Creating a Smart Web Application for Sri Lankan Universities: A Case Study of the University of Sri Jayewardenepura

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Abstract

Access to education is a fundamental right, and the pursuit of higher education often prompts students to relocate, even across borders. In Sri Lanka, a considerable number of students from rural areas migrate to urban centers for university education, resulting in a higher education gross enrollment rate of 19.8%. However, universities in Sri Lanka face challenges in providing sufficient on-campus housing for the growing student population. Consequently, there is a surging demand for private student housing, primarily driven by students themselves. Presently, private housing providers are stepping in to meet this demand. This study endeavours to explore available options for private housing in close proximity to universities, employing SMART online application techniques. Its primary aim is to assist students in identifying suitable private accommodations, taking into account a myriad of factors. A significant proportion of students attending Sri Jayewardenepura University hail from rural areas situated more than 30 kilometers away from the campus, rendering daily commuting impractical. Moreover, approximately sixty percent of undergraduate students at the University of Sri Jayewardenepura lack access to on-campus hostel facilities, necessitating their search for private lodgings. However, several crucial factors need consideration when selecting private housing. While regulations govern university dormitories, there is presently no legislation overseeing or standardizing private housing options for students. Consequently, nearly 90% of undergraduates encounter multiple challenges when seeking suitable private accommodations within tight timeframes. Given that many students are unfamiliar with the area, institutional guidance in selecting private housing would prove invaluable.

Keywords: Education, Private housing, Students, University, Accommodations

Introduction

Students everywhere have a fundamental entitlement to an education. Students move to various locations within the country or even overseas for educational purposes. The majority of students move from rural to urban regions primarily to seek higher education. However, the gross enrolment rate for higher education in Sri Lanka is shown at 19.8%. The average yearly growth rate has increased from 11.1% in 1970 to 19.8% in 2015 (Knoema Corporation (US), n.d.). Governments in many developing nations now have to accommodate university students, which is a huge burden for many. This seems to be caused by an increase in the rate of higher education enrollment. in countries like India and China, there has been a significant increase in the number of students enrolling in higher education institutions over the past decade. For instance, India's gross enrollment ratio in higher education increased from 19.4% in 2010 to 27.1% in 2020, putting immense pressure on existing university accommodations. Therefore, a need for private

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student housing has emerged, driven mostly by students, and private housing providers are meeting this demand in the present market. As of 2020, the global middle-class population had surpassed 3.2 billion people, with many middle-class families prioritizing higher education for their children. Developing countries, such as China and India, had experienced significant growth in middle-class populations, contributing to increased demand for education and, subsequently, student housing.

The majority of students who enter the University of Sri Jayewardenepura (USJ) are from rural areas, mostly beyond 30 kilometers, which makes daily travel to the university from their residences impractical. Hence, student housing has become a basic need for undergraduates to accomplish their higher education. However, a large proportion of undergraduates about 60% (according to USJ Hostel Office 2019) do not receive university student housing facilities (hostel facilities), as supply is becoming limited with the increasing number of undergraduates each year. Therefore, students are compelled to find private accommodation around the university, but about 90% (according to Survey conduct by Study) of undergraduates face numerous problems when choosing private accommodation in a short time. Since most students are not very familiar with the area, if the university can provide proper guidelines and a platform for choosing private accommodations, it will be very useful for students. Existing private student accommodations are not registered with the university, and accommodations are provided without proper standards. Hence, students are not guaranteed good security and the basic infrastructure required. The university authorities are unaware of the facilities of those private boarding houses, and the private accommodation providers have no recommendations from the university either. Those factors may affect student security and day-to-day life at the university. There is a lack of proper guidelines or databases to identify private student accommodations for anyone. Everyone must visit the accommodations in person and check them out before choosing one. It has become a major problem for both undergraduates and property owners. This is a real research gap focused on the following research questions:

The Objective of the Study

The main objective of this research is to develop a cost-effective, accurate, and efficient framework to organize private student housing using novel technologies and smart measures.

