A Report

ON

UNIVERSITY MANAGEMENT SYSTEM

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Prepared in partial fulfillment of
Major Project-1

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Thanking You
Gonuguntla Udaya Kiran
Kayitha Sai Vamsi Vignesh

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CANDIDATE'S DECLARATION

I hereby declare that the work done in my core project entitled **"UNIVERSITY MANAGEMENT SYSTEM"** in fulfillment of completion of 6th semester of Bachelor of Technology (B. Tech) program in the Department of Computer Science and Engineering, BML Munjal University is an authentic record of my original work carried out under the guidance of **Dr. Satyendr Singh, Dr. Atul Mishrs, Dr. Yogesh Gupta**. Due acknowledgements have been made in the text of the project to all other materials used. This core project was done in full compliance with the requirements and constraints of the prescribed curriculum.

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ABSTRACT

A university management system is a software application to streamline and automate various tasks in a university such as student registration, issue of gate pass, student attendance, and various other functions. The system also provides information about the faculty, their designation, email address and their cabin numbers. The university management system also offers a platform for faster communication, accurate decision making and collaboration between student, faculty and administration.

Ultimately the student management system provides a secure and centralized services for smooth run of any organization/university.

MOTIVATION

Whenever I use the existing system of student management I feel that some features are missing and the application can be made more user-friendly with additional features. Hence I want to utilize this opportunity to develop a user-friendly application with some additional features which will be helpful in managing student's time and improving the quality of campus life.

1. INTRODUCTION

1.1 Background

In recent years the education system saw a huge rise in faculty and students. With the increasing demand for timely and accurate information, universities are seeking efficient and effective ways to manage their data. Traditionally, universities have used manual methods such as paper-based systems to manage their data, which are prone to errors and inefficiencies. With the advancement of technology, universities are now turning to automated systems to manage their data, which offer greater accuracy, efficiency, and convenience.

The university management system is one such automated system that aims to provide a centralized platform for managing information related to faculty, staff, and students.

1.2 About project

Student management system aims to provide a platform that makes it easier for students, faculty, and administrators to manage, streamline and automate tasks which help in faster and efficient decision making. The system is made to give students a portal to access job/internship related content. Also the system provides information regarding each faculty their name, designation, email address, cabin numbers and their free timings. This feature helps students to manage their time and can meet the respected faculty during their free time slot.

1.3 Application privacy and security

Additionally the platform has authentication and authorization implemented which allows users to access specific content and allows administrators to have access to admin features. Students can have access to limited features of viewing the content, and do not have access to features of faculty and administrators. This ensures the highest possible

security and valid content in the platform. All the data is stored in MongoDB database and securely deployed to any cloud service.
All data is thoroughly reviewed and validated on the server before actual record alteration occurs. In order to make the application user friendly and available the platform will be deployed on cloud so that scalability, availability and security will be handled more efficiently by the cloud service provider.

1.4 Conclusion

Overall, the student management system will provide a valuable resource for the university community, streamlining the management of information and facilitating communication between faculty, staff, and students. Also the administrator can take decisions faster and quicker based on the data available from the application.

2. PROBLEM STATEMENT

2.1 Problem Definition

To develop a platform to streamline and automate all the management tasks such as maintaining student records, personal details, approval of gate-pass, mess attendance, weekend shuttle service booking in the university, post any important content and post some job opportunities, and faculty information along with their cabin number and free timings.

2.1.1 Existing Product Review

CollPoll is an existing management system application used by multiple universities to streamline and automate the tasks.
Problems with existing system:
User experience with the existing product is poor since users were searching for features and finding it difficult to use the application for the first time.
Bulk booking for shuttle service is not available in the existing system.
Student mess attendance is poor since students must enter their token each time they want to avail the mess food which leads to bad user experience. Also there is no feature of finding faculty information and their free timings which makes it difficult to know their free timings in order to meet the faculty.

2.2 Project Objectives

- **Improve Efficiency**: The app should improve the efficiency of managing student and staff information by automating manual processes such as attendance tracking, disciplinary action management, and staff management.
- **Enhance Communication**: The app should enhance communication between administrators, teachers, and staff through features such as social media features and notifications.

- **Increase Transparency**: The app should increase transparency by providing access to shuttle service booking, disciplinary points, accessing faculty cabin number and their free timings and staff details to authorized users.

2.3 Challenges

Developing a Student Management App for management purposes is a complex task that requires careful consideration of various aspects of student management.

