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**Short Paper**

# HAYBOL: An Android-Based Apartment Locator Application

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**Abstract**

*Purpose* – The study aims to develop a system for finding apartments and boarding houses named as HAYBOL. This android-based apartment locator application is a mobile one that can be used by the community especially students, easily find apartments and boarding houses as well as to help owners promote their businesses.

*Method* – The proponents used Rapid Application Development (RAD) in developing the software which is a systems developmental method that follow phases such as requirement planning, user design, construction and cutover. Then, it also facilitated testing and evaluation, purposive sampling was used to select the respondents. Two sets of questionnaires were developed, one for the apartment and boarding house owners and another for the tenants.

*Results* – Based on the result on the system evaluation using ISO 9126 in terms of functionality, usability, content, reliability and performance. Overall, the application was rated as 3.55 over which verbally-interpreted as excellent.

*Conclusion* – The system meets its objective to provide access to the users an application for finding apartment in a convenient way. HAYBOL is well-commendable and accepted by the community which provides a better, easy way of advertising apartments and boarding houses, and reliable tool for finding nearby apartments and boarding houses.

*Recommendations* – It recommends an expansion of the system coverage throughout the Laguna Province and to add a user guide and direction on the easiest ways to go to a chosen apartment to improve the effectiveness and functionality of the application.

*Research Implications* – Real time apartment information is currently growing which much provides more good services to make renters life easier. Once mobile locator application has been established in the business will help users to personalize their search and reduce the amount of time wasted on a bad rental fit and assist to set a budget looking for apartment you can afford.

*Keywords* – apartment, renter locator, mobile application, apartment locator, RAD, boarding house

# INTRODUCTION

The high growth of Internet users makes e-commerce to be a promising business opportunity. In e-commerce market, there is no physical interaction between buyers, sellers, and payments (Octavia &Tamerlane, 2017. This has made the use of mobility-supporting technology an interesting opportunity for business owners because it can optimize the use of selected business processes. Such mobile business processes are often found in industries for sales or service purposes (Gruhn, Kohler, & Klawes, 2007). Today, it is at the stage of maturity and has become the focus of business activities. At present, the growth of content and services related to information technology is inevitable as it opens new opportunities and encourages the creation of business rental with entirely new contents and services to help the community (Korona & Grzunov, 2014). Searching for an apartment and boarding whether for rental or permanent residence has become a tough job. But these tasks can be made easier with the help of mobile application websites that could help people search for a house. Because in the era of smartphones, mobile apps can make this job become easy. These mobile apps for searching a house for rent or a home to buy makes this hunting easier.

At present, finding an apartment or condominium for rent in the Philippines can be a time consuming exhaustive task (Sta Ana, 2017). There are also a shortage of off-campus and student-friendly housing in most college towns which cause students to rent in an apartment close to the vicinity of a school (Maughan, 2016). Currently, there are few existing systems intended for searching an apartment. For example, PadMapper allows users to search apartments in a specific city or country. It uses Google Map and allows users to register an apartment using their address. Other mobile applications for hunting house and apartment include Housing.com, CommonFloor, 99acres, MagicBrick and The Property. These applications can help an individual search, post a flat for sale, and find new house or apartment. The same application can be used for buying a new property. The application could help anybody visually explore and search by using search map. However, most of these applications are only applicable in India. The applications are focused on the properties for listing apartments, and for selling and buying land properties which students unfortunately could not afford.

Fortunately, the proposed system has the capabilities to help a student to locate nearby apartments and boarding houses, not to mention, save time and effort in finding available units for rent. The application could also help the apartment and boarding house owners to promote their apartments by simply uploading the pictures of their units.

The proponent utilized some available tool to create a system by using the Google Map which is being utilized in web-based systems. Considering this, the proponents had developed an android-based apartment locator application aptly called the HAYBOL. It involves the access to Google map containing markers indicating the position or location of the apartment registered to the application. In contrast to the current existing system for finding an apartment, it offers different colored markers that allow users to know if the registered apartment has a business permit. Some of its highlights are GPS mapping that could allow the landlord to use the Global Positioning System (GPS) to actually register their location or manually pin-point the exact location of a house or apartment for rent on the Google map. Important pieces of information are also available like the owner's contact information, , visit reservation, monthly rent, complete address, etc. It also has a web application for administrator to validate the legality of the business by accessing information about business permit and clearance. It has filters that are easy to use. This app is easy to use and because of its small memory requirements, it takes less memory space in installing and running on mobile.

