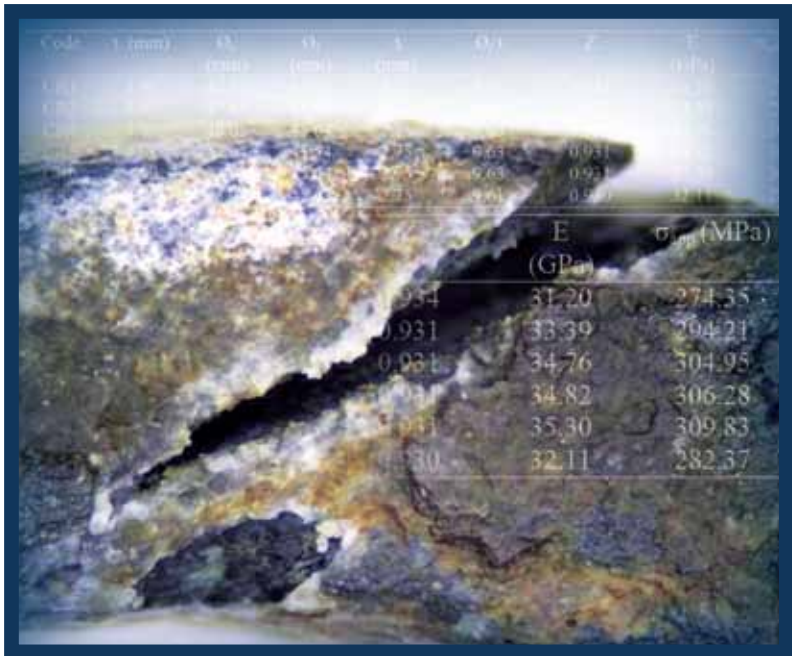


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Implementation of E-rental Housing via Generic Notification Message Through Mobile Phone

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ABSTRACT

As UiTM increases its student enrollment, the number of students seeking accommodation inherently increases. This is particularly true with respect to off-campus accommodation since the number of students that the residential colleges can accommodate is limited. Unit Kebajikan NR (Non Resident) under Hal Ehwal Pelajar (HEP) has been set up to assist students looking for suitable accommodation. The unit is still implementing a manual- and paper-based processing to capture information. This is both highly inefficient and time consuming. This study provides a convenient platform for students and landlords to share updated information about available rental accommodation. A prototype web-based rental housing system, which is based on generic notification messaging, has been developed. This online system offers services to students seeking rental accommodation around the UiTM campus. Home owners can use this system to advertise their properties without the use of paper based forms or placing advertisements in newspapers, which is common practice. Communication between potential landlords and tenants can be done interactively via SMS once both parties have registered with the system. A System Development Life Cycle (SDLC), an iterative development, has been adopted for the purposes of evaluating this study. This research has the potential to aid in the development of an effective means by which accommodation for students and essentially any potential rentees can be found and attained.

Keywords: *Web services, notification system, E-rental, SMS*

Introduction

The process of looking for suitable off-campus accommodation is not as simple as it seems. Many students have difficulty finding a house or apartment around or near the UiTM campus. This is largely due to a lack of information related to housing availability, which meets their budget and/or is in a preferable location. It is therefore of significant importance that the university develops a robust system to assist students through the automation of the house finding and matching process. The number of students seeking accommodation continues to increase with increasing university enrollment.

Universiti Teknologi MARA has approximately 120,000 students nationwide, with 70,000 new students in each intake. About 45 % of these students, which equates to more than 50,000 individuals, are located at the Shah Alam campus. Although there are 13 residential colleges provided in Shah Alam to accommodate these students, they can only cater for about 16,800 students at one time [1]. The rest of the students have to resort to renting houses located near to the campus. The Unit Kebajikan NR (Non Resident), under Hal Ehwal Pelajar (HEP) at the Shah Alam campus, is responsible for assisting students without college lodging to find suitable accommodation.