- User Management: The app needs to have a robust user management system that can manage different types of users, such as administrators, teachers, and staff. The system should provide different levels of access to each user type based on their roles and responsibilities.
- Student Profile Management: The app should have a student profile management module that allows administrators to manage the personal information of each student, including their name, address, phone number, and emergency contact details. The module should also include features to manage the student's disciplinary actions, if any.
- Communication Management: The app should have a communication management module that allows teachers and administrators to communicate with each other through different channels, such as social media and notifications. The module should also include features to send reminders, announcements, and alerts to the users.
- Staff Management: The app should have a staff management module that allows administrators to manage the personal information of the staff, including their name, address, phone number, and emergency contact details.

2.4 High level system design

The student management system can be broken down into various modules:

- Authentication and authorization: Each and every student must be authenticated to use the application. Authentication and authorization provides secure access to the application by restricting access to certain features which must be accessed by only university management.
- Social media features: Provides each and every user to post some important content, raise queries and perform a poll.
- Gate pass request: Automate the process of gate pass approval on students raising gate pass requests which gets approval by the warden through the app.
- Shuttle Service booking: Students will be able to book shuttle service from source to destination.
- Mess management: Students will be able to view the mess menu and log mess attendance.
- Faculty cabin: Students will be able to view faculty cabin numbers and their free timings in the app.

2.5 Deliverables

- Software Documentation
    - System documentation
    - User manual
- Project documentation
    - Software Requirements Specification
    - Software Design Specification
    - Software Test Plan
    - Software Quality Assurance Test Plan

3. LITERATURE REVIEW

3.1 Existing Student Management Products

Management system refers to computer software/solutions which are designed to assist various operations of the organization. Management systems offer multiple features such as document management, communication, analytics of data. This literature review provides a study about existing management systems available.
There are various types of management systems available which include Enterprise Resource Planning(ERP), Customer Relationship Management(CRM). ERP systems can help organizations streamline their operations and improve efficiency. CRM systems, on the other hand, are designed to manage customer interactions and improve customer satisfaction. Management systems are used to manage tasks, store and manage user information, streamline operations and automate various tasks.

3.2 Advantages of Management Systems

Management systems can provide several advantages to organizations, including increased efficiency, improved communication, and better decision-making. Management systems can help organizations automate repetitive tasks, allowing staff to focus on higher-value activities. Improved communication between team members can also lead to better collaboration and increased productivity. Better data management can help organizations make informed decisions about resource allocation, investment, and strategy.

3.3 Limitations of Management Systems

Management systems also have several limitations, including cost, training requirements, and data security concerns. The cost of implementing and maintaining management systems can be significant, especially for smaller organizations. Data security concerns related to cybersecurity and data privacy are also important considerations when implementing a management system.

3.4 Conclusion

Management systems are important for any organization, university or an institution to manage, automate and streamline operations. ERP systems can help organizations integrate various business functions and improve efficiency. CRM systems can help organizations manage customer interactions and improve customer satisfaction. Project management systems are used to manage tasks, timelines, and resources for specific projects. Management systems can provide various benefits to organizations including increased productivity and better decision making.
On the other hand, the cost of training and development of these systems and concerns over data breach are associated while implementing these systems.

3.5 Research Paper Survey

Paper Name	Findings	Summary
"Utilization of Learning Management System in higher education system"-Alex Kootsookos, Firoz Alam Feb 2019	Learning management systems (LMSs) are increasingly being used by academic institutions as a component of their educational management system to enhance the teaching and learning process in higher education systems. Different LMS systems are used by most universities in the US, UK, Canada, and Australia, as well as 28 universities in Saudi Arabia, for their academic activities.	Currently there is no function or tool accessible in any LMS to let students or teachers undertake laboratory experiments in a distant learning platform, despite the fact that all LMSs have identical capabilities for communication and management of a course. Since laboratory experiments are a requirement for the majority of engineering and science courses, these LMSs must include a feature for virtual laboratories.
"A Comparison of Faculty and Student Acceptance Behavior toward Learning Management Systems"-Jinkyung Jenny Kim,Yeohyun Yoon and Eun-Jung Kim August 2021	The COVID-19 crisis resulted in significant changes to the tertiary education landscape; the two primary areas of abrupt change indicated by higher education institutions across 20 nations were modified curricula for complete online delivery and	In the case of the student group, the results indicated that self-efficacy, enjoyment, and computer anxiety have a significant influence on perceived ease of use of a LMS. The traits that significantly affected perceived usefulness were