The study aims to develop a system for finding apartments and boarding houses named as HAYBOL. This android-based apartment locator application is a mobile one that can be used by the community especially students, easily find apartments and boarding houses. It can also help owners promote their businesses. To attain this, the

proponents gathered user requirements such as standards of tenants in selecting an apartment and issues and concerns encountered by both the owners and tenants for the development of a mobile application.

## LITERATURE REVIEW

In most college towns, there is a shortage of off-campus, student-friendly housing, which puts rentals in high and constant demand. Most of the tenants in an apartment are students who are enrolled in a higher education program that operates on a term or semester system (Maughan, 2016). In this regard, Sta Ana (2017) recognized that finding an apartment in the Philippines is difficult when one is not familiar with a place and environment. In addition, the location of an apartment plays a big role in choosing the neighborhood because one needs to consider security and personal convenience (Hoppler Editorial Board, 2017). Note-worthy is also the fact that students' study habits are also affected by living in an apartment away from the school. Students who perform better academically are those living in apartments compared to those living in their home due to the struggle of travel (Tsavo Media Canada Inc., 2010). Additionally, Hanna (2006) recognized that one of the advantages of living in an apartment is that when a student is in the room, all the things he or she needs like books, notes, and other study materials are already present.

Examples of online house for sale or for rent finders include the following: PadMapper at padmapper.com is an online based apartment finder that allows users to search apartment in a specific city or country. It uses Google Map and allows users to register an apartment using their address. It also allows tenants to email the landlord regarding the business transaction. It is a system which let the landlords/landladies plot the apartments on a big map, and allows one to filter for exactly what a customer wants (DeMenthon & Crowell, 2016). Hotpads at hotpads.com focuses on regency of the listing of new apartments registered to the system as top search when user navigates through the system. (Zillow Group, Matt, Douglas, & John, 2005). Rent Jungle at rentjungle.com features listing of apartments gathered from over 12,000 property management and owner websites. It serves as a 'housing search' engine that lets user even search for a town house and rental property (Rainmaker Group, 2014).

The most popular app for hunting a house is Hosing.com. With the help of this app, one can post a flat for sale, find a new apartment to rent or buy, search for a hostel, and look up new localities. This app has detailed data and pictures of every property. One can use filter and search every specific detail needed. The CommonFloor property app can help an individual search real estate projects and properties. This app could be used for searching, buying, renting and selling properties like apartments, flats, houses, villas, residential projects in India. It has smart filter options which search properties by using map search. Additionally, another mobile, the app 99acres is one of the housing apps that could be used for searching a place to buy, sell, or rent. It is widely used in India. Moreover, MagicBrick is another application that can assist a person who is interested to buy, sell, or rent properties. It gives detailed and latest information about properties in India. It has map facility so that a user can visually explore the area nearby the property. It has photos and videos of the neighborhood for a customer to see. MagicBricks however does not disclose details until it verifies the details of another person. Lastly, The Property Plus which uses the search property to buy and rent via the mobile. This app is easy to use and with its memory requirements, it takes less memory space in installing and running on mobile. This app redirects one to other housing related apps like 99acres, Apartment guide, Backpage, Click, Century21, Ebay Classified, Flat-club, Homefinder.com, and among other (Singh, 2015).

Airbnb is a website that offers exclusive accommodation in a house, apartment, boat, or room. It is free to create a listing. The host decides how much to charge per night, per week or per month. Each listing allows hosts to promote properties through titles, descriptions, photographs with captions and a user profile where potential guests can get to know a bit about the hosts (Guttentag, 2015). While Agoda.com serves a variety of information about the hotels needed by tourists, it only accepts payments by credit cards. In a review, Agoda shows names of the hotels, their average user rating and the price for the rooms. Clicking on a hotel takes a customer to a page where one can have the option to see the hotel's policies and a listing of its facilities as well as other useful information (Montenegro, 2014). Both of these websites are online booking and reservation for tourists. It is the reason why it is used not only by more and more tourists, but also by renters. In online transaction, there is no physical interaction between the buyers and sellers.

GPS is a system that can be utilized in the development of HAYBOL. GPS mapping gives a number of advantages like 100% coverage of the planet, easiness of navigation, low cost and as a result, it is very easy to integrate into other technologies like mobile phones. HAYBOL is an application that is fast, clear and simple to use by the target users via mobile and web application renters and clients can communicate and connected easily.

