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DEVELOPMENT OF GEOLOCATION-BASED MOBILE APPLICATION FOR OPTIMIZED FREELANCE MAID SERVICE RECOMMENDATION

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Abstract— The increasing demand for freelance maids highlights the need for a streamlined platform to connect them with customers. This study presents the development of a Freelance Maid Application that utilizes geolocation and a recommendation system to simplify the hiring process. The objective of this project is to develop Freelance Maid Application using geolocation and recommendations system. The methodology involved five key steps: data collection, service selection, maid recommendation, booking selection, and confirmation. The application allows users to choose services, view top-rated

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Systems	maids, and complete bookings efficiently. Geolocation aids maid navigation, while customer ratings ensure service quality. Results indicate that the application enhances accessibility and reliability for both users and freelance maids. Customers can find nearby maids easily, while maids receive structured job requests. Future enhancements include FPX payment integration, a service rate recommendation system, and live location tracking to improve user experience. These features will further optimize the platform for a more efficient and convenient hiring process.

I. Introduction

Technology has become an essential element of modern life, shaping how individuals work, communicate, and access services. In developing nations, it contributes to infrastructure advancement, improves transportation, education, healthcare, and supports small businesses. This reliance has accelerated digitalization, with smartphones and mobile applications becoming mainstream in the mid to late 2000s. In Malaysia, the number of smartphone users was projected to reach approximately 29 million in 2021, with an estimated increase of 1.74 million by 2025 [1]. The widespread adoption of smartphones has driven the growth of mobile applications, enhancing access to entertainment, news, and business opportunities.

In 2021, leading mobile applications included TikTok, Instagram, Facebook, WhatsApp, and Telegram [2], serving multiple purposes such as stress relief, information sharing, and job promotion. One commonly promoted service is domestic cleaning, which can be classified into deep cleaning, routine cleaning, move-in or

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move-out cleaning, and event-based cleaning [3].

Maids are generally categorized as full-time or freelance. Freelance maids are engaged on a per-task basis, often working for multiple clients and enjoying greater flexibility in selecting assignments [4]. While demand for freelance maids continues to grow, there remains a shortage of specialized platforms to efficiently connect them with potential customers.

The Freelance Maid Application is designed to address this gap by enabling users to locate and hire nearby freelance maids through geolocation and customer-based recommendations. Geolocation technology identifies device location using GPS, mobile towers, or Wi-Fi [5]. Meanwhile, recommendation system of popularity-based highlights top rated maids based on customer feedback, similar to trending product suggestions on platforms like Netflix [6]. This solution aims to streamline the hiring process, enhance accessibility, and improve reliability and efficiency for both customers and freelance maids.

II. Related Works

A. Location-Based Service (LBS)

Location-Based Services (LBS) are mobile and web applications that deliver information or functionality based on a user's location. They rely on smartphones, GPS, and mobile networks to determine a person or device's position, then offer relevant services accordingly. Initially applied in outdoor environments, LBS now extends to indoor contexts such as shopping malls, museums, airports, and public transport hubs [7]. LBS is increasingly important in diverse sectors including emergency response, navigation, healthcare, tourism, transportation, entertainment, and social networking.

The underlying technology, geolocation, enables accurate identification of user or device positions using tools like GPS, motion sensors (gyroscopes), and accelerometers [8]. The choice of geolocation method

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depends on the required precision and context of use. Continued research focuses on improving location accuracy, enhancing user experience, and expanding application areas.

B. Recommendation Techniques

The rapid growth of e-commerce has made it challenging for consumers to select products from vast choices, especially when they lack knowledge of available options or cannot use precise search terms. Recommender systems address this challenge by providing personalized suggestions based on user behavior and preferences [9]. These systems filter large datasets to present relevant options, using explicit input such as ratings or implicit indicators like browsing patterns and purchase histories [10].

Popular platforms like Amazon, iTunes, and Netflix widely use these systems to enhance user experience and decision-making [11]. Algorithms powering recommender systems are evaluated based on criteria like accuracy, scalability, diversity, and novelty [9]. A common approach is collaborative filtering, which uses user ratings and interaction histories without requiring detailed product information [12]. However, collaborative filtering faces issues such as data sparsity and the cold start problem for new users or products [11].

To mitigate these, improvements include time-interest weighting, which captures shifts in preferences over time, assigning greater relevance to recent interactions [11]. Besides, popularity-based recommendation is another method which leverages trending or highly rated items. While useful for new users with no interaction history, it often sacrifices personalization. For instance, the release of Netflix's The release of the Queen's Gambit led to a surge in chessboard sales, demonstrating the strong influence of trend-based recommendations.