	social distancing measures for those who must be on campus. Most universities have heavily relied on learning management systems (LMS), which is online software for academic lecturing and learning, to manage educational programmes in an effort to preserve the same level of depth of interaction between faculty and students as in face-to-face learning.	self-efficacy and enjoyment. However, it was found that in the faculty group, self-efficacy, subjective norm, enjoyment, and computer fear all had an impact on how easily an LMS was reported to be used. Along with self-efficacy, perceived usefulness was significantly influenced by subjective norm and enjoyment.
“Identification of Learning Styles in Distance Education Through the Interaction of the Student With a Learning Management System”-Roberto Douglas da Costa; Gustavo Fontoura de Souza; Thales Barros de Castro July 2020	The accessibility of studying anywhere and at any time, in accordance with the demands of the student, has enabled the inclusion of a large number of individuals, and this accessibility has considerably increased the number of students worldwide enrolled in distance education. To create varied instructional tactics and teaching methodologies, artificial intelligence is applied. There is a growing presence of interdisciplinary work	The concept of identifying students' learning preferences by their behaviour is desired and highly pertinent for designing courses, particularly in distant education, since the LMS logs all of the students' activity. In this study, our goal was to find any work behaviour characteristics that might be connected to learning preferences.The way that students behave is more important to consider than how often they used the

	involving experts in education, computer science, design, communication, and information and communication technology (ICT) among people who consider and create policies for distant education.	platform and how often they used each resource.
“Main Benefits of Integrated Management Systems through Literature review” - S.Talapatra,G.Santos June 2019	Recently, corporate social responsibility management systems (CSRMS) have been used by business organisations. Each management system functions in a certain region and has advantages there.	We can infer a number of pertinent conclusions about IMS from this paper. First off, it demonstrates how many businesses all over the world adhere to the integration rules. Integration of the management systems of the companies mentioned has benefits in terms of: Improving the organization's standing with its stakeholders; Contributing to an integrated approach to risk management in business; Increasing the organization's capacity to achieve objectives; Better achieving the alignment of strategic, tactical, and operational policies and objectives;

		Providing competitive advantages from the synergies of various management policies;
“The Construction of University Student Management System Platform Under the Background of Internet”- Shan Zou Jan 2022	To enhance each university's decision-making, management, and student training levels, the goal of this paper is to design and implement a comprehensive platform for managing enrollment, housing, fees, employment, and a variety of student-related tasks. In this article, the design of the student management system platform first summarised the functional modules of the system through the system requirements analysis. The function should then be included in the specific analysis and detailed design of each functional module in accordance with the function of writing code.	In conclusion, creating an online platform for a student management system at a university is an essential component of contemporary university management. Such a platform can considerably increase efficiency, scalability, and security by integrating multiple functions and utilising internet technology. The platform can also be made more usable and accessible for students by having mobile compatibility and user-friendly interfaces. at conclusion, this article emphasizes the potential advantages of such a platform and stresses the significance of its adoption at universities right now.

“Blockchain in education management: present and future applications” - Preeti Bhaskar, Chandan Kumar Tiwari, Amit Joshi May 2021	Blockchain technology has the potential to significantly improve education management by increasing data security, transparency, and efficiency. The authors note that several universities and organizations have already begun experimenting with blockchain-based solutions and predict that the technology will become increasingly prevalent in the coming years.	Only a few locations have used blockchain technology in the education sector, so its full potential has not yet been reached. Although a wide variety of applications are quickly emerging, and development is very sluggish. Without removing the obstacles, the adoption of blockchain technology cannot be successful. By highlighting the current advancement, advantages, difficulties, and current application of technology in the educational environment, the study adds to the body of existing information. The number of publications and citations in the discipline have been on the rise in relation to recent advances. The study also concludes that the use of blockchain technologies for managing education are still in their infancy.

“Design and Implementation of a Novel Student Information Management System”-Xiangcheng Wu, Bowen Feng, Wenmin Qi Nov 2020	The design and deployment of the student information system are discussed in this essay. Teachers and students may find the information system to be highly useful for learning and daily living. The administration and sharing of information between colleges and universities is made possible by the student information management system, which also improves, standardizes, and streamlines student management.	The student information management system is designed and implemented in this work. The client design is altered based on the conventional C/S mode. QML programming is used by the client in the front-end design. The mobile terminal's design was also added at the same time. The well-known WeChat applet uses it to implement. This straightforward design approach improves user experience while requiring less code from developers and maintenance labour from maintenance staff.
“Development of an integrated student information system”-Dr. Gatete Marcel , Dr. Uwizeyimana Faustin October 2019	The old student record-keeping system can be replaced by the adoption of an effective student information management system. The employment of both a well-managed database and an appropriate front-end design, as opposed to dealing with manual files, would not only make the duty of the	The numerous activities are made easier by the student information system. The personnel must use this technique to lighten their burden, which lowers malpractice. It has a safe, digitalized, and user-friendly user interface. Previously manual processes have been computerized and

	registrar and his in-charge assistants easier but also minimize the operational cost.	are now available online around-the-clock.

