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Smart PG/Hostel Booking System using Cloud Computing

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Abstract

It is very simple to find PG accommodation near your office. It was difficult in the past to travel to a place to work that was located over great distances, and as a result, we had to miss out on wonderful possibilities because we didn't know where to stay and were unfamiliar with a certain city. However, it is now much easier to obtain affordable lodging near the workplace. The Hostel Booking System is a web-based application for booking hostels for individuals. This will reduce manual labor and make hostel assignment considerably simpler for students and hostel administrators. It keeps track of data in a database and retrieves it as needed. We design this system for the ease and welfare of person seeking for residence when they are away from their hometown. The designed system is more user-friendly, GUI focused, reliable, efficient, and secure with access control mechanisms, overcoming the drawbacks of manual hostel management. Educational systems have been impacted by outdated techniques that have limits. As a result, we're working on one. Cloud computing technologies will be used. A web app will be built that will run on both IOS and Android, considering all the requirements specific to the hostel.

Keywords: Cloud computing, Load Balancer, Stateless design, Database.

1. INTRODUCTION

The students coming from far off cities and towns often find it difficult to find the right accommodation for themselves. They aren't aware of which rooms are available for rent as many don't even put the "Room for Rent" boards outside their houses. So, either they must compromise with the basic facilities they require like room size, clean environment, security, water, electricity and mess facilities or they get it at higher prices. Also, they are unaware of the surrounding they are living in. Also, this COVID situation has made it more difficult to visit every location. The main idea of developing this project is to ease the students. This Web Application will help to overcome the entire problem which they are facing currently by making everything digital and easily accessible. We students will develop the PG/Hostel booking system, and we will use libraries, databases, and a variety of techniques to complete our project. React JS, Node JS, Cloud computing, and so on.
Basic idea behind this work:

Real life experiences:

Students or working people work hard to find the best accommodation near college premises or their workplace. They could only search for 2-3 hostels which were referred by their friends as they didn't know much about the locality and proper pricing of the room available. It is also for those who are paying higher than the facilities provided by the owner. They are the victim of the false promises like proper cleaning, hot and cold water, no extra bills, etc.

Reviewed other related websites/applications:

Various other related websites/applications are generally for hotel room booking or property dealing. There are not many applications that are dedicated to students only.

2. LITERATURE SURVEY

We looked for numerous sites for a PG/Hostel booking system in this literature review and found a handful that were like what we required. We've mentioned the survey we'll use to do research for our project; with this survey, we'll be able to add to and update our project in stages. All four members of the group are assigned the task and the task is divided equally.
Below are the details of the sites of hostel booking system we have listed some of them:

- OYO: This is the online hotel booking system which provides excellent facilities to its customers. Pros and cons: Smooth will all its functionalities, not dedicated for students in hostel booking.
- Little Hotelier: It is a cloud-based platform that allows users to book rooms and includes amenities such as food with their bookings. Pros and Cons: Good Channel Manager, but no payment customization.
- Airbnb: It is an American corporation that runs an internet marketplace for lodging, particularly homestays for vacation rentals, as well as tourism-related activities.

3. DEVELOPMENT-REQUIREMENTS

3.1 ReactJS-

React JS is a JavaScript component-based framework [1]. Everything in React is a component, and they are usually JavaScript classes. React Declarative makes the code more predictable and makes creating complicated UIs easier [2]. React is adaptable, with hooks that let you connect to different libraries and frameworks. We'll be using more and more components as the application becomes more complicated, and data that must be shared between components will be passed down the component tree so that the state of each component is always updated with the required data.

3.2 NextJS-

Built on top of Node.js, this open-source web development framework enables server-side rendering and the production of static websites in React-based online projects [3]. React apps can only render content in the client-side browser, however Next.js extends this to include server-side applications.[4] The NextJS enables one to quickly start building an application and provide a complete base setup.

3.3 Express-

Express is a Node.js web application framework that provides a wide range of features for web and mobile projects. It's open-source software that's been released under the MIT license [5]. The back-end component of popular development stacks like MEAN [6], MERN [7], or MEVN [8] is Express, which is used in conjunction with the MongoDB database software and a JavaScript front-end framework or library.

3.4 MongoDB-

MongoDB is a major NoSQL database and an open-source document database.[10] Indexing, replication, load balancing, file storage, and server-side JavaScript execution are some of the features.

3.5 Vercel-

Vercel is a frontend framework and static site platform designed to interface with your headless content, commerce, or database. It helps in maintaining and deploying the NextJS projects easily on its platform.

