Food Finder: A Mobile App

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***Abstract*—Decisions are often the starting point of social interactions. One of the most common activities socially is eating out. Restaurants all over the world have tried to tackle this issue through different marketing schemes throughout the years. With the advent of technology, a new channel is presented to address said issues. Why not make the process of deciding where to eat more convenient to consumers? This study presents a solution to the decision-making process through the development of an Android mobile application to find food establishments in the locality of the Los Baños, Laguna. The area was chosen because of its restaurant population, emerging food scene, and inhabitants. The mobile application aims not only to ease the social dilemma of deciding where to eat, but also acts as a way for small- to mid-sized businesses in the area to get the much-needed publicity. It features a fully-functioning UI with *search, suggested and nearby restaurants,* and *reviews*. The mobile application was developed in Flutter, using the language Dart. The database used for the application is Google Firebase to keep a uniform Google-based development for seamless integration. It is based on client-server architecture.**

***Keywords*—Android, channel, mobile application, publicity**

INTRODUCTION

The usual dining experience begins with one thing, deciding where to eat. That decision process, however, can be tricky. Social circumstances often lead to a dilemma when it comes to food preferences. The countless food options in the Philippines do not help either. According to Payroll Hero, since 2009, the local fast food industry has seen an average of 7.06 percent in terms of growth [1]. This increase in the volume of food establishments, regardless of type of cuisine served, makes an already difficult task more intricate. Since eating out has transformed into a social activity done with many other people, the process of deciding where to eat is not done by just one person. To add to the dilemma, not all food options are known to every diner, despite having a myriad of options.

Presently, food establishments employ social media in order to expand their reach and let their brands become known, and to great effect. The same 2013 study from Payroll Hero suggests that 71 percent of consumers are more likely to make a purchase based on social media referrals. The study also found that three out of four people have used the social networking website, Facebook, in making restaurant or retail decisions.

There are food establishments, however, that either do not share the same social media presence or have proprietors that lack the technological know-how to even operate one in the first place. Another issue is accessibility. Both of these hindrances in achieving and administering a great dining experience are aimed to be solved by the researchers through the proposal of a mobile restaurant finder application. The development of this application would be beneficial to both people who have a hard time deciding where to eat and owners of businesses, especially those who are not considered as "tech-savvy."

Objectives

The general objective of the project is to design and develop a user-friendly Android mobile application for finding food establishments in select Los Baños, Laguna areas. The specific objectives of the project, are: to design a user-friendly mobile application that would be of substantial aid to both parties involved; to develop a mobile application that would help consumers in choosing food establishments based on the factors that affect their decision-making and restaurant proprietors in various aspects of their operations such as getting orders, convenience, and most especially, marketing; and to evaluate the system using software standards.

RELATED WORKS

The ability to seamlessly pinpoint a location or direction within a person's hands has catapulted services that utilize location or Global Positioning System (GPS) tracking into one of the most widely used kinds of applications today. The advents of these technologies, known as Location-Based Services (LBS) have also elevated user standards in a way that they expect applications to include real-time, geo-addressable features. The emergence of Information and Communication Technology (ICT) in the academia environment has contributed to the development of e-learning systems. They have received considerable attention in education and provided significant

advantages such as convenience, flexibility. and a global learning community [2].

Services that make use of LBS technologies include, but are not limited to, safety and emergency, navigation, search applications, e-commerce, and geo-tagging in social media which also lists how the utilization of LBS can help further enhance the usage of restaurant finder applications such as the one the researchers proposed through the addition of features such as: location-based advertising, restaurant awards and/or badges, and tracking friends' restaurant history [3].

There are many reasons as to why Android continues to be the world's most widely used operating system (OS). The biggest is its open source nature. It has become the preferred OS by both customers and developers alike since it is fully customizable and easily tinkered with [4]. Users of other mobile operating systems such as iOS do not enjoy the same degree of availability and flexibility that those who use Android devices do.