## METHODOLOGY

*Software Development*

The proponents used the Rapid Application Development (RAD) in developing the software which according to Rouse (2016) is a systems developmental method. In Phase 1- Requirements planning, three apartment owners in Siniloan, Laguna and 30 selected tenants who are students of Laguna State Polytechnic University were interviewed using focused-group discussions. The proponents discussed first the concept of the proposed system and the benefits that can be derived from it once developed. Deliberations on project scope and potential issues were argued including the business requirements. This is the most vital process and communication is the key to this stage. In Phase 2, the prototype of the mobile application was developed. All the collected pieces of information from Phase 1 were integrated into the processes including the required inputs and expected output. This process is iterative; allowing the proponents to continually tweak the model until the requirements have been satisfied. Phase 3 is the start of the final construction. The final suggestions for the improvement of the mobile application were integrated to the 3 system modules (i.e. administrator's module, apartment owner's module and tenant's module). Phase 4 is the cutover phase. Since there is no existing system that is being utilized by the respondents, there are no data that are needed to be converted. Hence, testing and user's training were the only processes conducted before the system was placed into operation.

*System Testing and Evaluation*

To facilitate the testing and evaluation, purposive sampling was used to select the respondents. The same three apartment owners and 30 student-tenants from the Laguna State Polytechnic University were included. Two sets of questionnaires were developed, one for the apartment and boarding house owners and another for the tenants. The questionnaires contained five criteria: functionality, usability, content, reliability and performance. Each of the criteria utilized several indicators as shown in Table 1. These questionnaires were validated by the panel of oral examiners during its proposal stage.

Table1. Components of the evaluation questionnaire

| **Criteria** | **Indicators** |
|---|---|
| Functionality | Ease of operation |
| | Provision of comfort and convenience |
| | User-friendliness |
| Usability | Intuitive design |
| | Ease of learning |
| | Efficiency of use |
| | Memorability |
| | Error frequency and severity |
| | Subjective satisfaction |
| Content | Accuracy |
| | Updatability |
| | Presentation |
| Reliability | Conformance to desired result |
| | Absence of failures |
| | Accuracy in performance |
| Performance | Trial 1 |
| | Trial 2 |
| | Trial 3 |

Using a 4-point scale, the average weighted mean was computed and interpreted as (1) 3.26-4.0: Excellent; (2) 2.51-3.25: Very Satisfactory; (3) 1.76-2.50: Satisfactory; and (4) 1.00-1.75: Needs Improvement.

## THE PROPOSED SYSTEM

*System Architecture*

Figure 1 represents the system's architecture of the project "HAYBOL: An Android-Based Apartment Locator Application". It shows the interaction and privileges of the 3 end-users who can access the system; the admin, with highest privilege; user, and landlords. It is a mobile-based application that requires internet connection to access the whole content of the system. All the information accessed by the users shall be obtained from the storage of the server.

