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Developing An Application For Handyman Services Platform Using Geofencing With Content-Based Filtering (Handy2help)

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Abstract --- Hiring a handyman is not strange but rather the usual. People tend to hire qualified handyman services because they do not have spare time to fixing or repairing by themselves and, they do not have tools or any equipment. Moreover, the handyman services have grown widely as because of the new lifestyle which most of us are living now. Therefore, the project aims to design and develop a platform to connect the handymen and users who need the services. Handy2Help can help handymen to looking for a job by using geofence technology. Geofence technology is used to send out the notification to potential handymen that are available for the job in the area within the geofence boundary. This mobile application will focus on helping handymen to have better job opportunity and a user who are looking for handyman services within Jasin and Merlimau, Melaka. This application has been tested using functionality testing to evaluate the effectiveness and functionality.

Keywords --- Handyman services, High demand, Mobile application, Application for handyman services (Handy2Help), Job opportunity, Geofence technology, Android users, Content-based filtering

I. INTRODUCTION

Every homeowner is responsible for a variety of activities around their property, which can range from minor repairs and odd jobs to more significant repair and maintenance duty. Homeowners will be able to complete these jobs on their own if they have the appropriate level of knowledge and enough spare time. Therefore, homeowners typically hire a professional handyman in their area to perform these duties correctly and effectively [1]. In the Cambridge Dictionary, the term handyman refers to a person who works at many small jobs in and around a building. Handyman service is type of public service that includes a person who is skilled at a specific task, as well as an activity and advantages provided by the provider to the customer [2]). There are many more services that handyman can provide, but it limited to their profession. According to [3], lawn mowing, house services, repairing, and house painting are kind of services that handyman offered for home handyman services. The demand for technology nowadays can help the user who regularly uses the services of a handyman by searching the services on the internet.

Likewise, there are numerous options for job seeking these days. With the advance of technology nowadays has given space to society to job seeking through the internet and it may now be done entirely online. Most businesses are already using e-recruitment to post job vacancies, accept resumes, and interact with applicants via job portal [4]. According to the Department

of Statistic Malaysia, for the whole year in 2021, there are 563,636 job vacancies advertised in the online platform. People can now use the Internet to look for jobs that have been posted online. There are numerous platforms available on the internet for job applicants today.

Followed by a device platform, mobile phones have transformed communication around the world and have changed the way people communicate. With the advancement of technology, mobile phones have evolved into what is now called smartphones and have different features, which are handled by different applications [5]. Each application has their own capabilities and delivers its own function to fulfil the users' needs. Is it because phones are used for more than simply communication; they can also be used for banking, entertainment, and education [6]. Since most mobile phones have Wi-Fi and GPS, a platform based on geofencing, and geolocation can be built.

Geofencing is a form of virtual geographic barrier that makes use of technologies such as the Global Positioning System (GPS) or Radio Frequency Identification (RFID) to detect mobile devices and determine when they enter or exit a specified area. When a device enters or exits a geo-fence, it receives a notification that has been set by the admin and the location information is sent through mobile phone [7]. Nowadays, geo-fence is widely used in daily life. Since mobile phones are so common these days, combining a mobile phone application and a geofence has made navigation and tracking more easier than before. Many companies use geofencing tools in mobile applications for business purposes such as monitoring their employees working in particular areas. Based on these, Handy2Help application can help solves the lack of platform of handyman services and give them opportunity to do works.

II. LITERATURE REVIEW

A. Handyman

Handyman is a person who is capable of fixing and making items within inside or outside of the home, and who does for their profession or as a job. A handyman can perform a variety of skills, including basic carpentry, wall painting, gardening, property maintenance and household activity. Every homeowner has some unsolved repair work around their house that they need to complete, ranging from minor odd repairs to major maintenance work [1]. As a result, homeowners frequently engage a professional handyman in their neighborhood to complete these tasks properly and effectively. According to [8], the average hourly wage for a handyman is USD\$18.24. The actual wage will depend on the individual's geographical area, education, and experience level. This is because handyman services fall into gig economy. Gig workers are employed to do a certain task or for a specific time period [9].