Why m-commerce? Convenience is the number one answer, but there are other factors at play, pros include a faster transaction process, increased consumer reach, low operational costs, access to remotely located stores, ability to rapidly scale upwards, and easier communication process [5]. On the other hand, the cons include conflicts in security, human and machine error, technical requirements, and high reliance on technology.

The role that food plays in society is deeply rooted into a certain country's culture—food is an important dimension when it comes to ethnicity and national identity. Results also state that food possesses a "heritage that is worthy of protection." Another aspect that gives food its social nature is its global characteristic. Henderson's study, for instance, details how food in one country can be directly "influenced by globalizing forces." This does not mean that external food cultures would overpower local uniqueness. That differing food cultures can co-exist in a same local plane that gives food all the more social capabilities [6].

When talking about restaurant-related applications for mobile, arguably the most popular is Yelp. It was started in 2004 by two former PayPal employees, Jeremy Stoppelman and Russel Simmons. It is one of the biggest restaurant-recommendation services online, with $5 billion valuation and about 130 million unique monthly visitors in 2014. While not entirely restaurant-exclusive, many people use Yelp for that purpose—to find good places to eat. How effective is it, though? [7].

It is suggested that online review services such as Yelp do indeed have an impact on restaurants and its patrons. The study found that a one-star increase in a restaurant's Yelp rating increases revenue to up to five to nine percent. Nonetheless, not all restaurants enjoy this effect. Chain-affiliated restaurants, such as McDonald's and Burger King, are excluded from this, and have even declined in market share as Yelp continues to evolve and occupy a large market share. This leads to a belief that an introduction to lesser-known restaurants (not chain-affiliated) through the use of a technological application would be beneficial business-wise and client-wise [8].

METHODOLOGY

Project methodology

The agile methodology has given other software development methods such as in Scrum and Agile Unified Process a platform. The mobile nature of the system, however, that the researchers proposed requires the chosen methodology to suit its needs.

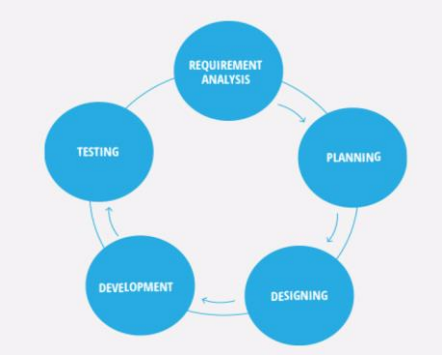

Figure 1. Agile methodology with Lean SDLC

Using agile methodology for mobile application development, the application development process becomes quicker, easier, and more efficient. The *requirements analysis* began during the inception of the project topic and client deliberation in order to gauge and measure the required components of the system based on the needs of the client. After the goals of the proposed system were clear with the guidance of the client, the researchers moved on to the next stage of development. After identifying the requirements for the system, the *planning* phase occurred in order to determine how best to tackle the needs of the client. The planning stage included analysis and assumption of time, financial, and personnel costs. This is critical in order to assess the feasibility and measure the success of the system. Apart from designing the application's parameters, the researchers also underwent the actual design of the application. The project's components, including user interface and features are meant to fulfill the requirements planned during the *requirements analysis* stage. The design of the system should adapt to

the mobile platform that the researchers propose to be used. *Development* is the actual creation of the system, in this instance, in the form of programming. The researchers utilized Android Studio in order to build the system with the Java programming language. Currently, the researchers are in the developmental stages. The system currently features only a log-in module, with the other modules soon to follow.

The *testing* of the application would be the final phase of the study and it would be the measuring stick for the success of the system. Additionally, the researchers would employ a post-development survey for users and administrators of the application in order to gauge how effective the system is in terms of functionality, ease-of-use, and maintainability.

System architecture

This is the system architecture of the capstone project which is the foundation of the layout of its hardware and networking topology that are used in the development of the system.