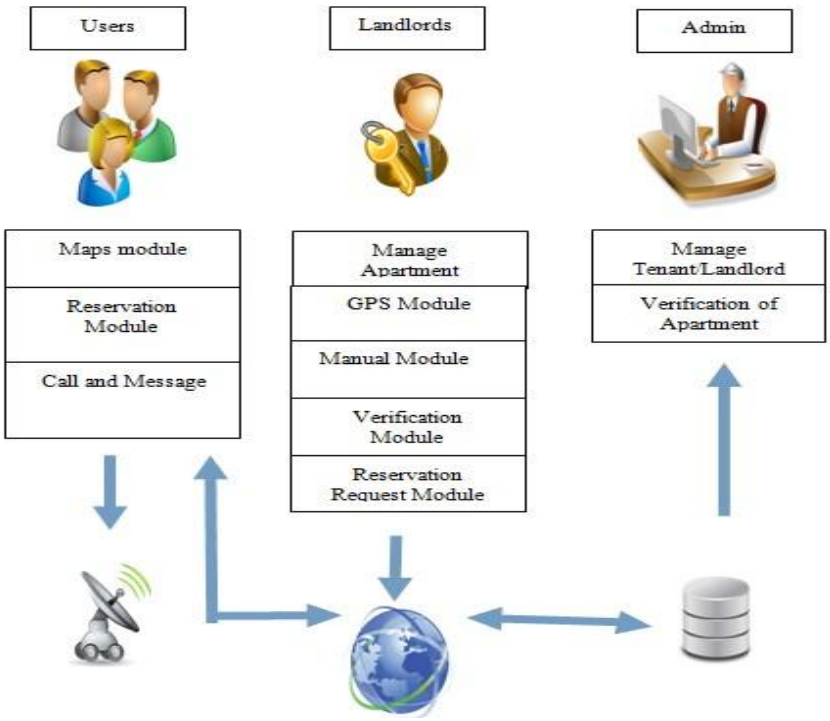


*Figure 1*. System's Architecture

*Administrator Activities*

Administrator, who happens to be the developer of the system, has the highest privileges in the system.. He can manage the landlord and the user by blocking and unblocking them from using the application. They also have access to the verification requests submitted by landlords. The Administrator is responsible for managing the business permit. Whether it is verified or not will result to a different marker indicator on the Google Map Activity of the User represent in Figure 2.

*Landlord Activity*

Figure 3 shows the landlord module who can manage the apartment. In this activity, the landlord can view his registered apartment. If there is no registered apartment yet, the landlord can add one in this section too as shown in Figure 4. The landlord has access to the visit reservation of the user if someone requests it. The owner can also upload a business permit under the 'Verification Request' which will be sent to the administrator for certification.

*User Activity*

The User has access to the Google Map containing different marker indicating if the registered apartment is verified or not. It is under the 'Apartment Finder' section as shown in the Figure 5. The users can also send a visit reservation under 'Reservation' section. His or her reservation request status is shown in Figure 6.

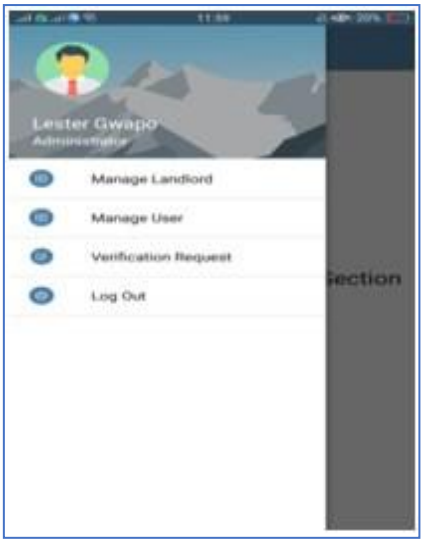


*Figure 2*. Administrator's Module

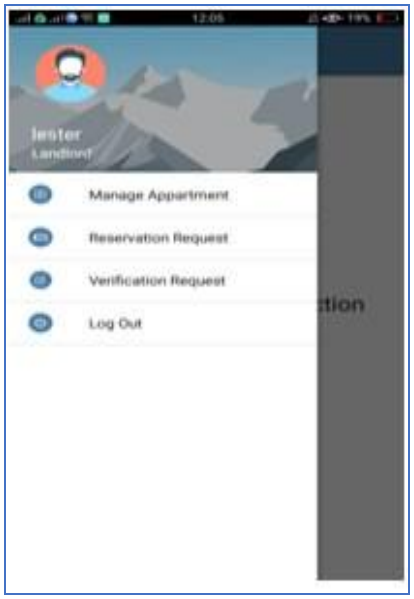


*Figure 3*. Landlord's Module


*Figure 4*. Management Apartment Section

One of the features of the system is that, it is secured. Figure 7 shows that it allows landlord to upload their business permit for verification which are processed by the administrators of the application. The users or the possible tenant must log-in a Facebook account upon registering the application and input information such as the address, contact number, and other personal details to confirm the identity of the real renters or tenant to avoid the admission of bogus users. The tenants have access to the Google map containing markers indicating the location of the registered apartment as shown in Figure 8. It features different markers whereas red indicates that the apartment is not yet verified because the landlord was not able to submit their business permit. On the other hand, green indicates that the registered apartment is verified and certified.