Currently the unit manually gathers information regarding accommodation availability from potential landlords. Landlords who wish to rent their properties are required to go to the Unit Kebajikan NR office, located at the HEP building, to register and complete paper-based forms regarding the specifics of the accommodation they wish to rent. All the available information is compiled and a list of available accommodation is placed on the notice board. Unfortunately, since the forms are processed in batches, there is a distinct possibility that advertised properties are no longer available upon their publishing on the notice board. Although unfortunate, the unit has no control over the landlords and to whom they rent their properties. Ideally students seeking accommodation would go to the Unit Kebajikan NR office to get information regarding the available properties, contact the potential landlords, visit the potential properties, and finally settle for their preferred property [1]. These activities are particularly time consuming, so much so that sometimes students settle for houses that they dislike, this is further compounded by the likelihood that the property information provided by the Unit is out of date.

In order to resolve accommodation issues and improve the efficiency and effectiveness of the Unit's student accommodation system, the E-rental Notification System has been developed. The E-rental Notification System integrates web application technology, SMS notifications, and provides decision making elements in an application that has the potential to resolve the problems faced by the Unit Kebajikan NR and off campus students in Shah Alam.

E-rental Notification System

A web application system is a system is provided through web pages, accessed through a standard web browser. Typical activities for web application systems include monitoring conditions, running reports, changing set points, changing schedules, receiving and responding to alarms, downloading updated control programs and graphics [2-3].

Notification systems allow the broadcasting of messages to multiple people via various mediums including paper, SMS, e-mail, mobile telephony, fax and voice mail [5]. SMS is the preferred medium in notification systems which use mobile phones. [6-7]

The E-rental notification system is a web application system that uses alerts to keep users up-to-date of the latest developments, thus making it highly interactive and effective. The system requires little time and effort from users, this coupled with easy processing ensures that accommodation hunting can be accomplished quickly and effectively. The participation of any parties is purely voluntary and can be terminated at any time.

System Design and Development

This project was divided into small phases so that for each phase, real-time results can be produced and reviewed while the process is continuously running. The phases involved include system planning, system requirements, system design and system implementation. In the first phase, the E-rental Notification System was planned with respect to findings from several pieces of related research. The second phase focused upon the system requirements. The actual design of the E-rental Notification System is designed and the system implementation are explained in detail in the following two sections.

System Design

The E-rental Notification System design process architecture is presented in Figure 1. The system involves two parties; the potential tenants, referred to as customers, and the property owners, referred to as landlords.

Within the design phase of the system, there are two sub phases. In the first sub phase, the customer and landlord will interact with the system independently. Figure 1 shows the design of the first sub phase of the process, which is an automated system. Customers will be interacting with the system via a web page. The system involves a database which contains information of the registered customers, registered landlords and properties to be rented out. All these information will not be deleted from the database even though customers had found their preferred house and the properties had been successfully rented out. It will remain in the database until the landlord cancelled off their membership or registration. Another vital part of the E-rental Notification System is Ozeki SMS server, which is used for sending and receiving notification messages.

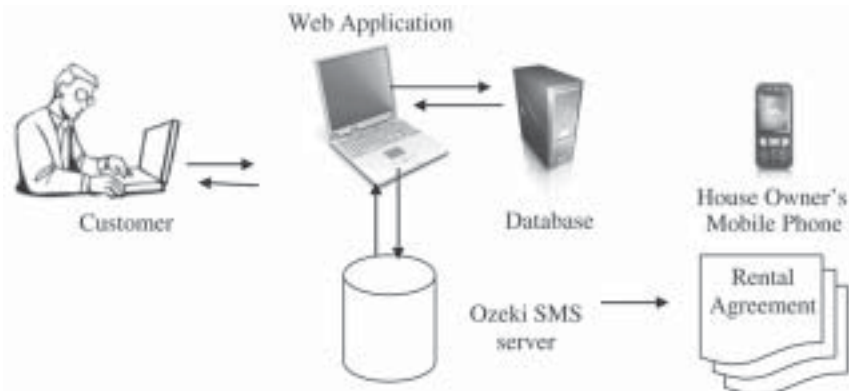


Figure 1: Architecture of E-rental Notification System

The second sub phase of the process is the printing of the rental agreement, which consists of detailed information such as standard terms and conditions, monthly rental payment and other additional information that the landlord may wish to specify. The system allows landlords to change the content of the rental agreement if they wish to do so prior to printing, and only landlords are allowed to generate the rental agreement. This completion of this phase is the outcome from the discussion between the customer and the landlord, which has been conducted offline.

