reservation system. Customers gain from hassle-free parking, which helps them save important time and money. The software puts convenience first, whether it is for booking seats in advance or finding open spaces with ease. The app's benefits go beyond personal gains; municipal planners may use the data it collects to make well-informed decisions and maximize the infrastructure for urban parking. Emerging as a crucial tool, the Smart Parking Mobile App improves customer pleasure, expedites the parking procedure, and boosts the general effectiveness of urban transportation networks. In a world of increasing urbanization, this innovative solution emerges as a beacon for urban planners and users alike, addressing the challenges of modern parking with sophistication and accessibility

Reference

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- Murageh.(2022). flutter parking app. https://github.com/murageh/parking-app
- Flutter API. https://api.flutter.dev/

Github Link for Project 2: https://github.com/NzGhost7/smartparkingapp-naz-