Table 3.1 List of Research Papers surveyed

4. METHODOLOGY

Developing a student management system is a complex task which requires careful planning and consideration of various aspects in student management.

4.1 Use Case Diagrams

Below the use case diagram displays relation between different users and their features.

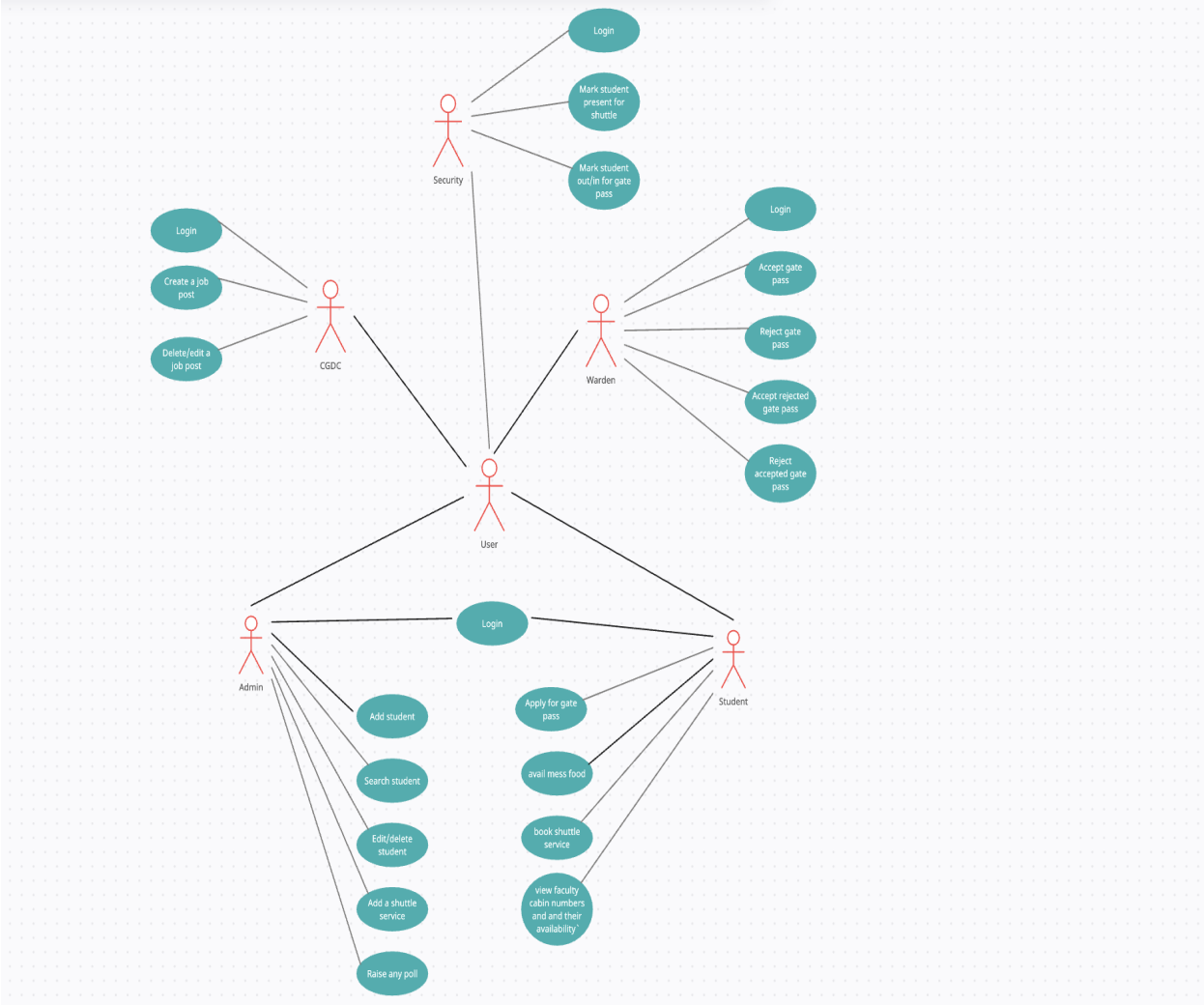

Figure 4.1 Use case diagram

4.2 Flow Chart

On the basis of end user requirements and investigation on current systems we had suggested a system that satisfies the user requirements.