3.6 Heroku-

Heroku.[11]is a platform-as-a-service cloud platform that supports a variety of programming languages. Heroku, one of the first cloud platforms, has been under development since June 2007 and only supported Ruby at the time [12]. Java, Node.js, Scala, Clojure, Python, PHP, and Go have all been added to the list of supported languages. As a result, Heroku is known as a polyglot platform since it allows developers to build [13], execute, and grow programmes in a consistent manner across multiple languages. In 2010, Heroku was bought by Salesforce [14].

3.7 TailwindCSS-

Helps in building modern websites without ever leaving your HTML. A utility-first CSS framework packed with classes like rounding the pictures, setting a different font.

3.8 Future Developments-

- Weekly and monthly views
- Google Calendar

- Google Maps
- Reviews and rating

4. PROPOSED SYSTEM: PLANNING AND DEVELOPMENT

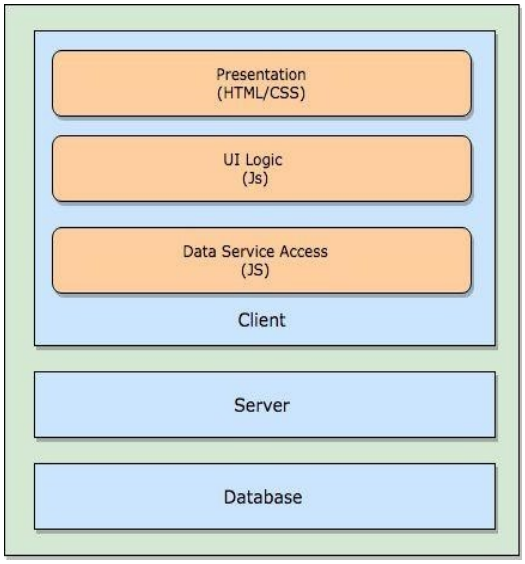

Figure 1 Client Server Architecture

- We started the planning phase by figuring out what the problem was and how the current system functioned. We also gathered information on what the new system should provide for the searchers. Then we looked at different booking systems on hotel websites and booking systems for rooms.
- We next started thinking about what documents and fields the database would require. We started figuring out how we could best present the data while designing the ERD to avoid the challenges that the seekers have with the current system. Figma was used to create the prototype.
- We started by listing all duties and assigning work to each team member.

4.1 NextJS-

- NextJS can create high-performing web applications and super-fast static websites. It is of great use for User Experience and Search Engine Optimization (SEO) [15].
- For business owners, Next JS provide unique user experience, adaptability and responsiveness, data security, faster time to market and support on demand [16].
- For developers, it brings many benefits like reusable components, built-in image component and automatic image optimization, community support, fast refresh, and TypeScript support [17].

4.2 Deployment of front-end –

Here the front-end is hosted in 'Vercel' as the Vercel has the copyrights and trademark of next.js which also maintains and leads this open-source web development framework. Vercel provides and maintains the hosted front-end and lets the user focus more on designing the front-end rather than worrying about hosting and maintaining it.

4.3 Express JS-

- Express.js makes development of node.js web application fast and easy.
- It is easy to customize and configure.
- Express.js helps to scale up the application quickly.
- It also has the advantage of lower development and maintenance costs. It is compatible with the Google V8 engine, which allows for increased processing speed without latency or errors.
- It also has a strong community, enables caching, and is simple to integrate with a variety of third-party applications and services.
- It is easy to connect express.js with databases such as MongoDB, MySQL.

4.4 Deployment of back-end –

Heroku is used here as deploying on Heroku is easy and convenient and it helps to focus on the code and structure it rather than worrying about creating, maintaining, and managing the deployed platform.

4.5 Why cloud for back-end and database?

- We used cloud to deploy the backend because cloud platforms help in easy scalability and load balancing. Heroku is used here which provides platform as a service (PaaS).
- Cloud [18] provides with the easy scalability by simply buying their higher plan for more servers or more traffic.
- Cloud also helps in reducing the cost as you only need to pay for only the services you are using and there is no/less hardware cost included.
- There is also no need for the dedicated team/staff for managing the hardware and software and also for security.
- Cloud also provides with the high availability and remote access to the users.
- Heroku has different components which helps to achieve various benefits of using the cloud. Load balancer is the most important.
- Here we also used the cloud for our database. We used MongoDB, where the Database-as-a-Service is used which helps in accessing data anytime and anywhere as the database hosted in cloud. It has upper hand in handling the failure of any site.