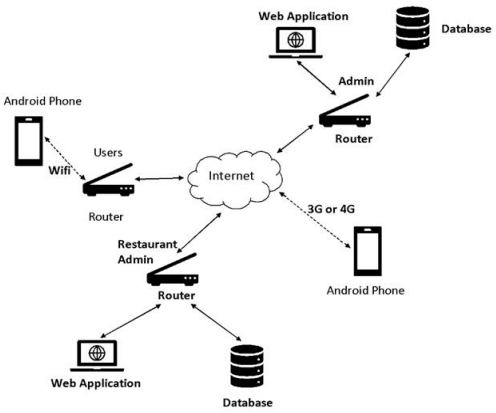

Figure 2. System architecture

The network topology defines the physical and logical layout of the network that the application uses. Figure 2 depicts an example wherein two users are simultaneously using the application; therefore, simultaneously accessing the database. This synchronous process makes use of the network through communication.

Graphical user interface

User account

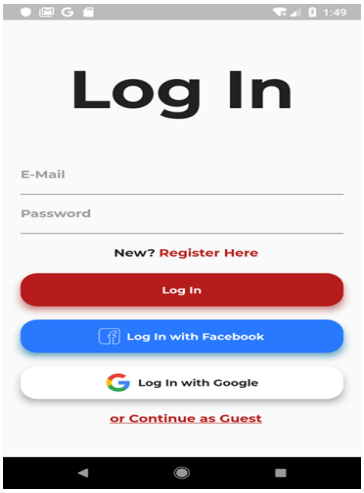

Figure 3. Log in/sign up page

Log in page of the system contains login forms such as text boxes for both the e-mail and password. There are three buttons on the page, one for logging in through e-mail, Facebook, or Google. For new users, a link for registering to the application is also present. A guest button is also available.

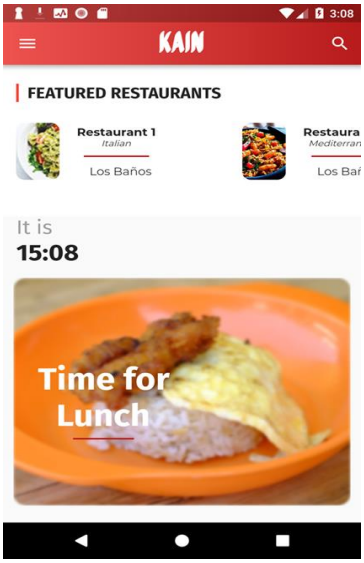

Figure 4. Homepage

The homepage of the application features a hamburger button on the top-left that triggers open a side menu, a search button on the top-right to search for specific restaurants, and featured restaurants on the middle that shows food options depending on the time of day.

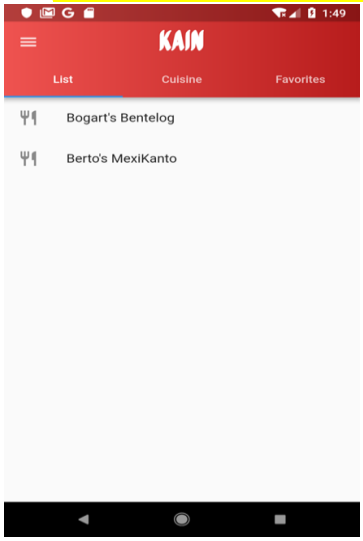

Figure 5. Side menus

The side menus slide open when the hamburger button is pressed. It has four sub-menus, namely: restaurants, nearby, settings, and FAQs. It also features a user profile above the menu. The homepage becomes blurred when the side menu is open to assert focus on the side menu.

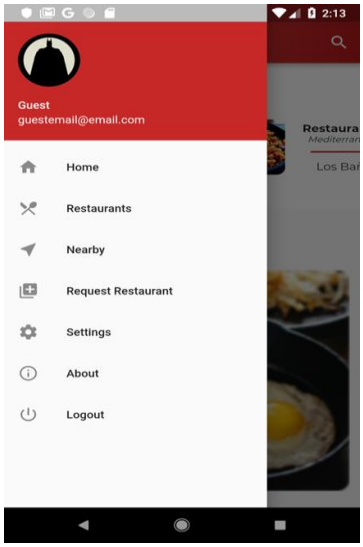

Figure 6. Restaurants' list menu

The restaurant's menu features three sub-menus: list, cuisine, and history. The *list menu* shows a list of all the restaurants registered in the application. The *cuisine menu* divides the restaurants by type of cuisine. The *history menu* shows previous restaurants ordered from or rated.