C. Development Frameworks

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Native mobile applications are developed for a specific operating system and optimized for high performance, seamless user experiences, and full integration with device features such as the camera and push notifications [13]. Android apps typically use Java or Kotlin, while iOS apps are built in Swift or Objective-C [14]. Native development supports robust interface design, strong security, and comprehensive debugging tools, but platform dependency means code cannot be reused across systems, requiring separate development for each [15].

Hybrid applications, on the other hand, use web technologies like HTML5, CSS, and JavaScript to create apps that work across platforms from a single codebase [16]. This approach reduces time and cost, though with limited access to low-level APIs, which can slightly reduce performance [17]. Frameworks such as React Native are popular for delivering near-native performance on both Android and iOS [15].

Web mobile applications are essentially optimized web pages designed for smaller screens, built with HTML5, CSS, and JavaScript, and accessed via browsers without installation [16].

D. Related Applications

Maideasy and GrabMaid are mobile and web-based apps for booking part-time cleaning services, but they differ in coverage, use of LBS, recommendation systems, and development frameworks. Maideasy serves multiple regions in Malaysia, giving it a wider reach, while GrabMaid focuses on Kuala Lumpur and Selangor for more localized service.

Both use LBS by asking users to enter their location before booking, so cleaners can be assigned based on proximity. Maideasy uses a rating and review system to help customers choose, and GrabMaid likely does the same, though details are limited. It is unclear whether either app offers advanced filtering or personalization.

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Both probably use hybrid or cross-platform frameworks such as React Native or Flutter, which work on mobile and web. GrabMaid's availability on both platforms supports this. These choices affect user experience, performance, and maintenance. While their core features are similar, Maideasy focuses on nationwide service, and GrabMaid targets a smaller regional market. Both rely on LBS for efficiency and user reviews for recommendations. Future research could explore how these features impact customer satisfaction, service allocation, and long-term engagement.

III. Methodology

The development of this application consists of five main procedures, as summarized in Figure 1, which outline the complete booking process.

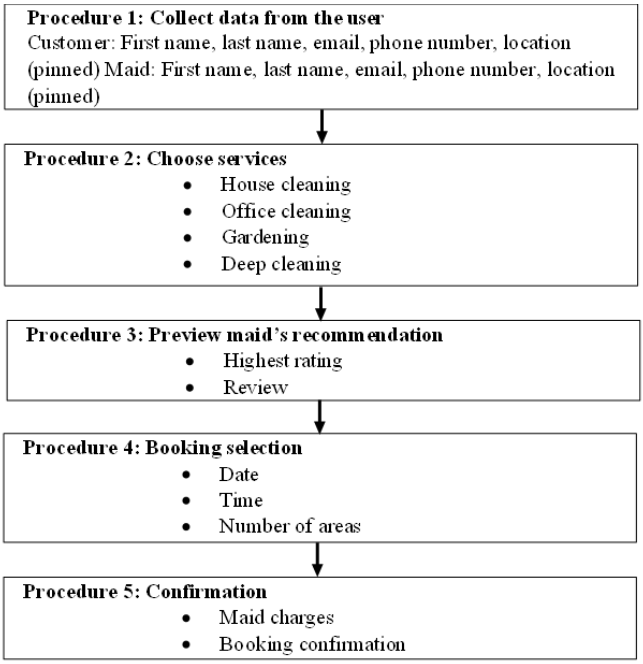

Figure 1: Application Development Methodology

The process begins with collecting data from the user, where both the customer and the maid must provide essential

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details such as their first name, last name, email, phone number, and pinned location. This ensures accurate communication, proper identification, and efficient service matching. Once the data is collected, the customer proceeds to choose services, selecting from options like house cleaning, office cleaning, gardening, or deep cleaning, based on their specific needs and preferences.

After selecting a service, the customer moves to the review recommendation stage, where they are presented with suggested maids or service providers best suited to their chosen service. This helps them make a more informed and confident decision. Next, in the booking selection stage, the customer finalizes the details by choosing a preferred date and time for the service, along with specifying the number of areas or rooms that require cleaning or maintenance. Finally, in the confirmation stage, the system displays the maid's charges, allowing the customer to review the pricing carefully before proceeding.

Once confirmed, the booking is finalized, and the customer receives a prompt confirmation notification, ensuring a seamless, transparent, and well-structured service booking process.

IV. Application Development

The modified waterfall method was used to develop the Freelance Maid application. The process included requirement gathering, system design, implementation, testing, deployment, and documentation. The tools used were Visual Studio Code, Firebase, Lucidchart, and Flutter SDK.