System Development

E-rental has been developed using PHP as the server side-scripting and MySQL was used as the backend database. Ozeki Message Server 6.0, which is a flexible SMS gateway application enabling users to send and receive SMS messages to mobile devices from a computer, was used as the SMS Server to handle the notification services. Macromedia Dreamweaver 8.0 was used as the web authoring tool to develop and design the interfaces and Mozilla Firefox was selected as the browser for this project. E-rental Notification System runs very well on Microsoft Windows XP Professional 2. The complete flow of E-rental Notification System is discussed in the next section.

E-rental Notification System Flow

Figure 2 presents the process flow for the E-rental Notification System. It is a necessary requirement that new users register themselves prior to be given permission to access and use the system. The user is then prompted to specify the requirements of the house that they have in mind. Based on the specifications, a list of houses available for rent will be listed. In some circumstances, no houses will be displayed since none match the user's specifications in the database. In this instance the user will be prompted to widen the scope of their search criterion. In the instance that too many results match the criterion, the user will be requested to refine their search criterion. Upon the selection of the users preferred house, an SMS Notification will be sent to the corresponding landlord. This SMS notification will contain the customer's name, mobile phone number, the property ID, the customer's gender, marital status and religion.

Once the landlord has received the notification, they are required to provide feedback to the system. Upon the system receiving a response from a landlord, it will generate an SMS notification to the customer. If the landlord has responded 'Yes', a positive SMS notification will be sent together with the landlord's contact number. If the response is 'No', then a negative SMS notification will be sent to the customer. If the customer receives negative feedback for all of the houses selected, then they need to re-enter the system and perform another search. If the landlord agrees to meet the customer and both parties are able to reach a mutual agreement regarding the terms and conditions of the proposed property rental, then the rental agreement can be printed and signed by both parties. In the event that the two parties are unable to come to an agreement the