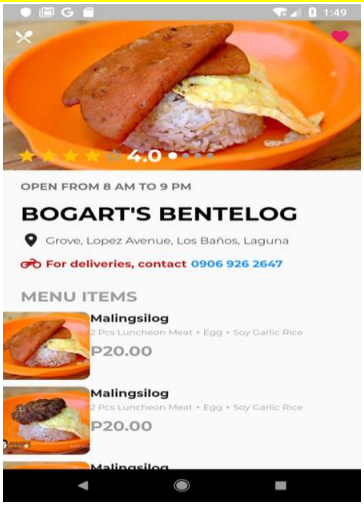

Figure 7. Sample cuisine menu (Silog)

A sample restaurant page, Bogart's Bentelog, contains restaurant details, restaurant menu, contact details for deliveries, and a rating system.

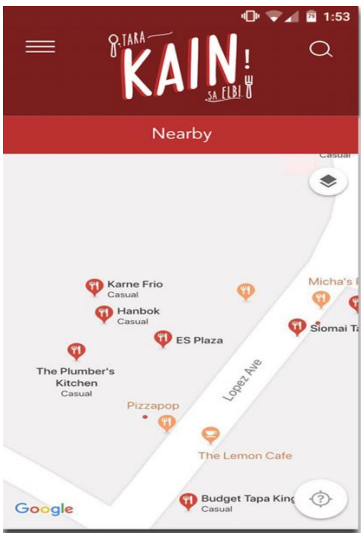

Figure 8. Nearby restaurant's menu

The *nearby food establishments menu* displays restaurants in the vicinity. This uses the Google Maps API in order to distinguish restaurants that are registered in the application as well.

RESULTS

Evaluation on system performance

This section summarizes the findings and results of system evaluation using software quality standards on software functionality, reliability, maintainability, and portability using ISO 9126, a software product evaluation standard from the International Organization for Standardization.

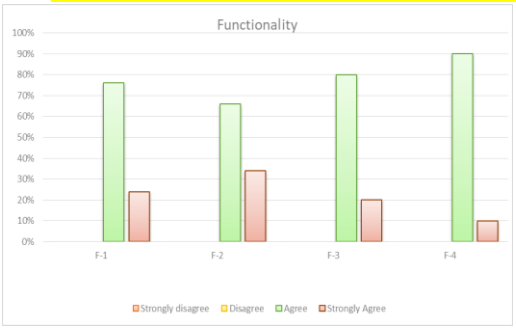

Figure 9. Functionality evaluation of the system

For F-1, *sufficient testing of the system was carried out prior to implementation*, 76 percent of the respondents *agree*, followed by 24 percent who *strongly agree*. For F-2, *the application is operating as expected*, 66 percent *agree* and 34 percent *strongly agree*. In terms of F-3, *the software responds well to user inputs*, 80 percent *agree*, while 20 percent *strongly agree*. In F-4, *the application is effective in accomplishing required tasks*, 90 percent of the respondents *agree* and 10 percent *strongly agree*.

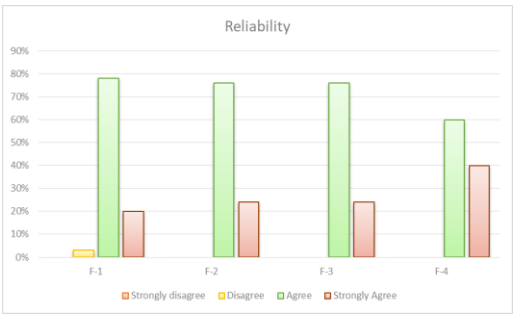

Figure 10. Reliability evaluation of the system

For F-1, *the application was able to serve its purpose reliably*, 78 percent of the respondents *agree*, 20 percent *strongly agree*, and two percent *disagree*. Under F-2, *the application experienced zero to little crashes*, 76 percent *agree* and 24 percent *strongly agree*. In F-3, *our business' data was not compromised during application runtime*, 76 percent of the respondents *agree*, followed by 24 percent who *strongly agree*. For F-4, *each runtime of the application was uninterrupted*, 60 percent *agree* and 40 percent *strongly agree*.