Users are authorized based on their role.

- Students can raise gate pass requests, book shuttle service, avail mess food and view faculty cabin numbers and their available time. Students can also post content in the app and express their views.

- Admin can add a weekend shuttle service, search for a student and can check whether a student is present in campus or not, add a student, edit/delete a student, raise a poll.
- Wardens can accept or reject gate pass requests, accept rejected requests and can reject accepted requests.
- Mess management can add a daily mess menu and can check the number of students availing the mess food. This can help mess staff to figure out the average number of students consuming in mess daily.
- CGDC staff can create a post regarding any job openings or internships. They can also create posts regarding any technical events such as hackathons, ideathons etc.
- Security staff can mark a student's attendance whether he/she boarded the shuttle service. Also they can mark students with gate pass entry and exit from the campus.

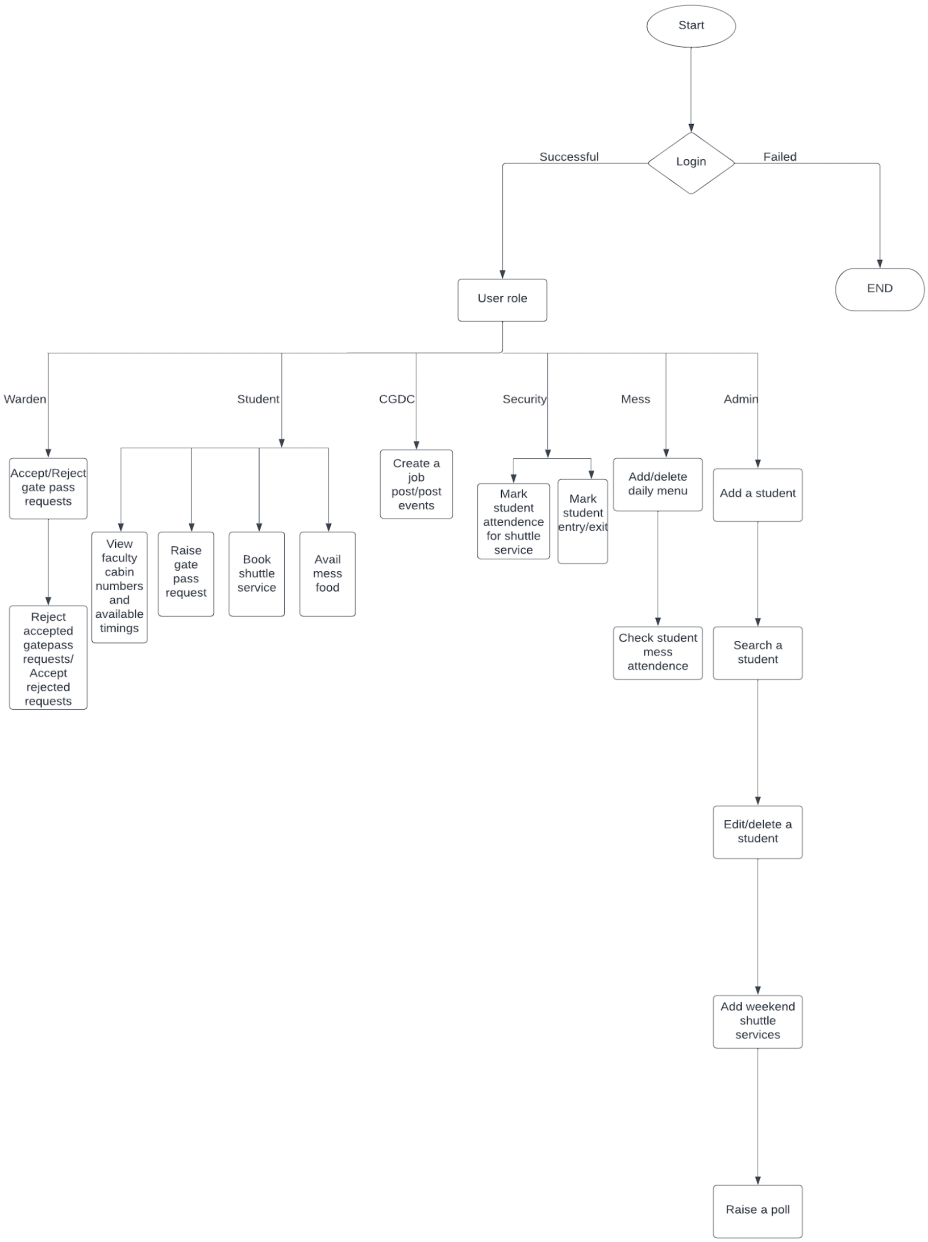

Figure 4.2 User flow chart

4.3 Technology Stack

For developing a student management system requires a frontend where the client will be interacting with the server, a backend where all the business logic would be stored and a database to store all the information related to users, their roles, posts done by each user.