B. Handyman Services

In the past, the majority of homeowners tended to do their own repairs. At the time, homeowners chose to consult books or the internet for instructions on how to complete their essential repairs [10]. Some of them even preferred to find out how to do their repair jobs without the use of any instructions. At the present time, because of the new lifestyle which most of us are living now, there is a higher demand for handyman services right now [11]. Nowadays, because of the long work hours, daily routines are becoming more crowded and hectic. As a result, homeowners find it more difficult to do their own home repairs as well as find a handyman in their neighborhood. According to [12], the need for services provided by handymen is rapidly growing in every region of the world [12]. As example in United States from 2014 to 2018, the demand for handyman services in the United States increased by 6.2 percent, and it continues to expand at a rate of 2% every year (IBIS World, 2021). It is clear from the data that there is a high need for handyman services at the present time, and this demand is fast growing year by year. Furthermore, the unemployment rate for handymen in the United States has decreased from 7.56 percent in 2010 to 2.08 percent in 2018 [13]. In addition to this, on-demand services need a large number of individuals to work for, and as a result, they can legitimately provide employment possibilities to local community members.

C. Location-Based Service

Location-based mobile services involve the use of mobile devices to provide users with location-sensitive information, allowing them to access information based on a suitable or preferred location [14]. Mobile location-based services utilise the Geographic location of a mobile phone or navigational device and use embedded satellite navigation receivers or network-based methods such as triangulation from the location of the base station transmission cells to establish the position of the device. Location based services involve a lot of technology [14]. To be effective, a location-based service (LBS) must deliver accurate location and appropriate information for users as required by the relevant service, with low investment in infrastructure and overhead.

D. Geofence

These days, geo-fencing has widespread use in day-to-day lives. The combination of a mobile phone application with a geofence has made navigation of mobile phones today. Geofencing is a type of virtual geographical barrier that uses Global Positioning System (GPS) or Radio Frequency Identification (RFID) technology to track when mobile devices enter and leave a certain. The concept of geo-fencing is combines the awareness of the user's present position with the awareness of the user's proximity to other areas that the user may find interesting [14]. In order to pinpoint a location, it is necessary to have both its

latitude and longitude. A geo-fence is created by using a location's latitude, longitude, and radius to create a circular region, also known as a fence, around the point of interest. According to Rahate & Shaikh (2016), geo-fence can be in two different way which is circular or polygonal as shown in Figure 1 and Figure 2.

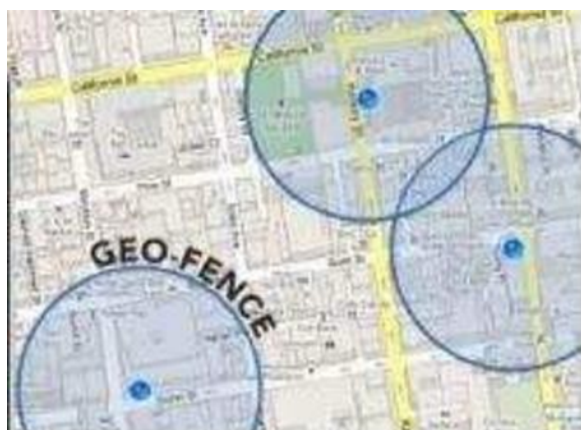


Fig 1 Circular Geo-fence



Fig 2 Polygonal Geo-fence

E. Recommender System

Currently, there is a limitless flow of information on the Internet, and this flow is developing at an exponential rate while providing users with a range of service-related resources [15]. As the number of data increases, however, individuals must contend with the issue of excessive information, which makes it more challenging to make the best decisions. Because of this, there is a problem with information overload and the process of decision-making becomes more complicated [15]. There is a need for a recommender system now more than ever to help people deal with information overload. These systems were designed to address the issue of information overload by offering 22 individualised recommendations of services to specific customers based on the preferences those customers have expressed. Therefore, Recommender System can assist users, as accurate predictions can narrow the user's search field, so facilitating their decision-making [16].

III. METHODS

This chapter explains the project methodology, which provides a clear and thorough explanation of how the project was created. The entire project's design and construction are guided by each activity's phase of the methodology that is chosen.