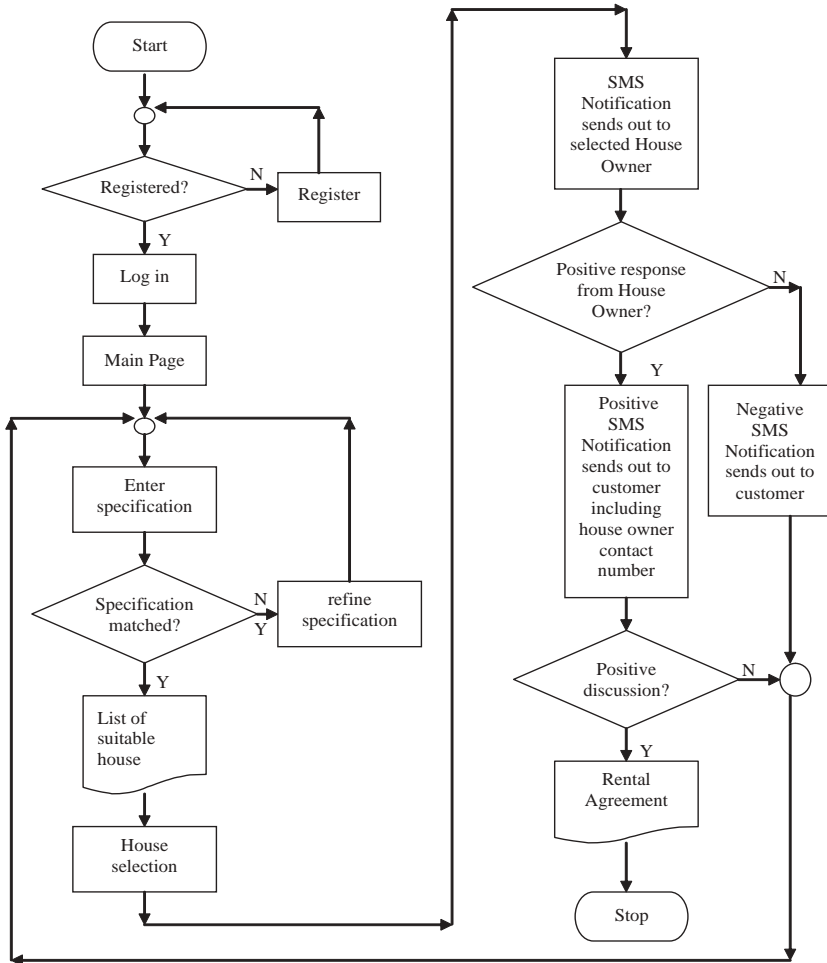


Figure 2: Flow Chart Process of E-rental Notification System

customer will need to re-enter the system and search for another property, which meets their specifications.

E-rental Notification System Prototype

A prototype of the E-rental Notification System has been successfully developed. A snapshot of the Main Page of the system is presented in Figure 3. On this page, there are several buttons and links, which enable the user to navigate around the system effectively and efficiently.



Figure 3: Main Page E-Rental Notification System

The search process, which identifies houses meeting the customer's criterion is generated by an inference engine. The inference engine has been developed using a combination of two artificial intelligence techniques, namely rule based and forward chaining. The inference engine uses customer input data and the landlords' data in the database, and compares them with respect to the rules stored in the knowledge database. The data used by the inference engine are the constraints entered by the customer; such as the affordable monthly payment amount, preferred location, gender, marital status and the preferred type of property. Once the inference engine finds a match, it will be added to a list of suitable properties and displayed to the customer. A sample snapshot of a suitable property listing is presented in Figure 4.

The customer can click on the 'Home ID' key to view a particular property's detailed information. If the customer is interested in any of the listed properties, booking can be made by clicking on the 'Book Now' button. Once the 'Book Now' button has been clicked, an SMS notification is automatically sent to the appropriate landlord to inform them of the booking. Figure 5 shows an example of SMS notification that has been successfully sent to the landlord.



Figure 4: List of Matching Properties

Landlords are able to check the customer information of interested parties using the system. A flow of information is able to continue between both parties until either an agreement is reached and the parties are ready to sign the agreement document, which can be printed from the system, or an impasse is attained and the landlord and customer decide an agreement is not possible. The agreement document is a standard rental agreement, but the landlord has the right to add, delete or modify the existing rules and conditions at their discretion. Once a specific property has been successfully rented; ie the agreement has been printed and signed by both the customer and the landlord, then the status of that property will be set to “No longer available” and will no longer be visible to other customers.

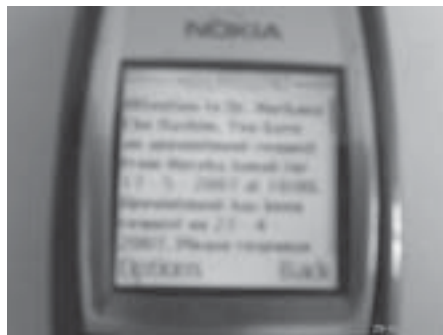


Figure 5: SMS Notification

Conclusions

An E-rental Notification System has been designed, developed and implemented. The functionality of the system has been assessed and the results are very positive. The proposed system has the potential to act as an effective broker between a customer and a landlord seeking to find and rent a property, respectively. The E-rental SMS Notification system has the potential to alleviate the problems faced by the Unit Kebajikan NR and off campus students in Shah Alam campus with respect to finding suitable rental properties.

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