4.3.1 Backend

- Node Js is a javascript runtime environment used to run code outside the browser.
- ExpressJs is a popular Node Js framework for creating REST API's.
- JWT, JSON web tokens used for authentication and authorization.
- MongoDB a NoSQL database for querying and storing data.
- Mongoose module for interacting with the database.
- bcrypt library to encrypt secret codes such as passwords.
- Mailer services such as mailgun to send emails to users.

4.3.2 Frontend

- React Native a cross platform framework used for building mobile apps for both android and ios using a single codebase. React Native is built on top of React.
- React Navigation for navigating between different screens in the mobile app.
- Redux is used as a state management tool.
- Cloudinary is a cloud platform for storing images and videos.
- Yup for validating user data.
- Axios for connecting the frontend to the server by making HTTP request calls.
- JWT decode for decoding the logged in user token and fetching their details from the token.

- Secure Storage for securely storing user auth token.

4.4 Overcoming Challenges

Node Js is a JavaScript runtime environment used to run javascript code outside the browser. It is proven that using nodejs number of lines of code for a project is reduced by 30% and there will be less number of people working in a team as compared to other frameworks. Also nodejs is highly scalable, cost efficient and maintainable.
React Native is a Javascript framework built on top of React. It is a cross platform framework used to build mobile applications for both android and ios with a single codebase. This is cost efficient and a single team can work on developing apps for both the operating systems which helps in efficiency in developing the app with reduced cost unlike native frameworks such as kotlin for developing android apps and swift for developing ios apps which requires two codebases and two teams and more infrastructure.

5. RESULTS

5.1 Welcome Screen

The system starts with a welcome page which consists of login and sign up buttons.

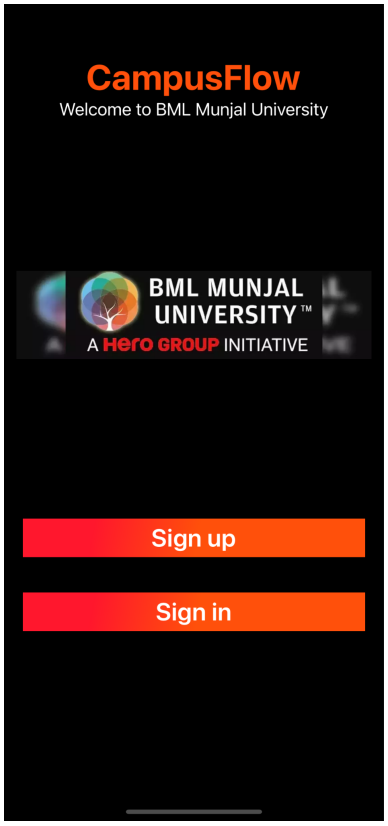

Figure 5.1 Welcome screen

5.2 Login Form

The has a login page where the registered user can enter user name and password to be able to access the system. Fig. 5.2 shows a login form which includes the registration path also and forgot password as well.

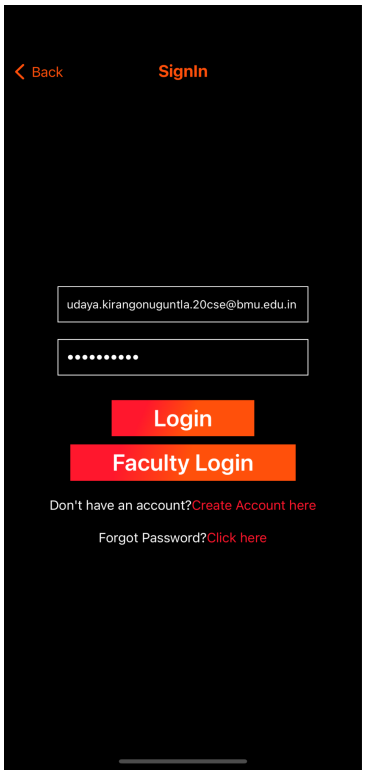

Figure 5.2 Login Screen

5.3 Landing Page

After successful login there will be a message pop-up. After responding to the message, the user can navigate to any screen using tabs present at the bottom. Figure 5.3 shows the landing page and figure 5.4 shows the accounts page.