*Figure 5.* User's Module


*Figure 6.* Reservation Request

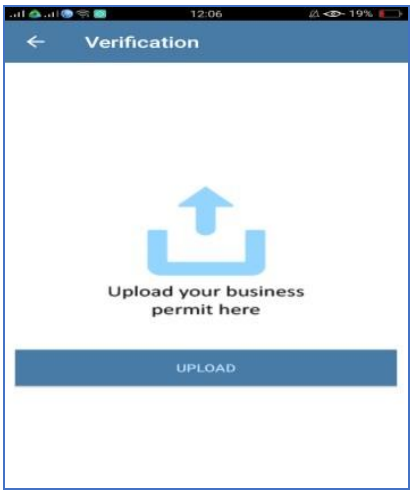


*Figure 7.* Verification Module

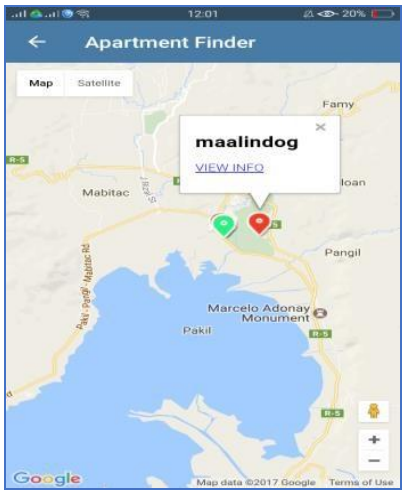


*Figure 8*. Location of apartment is shown in Google map

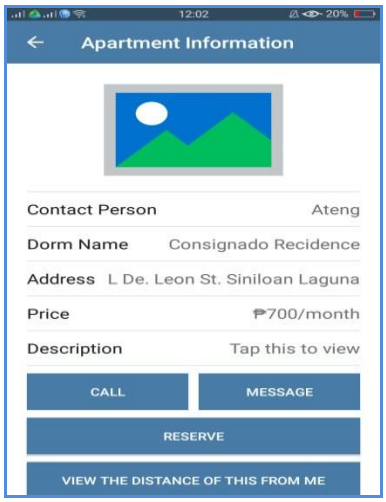


*Figure 9.* Apartment Information

Various pieces of information regarding the apartment are shown in Figure 9. The system also allows the users to call or message the owner of the apartment for further business transaction. It also features a room visit reservation and a GPS direction from where the user currently resides to the actual location of the apartment.

## RESULTS AND DISCUSSIONS

The system was rated by selected individuals of Siniloan Laguna as shown in Table 2. Functionality was evaluated with a mean of 3.5 which can be verbally interpreted as *excellent*. It means that the system is user friendly and easy to operate. Usability was also evaluated with a mean of 3.8 which is also interpreted as *excellent*. It means that the application is efficient to use, has an intuitive design and is easy to navigate. Content was graded with a mean of 3.4 which can be verbally-interpreted as *excellent*, which can prove that the system is accurate. Reliability has a mean of 3.9 which is verbally-interpreted as *excellent*. It denotes that the absence of failure and conformance was highly-rated by the respondents. Performance has a mean of 3.2 which can be verbally-interpreted as *very satisfactory*. The application has a very satisfactory presentation before the end-users. Overall, the application was rated as 3.55 over which can be verbally-interpreted as excellent.

Table 2. Overall Acceptance of the Developed System

| Criteria | Mean | Verbal Interpretation |
|---|---|---|
| Functionality | 3.46 | Excellent |
| Usability | 3.80 | Excellent |
| Content | 3.37 | Excellent |
| Reliability | 3.90 | Excellent |
| Performance | 3.23 | Very Satisfactory |
| **AWM** | **3.55** | **Excellent** |

## CONCLUSIONS AND RECOMMENDATIONS

The system meets its objective to provide access to the users an application for finding apartment in a convenient way through the use of an ICT tool that can easily be accessed by the users. The result of the evaluation of the acceptability of the system 'HAYBOL' is well-commendable and accepted by the community. In particular, it provides a better and an easy way of advertising apartments and boarding houses. On the part of the students and other tenants, the application is a convenient and reliable tool for finding nearby apartments and boarding houses. However, every application has a space for improvement and can be modified to further improve its effectiveness.

The researcher was able to upload a downloadable android package kit (APK) of the application on the internet so it can be available to target users. The proponents recommend an expansion of the system coverage throughout the Laguna Province to help the students who can serve as basis for a big system that can cover the entire apartments in the country. The researcher also wants to add a user guide and direction on the easiest ways to go to a chosen apartment to improve the effectiveness and functionality of the application.

## IMPLICATIONS

Real time apartment information is currently growing which much provides more good services to make renters life easier. Once mobile locator application has been established in the business will help users to personalize their search and reduce the amount of time wasted on a bad rental fit. It help to save time and money because it can assist to set a budget looking for apartment you can afford. Anticipating the requirement of the mobile user because community is demanding they want things easier, more commonly seek location based relevant information such as nearby store restaurant, schools, and share their location. You can use internet to search apartment without leaving you home and easier to get information about apartment through the mobile and web system that serve a search engine for apartment and house locator.

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