Literature Review

Most college freshmen are between the ages of 19 and 20. The majority of them have never lived away from home or been in a hostel. Thus, by spending a significant amount of time away from home, young pupils may learn a lot about life. They may pick up skills such as how to manage their daily duties, live independently, collaborate and work with roommates, share bathrooms and kitchens, etc (Ghani & Suleiman, 2016). Additionally, Garg, et al. (2014) pointed out that relocating away from their families to seek higher education has had a major influence on students' personalities and psychological well-being. Days of classwork may be missed by students while they hunt for suitable student accommodation. In addition, students often miss class, assignments, and practices, which might occasionally affect their grades (Chiguvi & Ndoma, 2018). Furthermore, substandard student housing may lead to arguments between housemates. Students must be able to adapt to any type of private student housing to ensure the comfort of property owners. There are times when a student's only criteria are to share a room with two or more other students and have a furnished room (Rugg, et al., 2010). Only a small portion of students can and desire to live alone at the moment. Private homes for students solely aren't generally constructed with that objective in mind. They are first constructed as family homes before being converted into student housing. Thus, the facilities required for students' educational activities are inadequate and of poor quality (Ghani & Suleiman, 2016). The bulk of private accommodations falls well below the minimal minimum norms, which supports the

aforementioned statement about their poor quality. If the university maintains many boarding houses and its calibre as a database with locations, students may easily find boarding homes.

In Sri Lanka, giving university students lodging is a necessary condition for their capacity to learn (University Grant Commission, 2004). But there isn't enough accommodation for all of the university students who are enrolling every year. The University Grants Commission has proposed several factors to identify students who would essentially be provided hostel residence due to the limited supply of university housing, including academic year, distance from home, and parental income. The following table describes the University of Sri Jayewardenepura's student housing.

Table 01: Hostel facilities of the University of Sri Jayewardenepura

Hostel facilities of the University of Sri Jayewardenepura				
Faculty	No: of undergraduates in the university		No: of undergraduates who are eligible to get hostel facility	
	girls	boys	girls	Boys
Management Studies & Commerce	3019	1776	1229	343
Humanities and Social Science	2786	659	1853	322
Applied Science	1402	870	200	110
Engineering Faculty	123	359	48	167
Technology Faculty	388	549	188	357
Medical Science	493	303	109	125
Paramedical Science	210	55	124	44
Total	**8421**	**4571**	**3751**	**1468**

Source: Student Council (2020)

A web application is a type of software that can be accessed through a web browser. Users with an active network connection can access web applications on the Internet connection (Path., 2022) . By definition, web services are web applications, and most websites—though not all—contain web applications. Jarel Remick, editor of Web.App Store, claims that a Web app is any component of a website that provides a service to the user. Web applications can be created for a wide range of purposes and are accessible to everyone, from businesses to individuals, for several functions (Remick, WebAppStrom, 2020). Webmail, online calculators, and online stores are a few examples of frequently used Web apps. While some Web apps are only available through a specific browser, the majority are accessible across all browsers (Remick, 2021).

The study that needs to be resolved is How do Web applications function? Since Web apps are accessed through a network, they don't need to be downloaded. Through a web browser like Google Chrome, Mozilla Firefox, or Safari, users can visit a Web application. A web app requires a database, an application server, and a web server to function. While the application server completes the given task, web servers handle client requests. Any necessary data can be kept in a database (Path., 2022). Web applications may be created by small development teams and often have quick development cycles. Most web applications are created employing Cascading Style Sheets, HTML5, or JavaScript (CSS). These languages are frequently used for client-side programming, which aids in creating an application's front end. The scripts which a Web application will use are created using server-side programming. Ruby, Java, and Python are frequently used in server-side development. (Remick, 2021)

Advantages of the Web Application

There are numerous uses for web applications, and these uses offer numerous potential advantages. Common advantages of Web applications include:

- Allowing access to the same program version by numerous users.
- There is no need to install web apps.
- Web apps can be accessed on many different devices, including desktops, laptops, and mobile and it's accessible via a variety of browsers.

Web apps and native apps, which are applications created especially for a particular platform or device and installed on that device, are sometimes compared in the context of mobile computing. However, the two are not exclusive of one another. Applications that are downloaded and built expressly for the sort of device they are installed on are known as native applications. Native applications frequently utilize the hardware specific to the device, such as the GPS or camera on a mobile native app. Hybrid applications are occasionally used to describe programs that blend the two methodologies. Although hybrid apps are installed on the device similarly to native apps, they function similarly to Web apps. By utilizing internal APIs, hybrid apps can also benefit from resources that are exclusive to a given device. Hybrid apps lack this feature, but downloaded native programs can occasionally function offline. Since hybrid apps are built on Web apps, they often share comparable navigational components with Web apps.

Methods

The methodology of the research consists of Four stages. The first stage focuses on analysis of data about private accommodation and analysis of data to identify the relationship between house rent with other factors. Step two of the methodology focuses on database development and web application development for private student accommodation. Research methodology demonstrates the methods and tools for gathering data, system methodology, and the suggested system input and output, a waterfall model will be used as the methodology. It is a step in the process that a system developer would use to create it. The waterfall model is sequential. The Waterfall model is one of the best methods to develop web applications and web-based Methodologies.