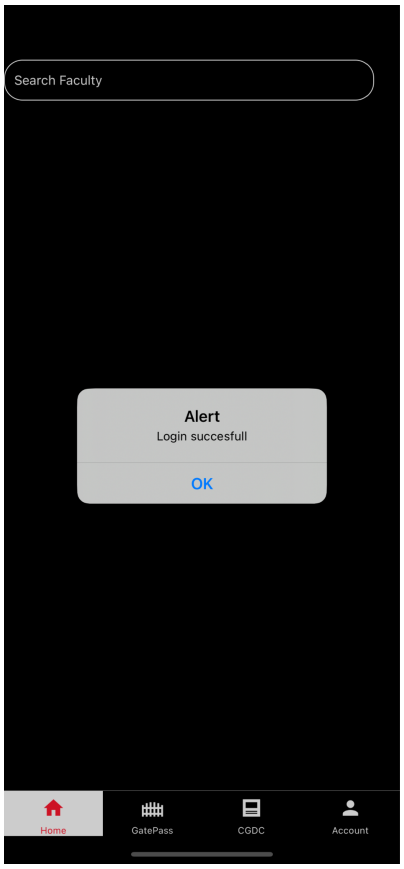

Figure 5.3 Landing page with popup

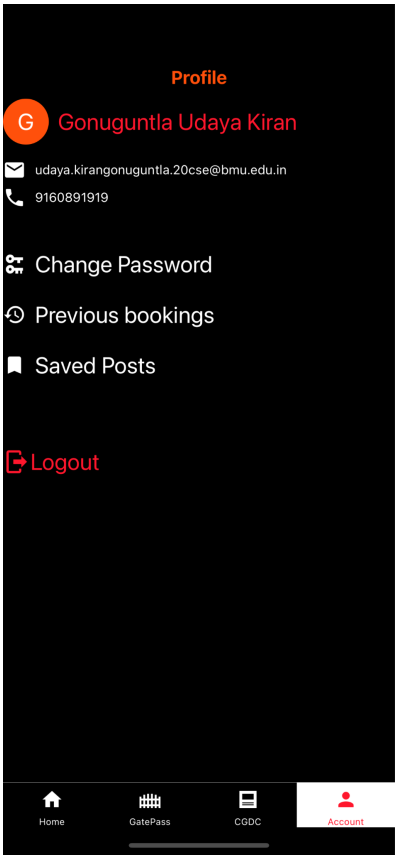

Figure 5.4 Account Screen

5.4 Job Posts Screen

When a user navigates to the CGDC tab he/she will be able to view all the posts created by cgdc admin. Figure 5.5 shows posts screen for student user, figure 5.6 shows posts screen with a button to add a post for cgdc admin user. Figure 5.7 shows a form to add a job post/internship/event/hackathon. This form is accessible only to cgdc admin users.