A. Phase 1: Requirement Analysis

The use case diagram of the Handy2Help mobile application, which outlines the interactions between the different users in the system and the relationships between these interactions. The diagram consisted of two main actors, the Customer and the Handyman, both of whom shared common use cases such as registering, logging in, and accessing their profiles. In order to use the application, both the Customer and Handyman were required to have an account, which they could obtain by registering and then logging in using their registered credentials. Both actors were able to update their profile details as well. For Customers, there were five additional modules available, including the "Create Job" module. In this module, Customers were able to create jobs and had the ability to update or delete them. The job location was used to define the geofence. Customers could also browse a list of handymen in the application, view their details, and search for handymen by type of service to filter the listings. Additionally, Customers were able to view the details of their active jobs, including the handyman's details, and contact the handyman. They could also rate the handyman after the job was completed. For Handymen, they were able to request any job that was listed in the application and view its details. They could also browse a list of jobs by using the search function and check for nearby jobs. The job location was used to create a geofence with a radius of 1 kilometre, and if the handyman was within the boundary, they would receive a notification.

B. Phase 2: Application Design

The application design phase is the next step after requirement analysis. During this phase, further information about the system and an illustration of how the system flow operates are illustrated. This phase is important to ensure a better understanding and view about the Handy2Help application. During this phase, the Flowchart Diagram, the Entity Relationship Diagram (ERD), and the graphical interface are illustrated.

C. Phase 3: Development

The phase of application development comes after the step of referring the system, which includes creating a flowchart, an entity relationship diagram, and a user interface. During this phase, further details on the development of this application is elaborated, including the implementation of application modules, geofence radius, and content-based filtering.