This model's primary tenet was "work as stages vise." It is necessary to complete or clear the preliminary stage before moving on to the following step, and the developer must have the necessary knowledge of the key assessments. It includes the phases of the feasibility study, analysis, design, coding, testing, implementation, and maintenance. It is an easy model to use and understand when developing a system. Analysts and users go sequentially from one phase to the next when adopting methodologies based on waterfall development. As the project progresses through each phase, a substantial number of deliverables are provided to the project sponsor for approval. Before moving on to the next stage, we will find any errors at this point. The web application's phaseout development cycle is shown in the following figure. In essence, you design, code, and test the system. It is necessary to assess whether a found error is a design error or not. Coding mistakes are easily corrected, while design mistakes could take longer.

Figure 01: A comprehensive explanation of the research methodology
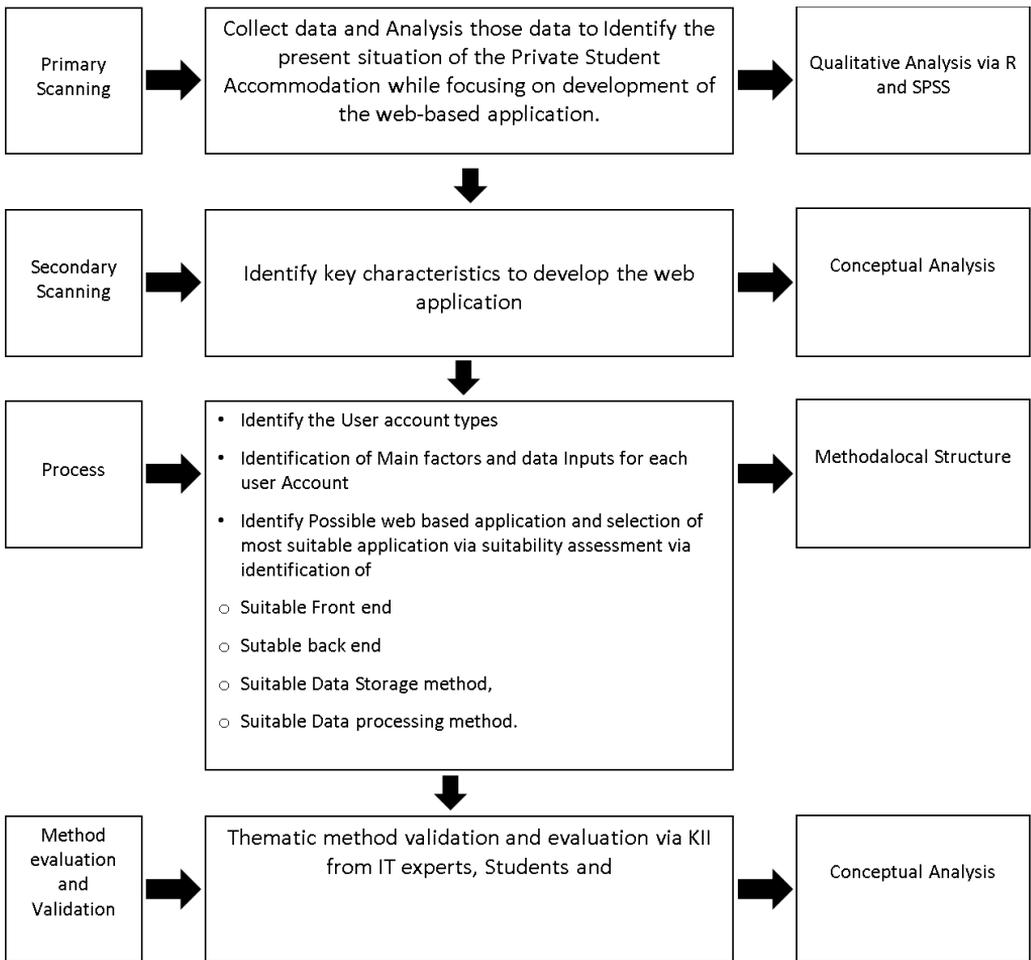
Results and Discussion

Technical Tools

Selecting the appropriate technical tools was a pivotal aspect of this research. The process of choosing technical tools formed the cornerstone of our investigation. This phase primarily revolved around identifying a cost-effective, precise, and efficient framework for establishing private student accommodation, leveraging state-of-the-art technology and intelligent metrics. Detailed descriptions of the essential elements of the web application can be found in the diagram presented below. The four fundamental attributes for the selection of these critical technical tools are outlined as follows.

- Compatible with the existing USJ Web application.
- Web application development is affordable.
- Web applications are simple to maintain.
- Web application development is simple.