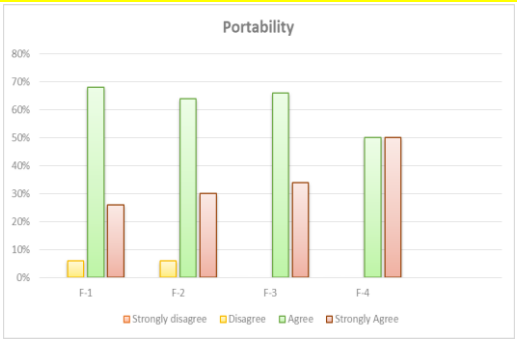

Figure 11. Portability evaluation of the system

For F-1, *the Android platform is the ideal environment for the application*, 68 percent of the respondents *agree*, followed by 26 percent who *strongly agree*, and six percent who *disagree*. F-2, *the application is easily utilized in mobile devices*, 64 percent *agree*, 30 percent *strongly agree*, and six percent *disagree*. For F-3, *the application is available for offline use*, 66 percent *agree* and 34 percent *strongly agree*. For F-4, *the application runs smoothly throughout many device iterations*, 50 percent of the respondents *agree* and *strongly agree*.

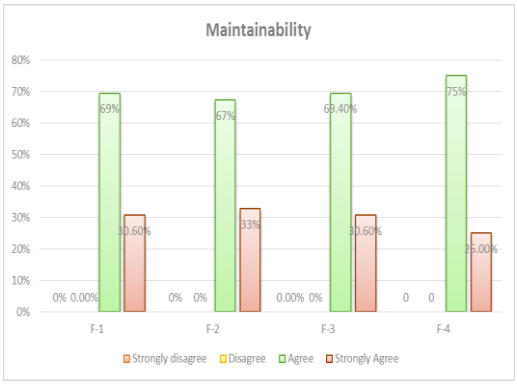

Figure 12. Maintainability evaluation of the system

In F-1, *the application is well-maintained*, 69.40 percent of the respondents *agree*, followed by 30.60 percent who *strongly agree*. F-2, *the application received regular updates from developers*, 67.30 percent *agree* and 32.70 percent *strongly agree*. For F-3, *the application's performance was kept in track*, 69.40 percent of the respondents *agree*, then 30.60 percent *strongly agree*. For F-4, *software bugs were regularly fixed by the developers*, 75 percent of the respondents *agree* and 25 percent *strongly agree*.

CONCLUSION AND RECOMMENDATION

Conclusion

The researchers were able to create an application that can provide information about certain food

establishments in selected Los Baños areas, show the location of said food establishments, display the cuisines of said food establishments, and avoid the dilemma of deciding on where to eat. With internet connection, users can create accounts and view the information in the application. The restaurant administrators can view, add, edit, and delete information regarding their restaurants and their menus. While the administrator can view, add, edit, and delete the list of restaurants and users in the system by the functionalities that are provided by the researchers. In developing the system that can reduce human errors and processing times, if this application can be implemented and released in the Google Play Store, it will surely help a lot of people, restaurant owners, and users alike.

Recommendation

With having this system, clients should have their internet connections or connected to a network for them to access the system or the application. Information dissemination to chosen restaurants should elevate the extent of awareness about said food establishments. The administrator is able to manage and see through the restaurants and users list that is made before, while restaurant administrators are the ones who manage their menu products. The users can only view the displayed information in the application.

The following recommendations are offered for future researchers. Researchers should have contact and communication with their clients. Future researchers ought to execute their arrangement in a decent way along these lines, objectives can be effortlessly accomplished. Future researchers should have the knowledge and technical skills in enhancing the *Food Establishment Finder Android Mobile Application* for the benefit of end users.

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