4.6 Tailwind CSS-

Tailwind CSS [19] is used to build the front-end as Tailwind helps in creating the front-end without worrying about the separate CSS file and integrating it into the original design. It also helps in removing the unused CSS when it is build for the production purpose, so that the final bundle is as small as possible. It is also responsive in nature.

4.7 Stateless Design-

To make sure our services are scalable, we need to make sure we build them in a stateless manner. By stateless, we mean that the service keeps no state from prior calls and treats each request as if it were completely new [20]. The benefit of this technique same service and ensure that the request is handled by the correct service instance.

4.8 Load Balancer-

A load balancer is a device that helps in distributing the application or network traffic across different servers. A load balancer is placed between the client and the server farm that accepts the traffic and distribute is across the multiple servers. This helps in reducing the individual server load and in preventing from any failure due to single point server failure [21][22].

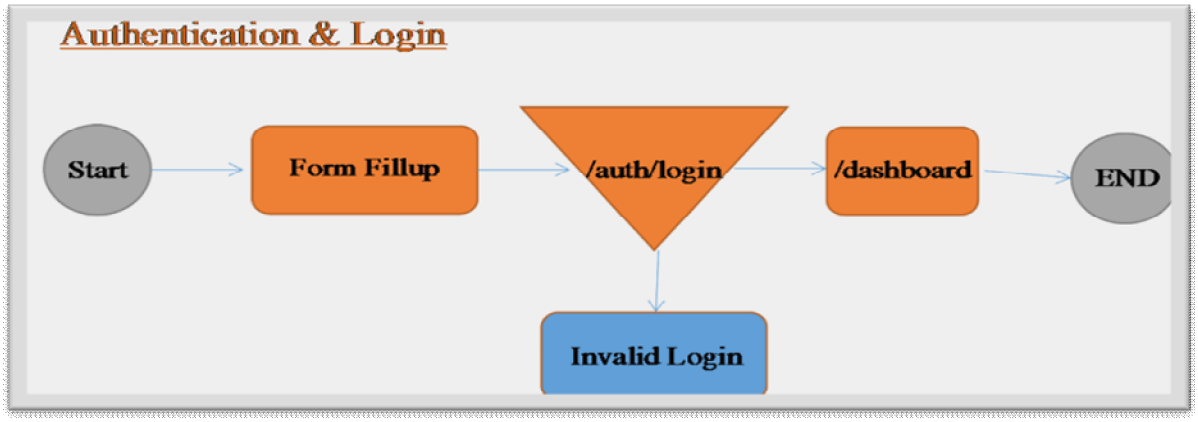

Figure 2 Flow diagram of Authentication and Login Module

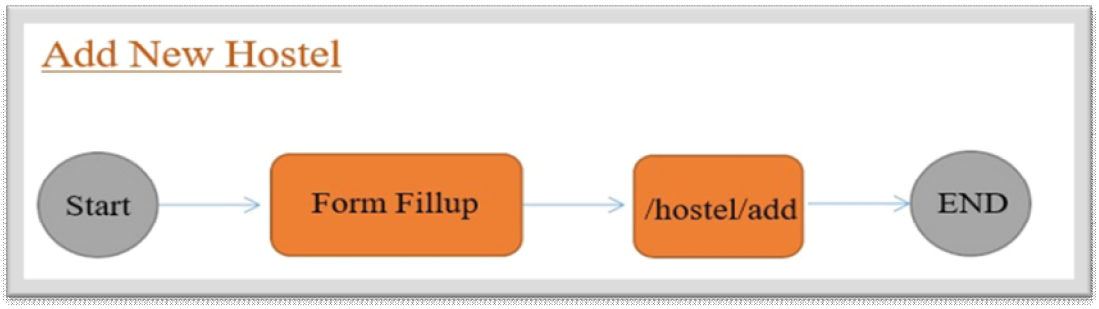

Figure 3 Flow diagram of Adding New Hostel Module

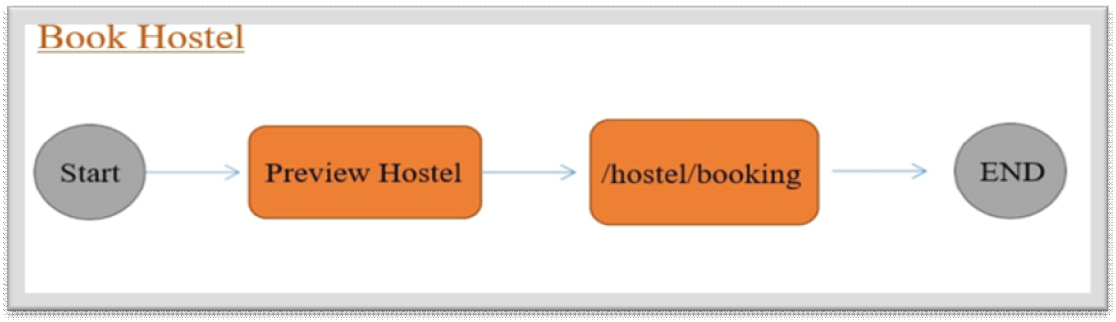

Figure 4 Flow diagram of Booking Hostel Module

Each step involved in the development of such idea can be depicted in the following manner:

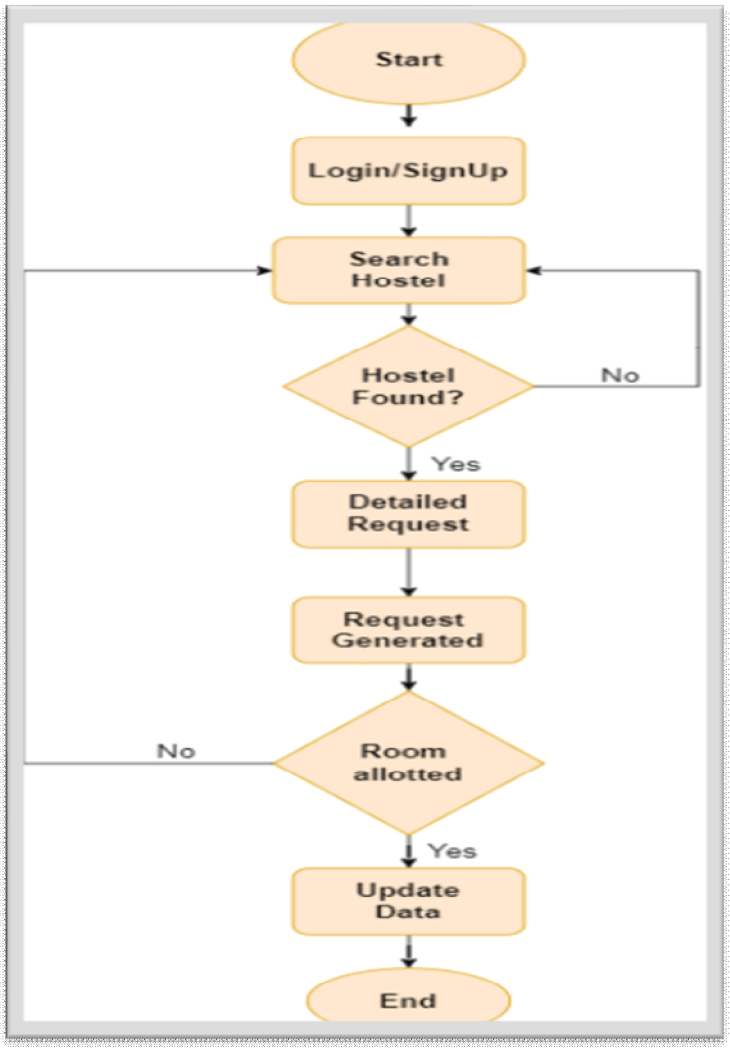

Figure 5 Flow chart of the application

The application was created to be an easy and intuitive way to navigate, analyze and generate bookings. This, in turn, allows for the most efficient use of resources.

5. CONCLUSION

The application acts as a link between the user and the hosts. This combines basic amenities for users, particularly students (seekers), on a single platform. This application will be beneficial to all students because it will provide them with a portable all-in-one application. None of the existing system's apps enable a user-friendly environment where all the needed capabilities are unified into a single integrated platform. There are numerous conclusive aspects on the website that indicate that it may be further developed, and a business outlook can be made using various hosting platforms. It's even more impressive when cloud services are included. The combination of these platforms can create a subtle environment in which a user can consume less data while saving time. The website's portability and ease of use will contribute to its

continued development in the future. This website brings together all day-to-day concerns that can be used as a business concept. This website has the potential to be a business complement in the long run. This application not only addresses issues, but it also considers the preferences or choices of customers who are utilizing it in a new place. To provide students with more options and to eliminate the tedious processes associated with hostel booking, we developed a solution based on technologies and libraries such as React JS, Next JS, Node JS, and cloud computing.

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