Figure 5.5 job posts screen for students

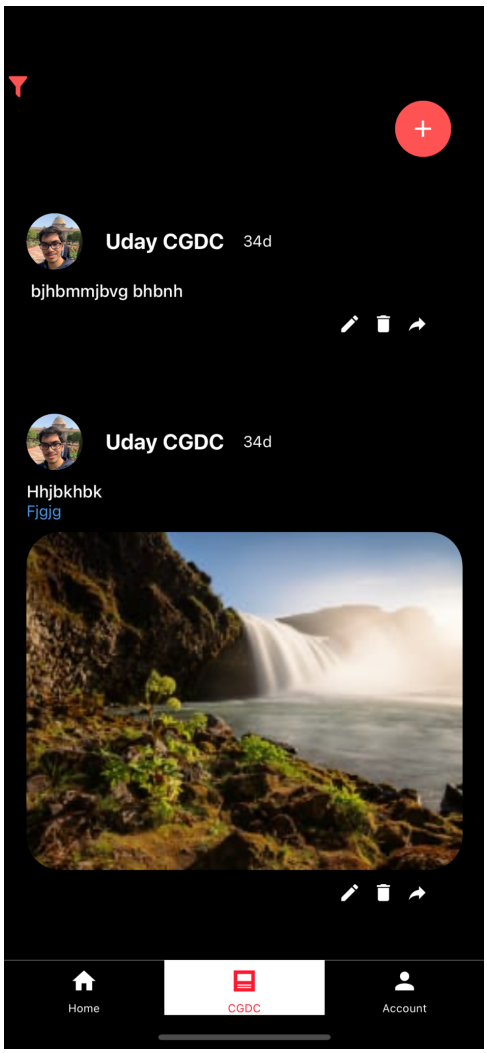

Figure 5.6 job posts screen for cgdc admin with plus button

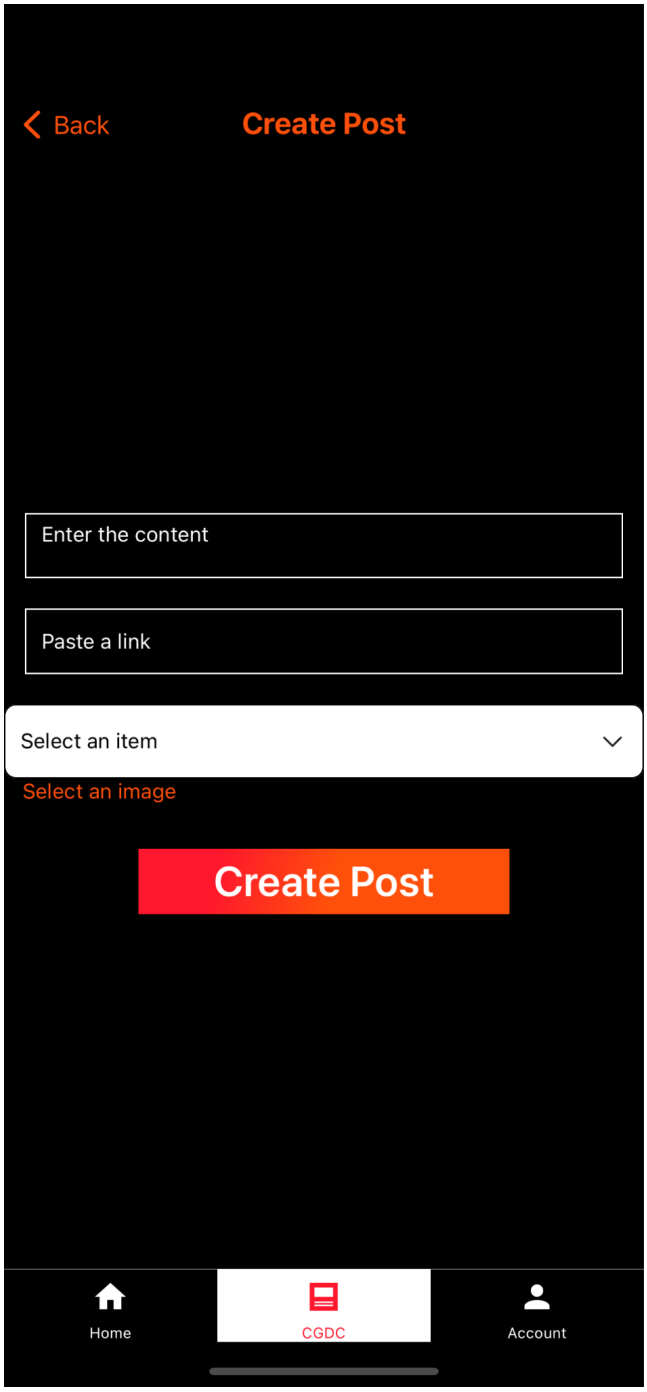

Figure 5.7 Creating job post screen

5.5 Faculty Search Screen

Figure 5.8 shows faculty search where students can search for a faculty and can obtain details of faculty such as name, cabin number and their free timings.

Figure 5.8 Faculty search with free timings

6. CONCLUSION AND FUTURE WORK

6.1 Conclusion

Student management system is essential for any higher education institution to manage and automate tasks and ensure smooth running of university. It also improves communication and improves quality of decision making. Management systems come with integration of various business processes which improves efficiency, students and faculty satisfactions. On the other hand, these student management systems cost a lot in training and development. And due to these systems being centralized there is a higher risk of data breach and cyber attacks.

6.2 Future Work

Traditional student management systems are centralized in which data authority is with the admin and cloud service provider. Users don't have control over their data. Blockchain comes to the rescue. Our future goal is to implement student management systems using blockchain technology so that user is the owner of his/her data. Authority is distributed across all the users and there is no central authority over the data.

7. References

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8. “Development of an integrated student information system”-Dr. Gatete Marcel, Dr. Uwizeyimana Faustin