IV. RESULT AND FINDINGS

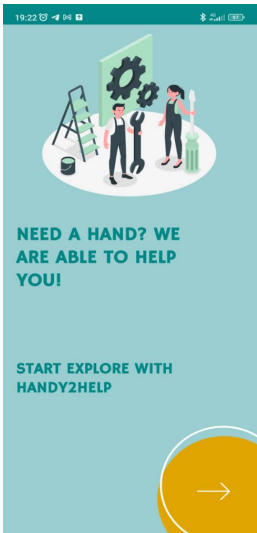


Fig. 3 Splash Screen

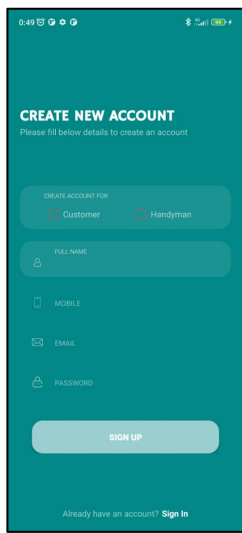


Fig. 4 Registration

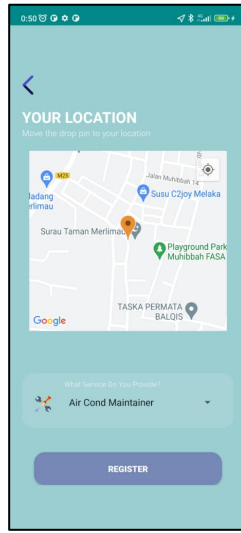


Fig. 5 Add Service

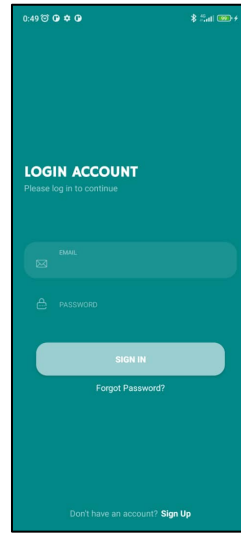


Fig. 6 Login

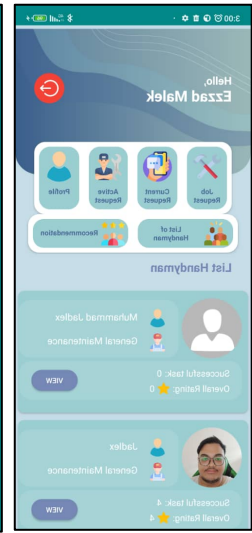


Fig. 7 Customer homepage

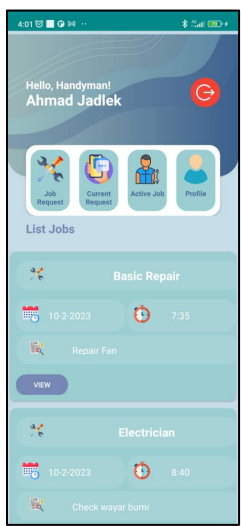


Fig. 8 Handyman homepage

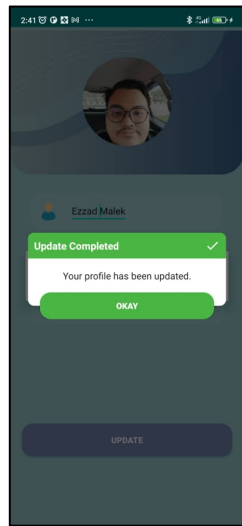


Fig. 9 Edit Profile

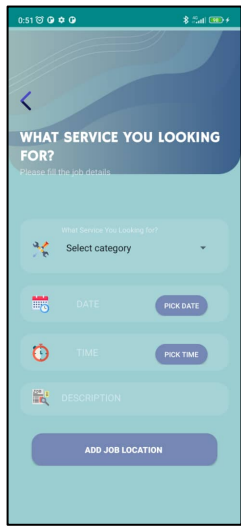


Fig. 10 Create Job

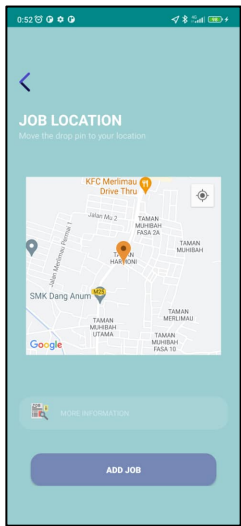


Fig. 11 Add Job

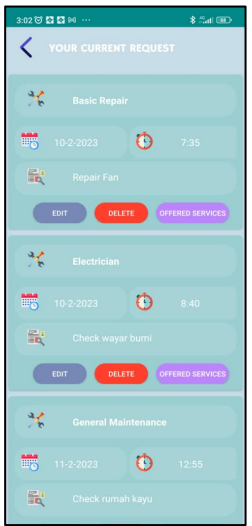


Fig. 12 List Created Job

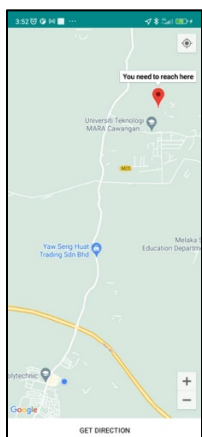


Fig. 13 View Job Location

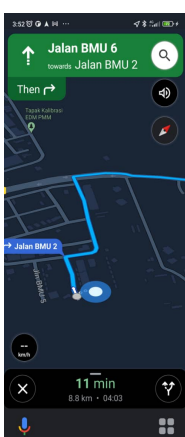


Fig. 14 Get Direction

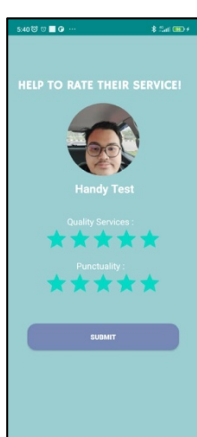


Fig. 15 Rating Handyman

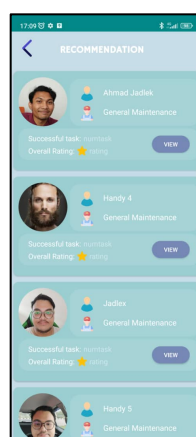


Fig. 16 Recommendation

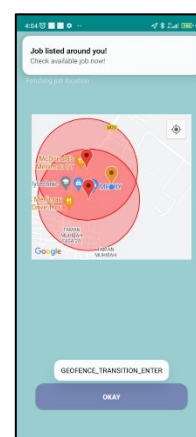


Fig. 17 View Job Around

V. CONCLUSION

The development of the Handy2Help application, which serves as a platform for handyman services and utilizes geofencing technology with content-based filtering, has been successfully accomplished and has achieved its intended goals. This mobile application helps both users and handymen in the discovery of service providers, as well as providing a platform

for those seeking such services. The geofencing features present within the application help handymen to easily locate job opportunities in their immediate vicinity, while the content-based filtering component helps customers to find suitable service providers based on their specific needs and preferences. The numerous functions and modules integrated within the Handy2Help application are incredibly valuable to both users and handymen alike, making the search for handyman services and job opportunities a quicker and more seamless experience. In essence, the objectives of the Handy2Help application have been successfully achieved, as it has effectively reduced the time and effort required for both customers and handymen to find what they need.

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