During development, the focus was on designing key pages to build the app's main features and interface. The team created user-friendly layouts and navigation, aiming for a smooth and responsive experience. User feedback and best practices helped improve the design before moving to the next phase.

As shown in Figure 2, customers and maids must enter their basic details, including email and password, to create an account. In Figure 3, users are asked to pin their house location

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on the map. The selected address appears below the map, and users must click 'Save My Location' to store it in the database.

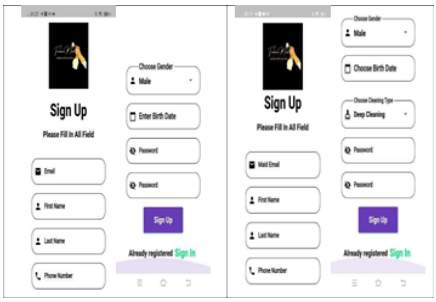

Figure 2: Information Required for Customer and Maid

Figure 3: Pinned Location Page

Figure 4 displays the customer home page, where users can select the desired services. They can also view maid locations and top recommendations by clicking the 'Maids Location' and 'Maids Recommendation' buttons. The bottom menu allows navigation to the booking receipt or user profile, while the logout icon at the top lets' users exit the application.

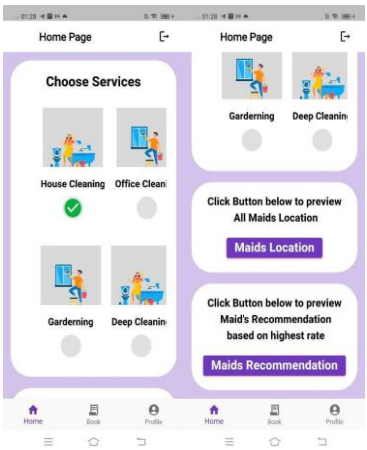

Figure 4: Services Selection

Figure 5: Maid's Information

Figure 5 shows available maids based on service type, along with their profile picture, name,

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phone number, email, gender, and rate per two hours. Customers can view past reviews by clicking 'View Review' or proceed to booking using the 'Book Now' button.

Figure 6: Maid's Location

Figure 7: Recommended Maid

Figure 6 shows the maids location page. This page will show all the registered maids' location. Customers can view the maid's location whether it is near or far from their location. While Figure 7 is the recommendation result based on the top 5 highest rates maids. It shows basic information about the recommended maid.

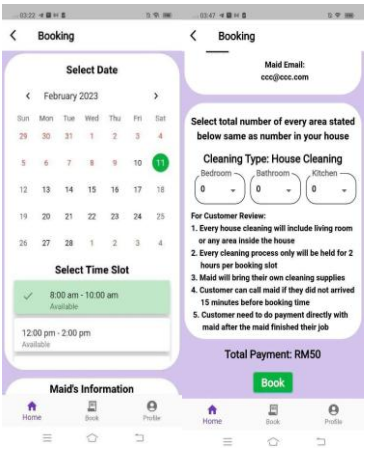

Figure 8: Booking Selection

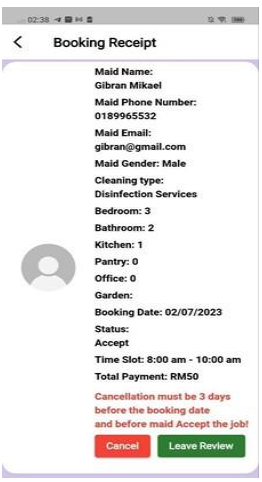

Figure 9: Confirmation

Figure 8 requires customers to select the booking date, select time slot, select total number of

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their house area. Customers also need to read the terms and view the maid's information before clicking on the 'Book' button. Figure 9 shows the confirmation page of booking details and the status of the booking. The customer can cancel the booking by clicking on 'Cancel' button before the maid accepts the job. Customers also can leave their review after the status updated to done by clicking on 'Leave Review' button.

V. Conclusion and Future Works

The application enables customers to easily find and book freelance maids, even for short periods, making it ideal for busy individuals. It also benefits maids by providing the customer's location and directions in advance through geolocation, improving navigation, reducing travel time, and avoiding manual address entry. A rating-based recommendation system helps customers select reliable maids, ensuring quality service.

Planned enhancements include FPX payment integration for secure bank transactions, a payment rate recommendation system to help maids set fair prices based on job scope and experience, and live location tracking for real-time maid updates. Live tracking allows customers to estimate arrival times without repeated calls, while maids can manage schedules more efficiently. These features aim to further improve usability, efficiency, and convenience for both customers and freelance maids, creating a smoother, more reliable service experience.

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