Comprehensive Use Case Diagram of Web Application

According to a Preliminary study, it's identified that there are required to have 3 user scenarios to achieve the success and sustainability of the web application. There are 3 main users such as,

- Owner Account – USJ Hostel Office and Administration
- Admin Account - Private Student Accommodation
- Tenant Account –Boarding seekers

Figure 02: Technical Tool Process
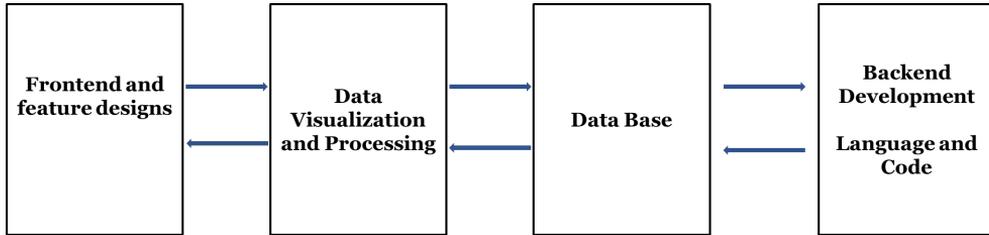
Figure 23: Comprehensive Use Case Diagram of Web Application

The following filters will be displayed when one of the three answerable questions is clicked.

1. There are eight different types of accommodation available under "place selection," including "Single Room," "Double Room," "3 Person Room," "4 Person Room," "5 Person Room," "6-person to 10 Person," "Over 10 Person," and "Other."
1. The Gender Preference field must be added under Gender Butten. Male and female gender preferences exist.

2. The distance will need to be added under Distance to University. Disturbance can be found at distances of 100, 300, 500, and more than 1 km. After entering the aforementioned information, the tenant will see just those ads that meet their criteria.

Figure 04: The Search page of the model web application

Figure 05: The Home page of the Model web application for USJ
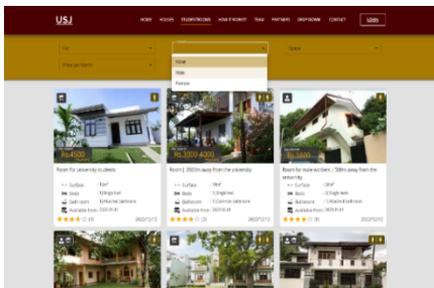
Figure 06: The filter page
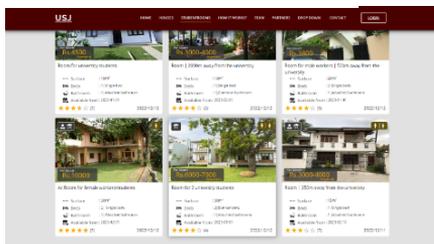
The majority of this web application's user base, which includes university students and others looking for boarding houses in and near the university township of the University of Sri Jayewardenepura, are tenants. The tenant has access to the web application's home page, where they can search for accommodations and enter their needs and interests. The unique element of this tenant user is that they may score their experience and thoughts and provide feedback through the advertisement, which will then appear on the advertisements.

One of the key feature pages of the online application is the Search page. The accommodation type can be selected by the user who has access to the home screen. There are two types of accommodations, referred to as rentable houses and rentable student rooms, as previously mentioned. By selecting one of these two options, users will be taken to the search page titled "Search here to your dream spot." To find accommodation, there are three basic search criteria

The filter page of vacant rentable place adverts can be considered as a mostly brief description of the Price or price range of a Rentable place. Additionally, there are images of various types of accommodations, including those for single, double, and other types, as well as information about general satisfaction with the accommodations. Through this tenant, the unoccupied rentable space and its reviews can be examined in detail.

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Figure 07: The Advertisement page

The information for the available student room or boarding houses are included on the advertisement page. All of these advertisements are controlled by the admin account (the owners of private boarding houses), which is overseen by the owner account (USJ). To help potential tenants acquire a general understanding of the student room or rentable house, the advertisements offer the following information.

Conclusion

The world is now smaller than it once was. advances in technology and computer science, everything is now at our fingertips. Universities are the driving forces behind this progress, thus improving our awareness of it is important. As researchers, we must discover unique knowledge, examine knowledge, and discover fresh approaches to carrying out tasks simply and efficiently. This research was done using web development to discover a cutting-edge way to locate Boarding places for freshmen at State universities in Sri Lanka. The University of Sri Jayewardenepura is one of the best scenarios for this Because only around 60% of undergraduate students have access to university housing, it was a more advantageous location to conduct the study. The study aims to provide a common platform to promote relationships between university students, the owners of private student housing, and the University of Sri Jayewardenepura's hostel office. The appropriate web application model and method of its development are advised based on the research.

Acknowledgements

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