



A SURVEY ON EXAM SEATING ARRANGEMENT SYSTEM

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Abstract: The exam Hall Seating Arrangement System is developed for the college to simplify examination hall allotment and seating arrangement. It facilitates access to the examination information of a particular student in a particular class. The purpose of developing an exam hall seating arrangement system is to computerize the traditional way of conducting exams. Another purpose for developing this software is to generate the seating arrangement report automatically during exams at the end of the session or in between sessions.

I. INTRODUCTION

Examination Hall Management System is developed for the college to simplify the allocation of class rooms and bench number through mobileapp. Teacher can access their investigation schedules about exams(class rooms, timing of duty),non-teaching staff can check their assigned related to exam hall setup and student guidance. It facilitates to access the examination information of a particular student, teacher and non-teaching staffs in a particular department. This system also helps in finding the examination eligibility criteria of a student of a particular department. This project comes with three websites were; an admin page, a student page, and a teacher page. Adminis the one who can add the students, teacher, and examination details and can allow the permissions to users to get a login to the page. Students can see his/her exam seating arrangement details after getting login to the student page. The teacher can see their invigilation details after getting login into the page.

II. LITERATURE SURVEY

This project also provides the seating arrangement of the students but this project was developed in MchineLearning. Recent advancements in educational technology have led to the development of smart, web-based, and mobile-accessible systems for managing institutional tasks like exam seating arrangements. These systems are designed with a focus on automation, user experience, and role-based accessibility. Technologies like Django (Python-based web framework), HTML/CSS (frontend UI), and Machine Learning are commonly adopted in these systems to improve efficiency, intelligence, and interactivity. Several modern research projects have explored the automation of examination seating using web-based. dashboards and REST APIs built with Django. These systems typically provide separate portals or interfaces for students, teachers, administrative staff, and non-teaching staff such as attenders. Role-based login and access control allow each user to interact with the system based on their responsibilities.

For instance, students can log in to view their allocated exam hall and seat number, while teachers can view their invigilation duties and attenders can access room setup instructions. Machine Learning has also been applied in recent projects for optimizing seat allocation to minimize cheating opportunities and ensure fairness. Clustering algorithms like K-means and optimization models like Genetic Algorithms are used to divide students across available rooms, taking into account department, subject, gender, or roll number.

Some models also consider psychological factors like seating comfort and social distance preferences to enhance student focus and behavior during exams. Studies have also reported success in integrating mobile-first design approaches using responsive frontends built with HTML, CSS, and Bootstrap frameworks. These systems allow real-time notifications, easy login, and dashboard access from mobile phones, making them highly accessible to all users, especially in resource-constrained academic environment.



III. OBJECTIVES

A. Automate Exam Seating Allocation

To eliminate manual processes and human error by automating the allocation of seats for students during examinations.

B. Enable Role-Based Access

To create a secure and role-specific interface for both Admins and Students, ensuring that each user only accesses relevant features.

C. Enhance Administrative Efficiency

To reduce the workload on administrative staff by providing tools to manage students halls, departments and seating arrangements in a centralized system.

D. Ensure Data Security and Integrity

To maintain a high level of data privacy using modern authentication techniques like JWT, and secure database practices with PostgreSQL.

E. Implement Version Control and Team Collaboration

To ensure robust development and deployment cycles using Git and GitHub, facilitating team collaboration and continuous improvement.

F. Real-Time Data Access

To allow students to view their assigned seating in real-time via a secure and responsive web portal.

G. Responsive and Intuitive User Interface

To provide a seamless user experience using modern front-end tools such as Tailwind CSS or Bootstrap 5, making the system accessible across devices.

H. Scalability and Performance

To design the system with scalable architecture using Django, Docker (optional), and REST APIs, ensuring it can handle large numbers of students and examination sessions.

I. Utilize Machine Learning for Optimization (Optional)

To implement Machine Learning algorithms for predicting and optimizing seating arrangements based on historical data, department size, and room capacity.

IV. PROPOSED SYSTEM

The Proposed system Exam Hall Seating Arrangement System is an automated technology that sends e-mails and SMS to the student about the student exam hall, seating number, etc. The proposed system also facilitates a website to login with their credentials and can see their exam hall allocation and seating arrangement. PYTHON is used to write code, we used Advanced PYTHON to script which is used as a database for our Mobile Application.

4.1 Techniques and Tools Used

Tools:

HTML: The preferred markup language for documents intended to be viewed in a web browser is HTML or Hyper Text Markup Language. Technologies like Cascading Style Sheets (CSS) and scripting languages like JavaScript can help. HTML documents are downloaded from a web server or local storage by web browsers, who then turn them into multimedia web pages. HTML originally featured uses for the document's design and semantically explains the structure of a web page.

CSS: The process of making webpages attractive is made easier with the use of CSS, often known as cascading stylesheets.

PYTHON: Many developers use Python, an open-source programming language, to create websites. In addition, it is a general-purpose language that you can employ to create a variety of tasks, such as Graphical User Interfaces (GUIs) API



MYSQL: SQL is a relational database management system (RDBMS) contained in a C library. In contrast to many other database management systems, SQ-Lite is not a client-server database engine. Rather, it is embedded into the end program. SQ-Lite generally follows PostgreSQL syntax. SQ-Lite uses a dynamically and weakly typed SQL syntax that does not guarantee domain integrity. This means that one can, for example, insert a string into a column define daran integer. SQ-Lite will attempt to convert data between formats where appropriate, the string "123" into an integer in this case, but does not guarantee such conversions and will store the data as-is if such a conversion is not possible.

4.2. Modules and Project Description:

ADMIN: The admin is the super user of the mobile application, responsible for controlling and overseeing the entire exam management system. The admin logs in securely through a verified college email or mobile number, with multi-factor authentication if needed.

Once authenticated, the admin can access a powerful mobile dashboard that allows them to:
Create, update, or delete users (students, teachers, non-teaching staff)

STUDENT: The student is the user who registers into the website with an authorized college email or mobile by verification process after the authorized college email is verified then the student registers to the website successfully and can log into his/her account to view his/her seating arrangements for the respective examinations.

TEACHER: The teacher uses the mobile application to log in with a verified college email or mobile number. After successful verification, the teacher gains access to features such as invigilation duty schedules, assigned exam halls, and student lists for each room. The app also allows teachers to receive real-time notifications for hall changes or last-minute updates and to mark attendance or submit reports if enabled.

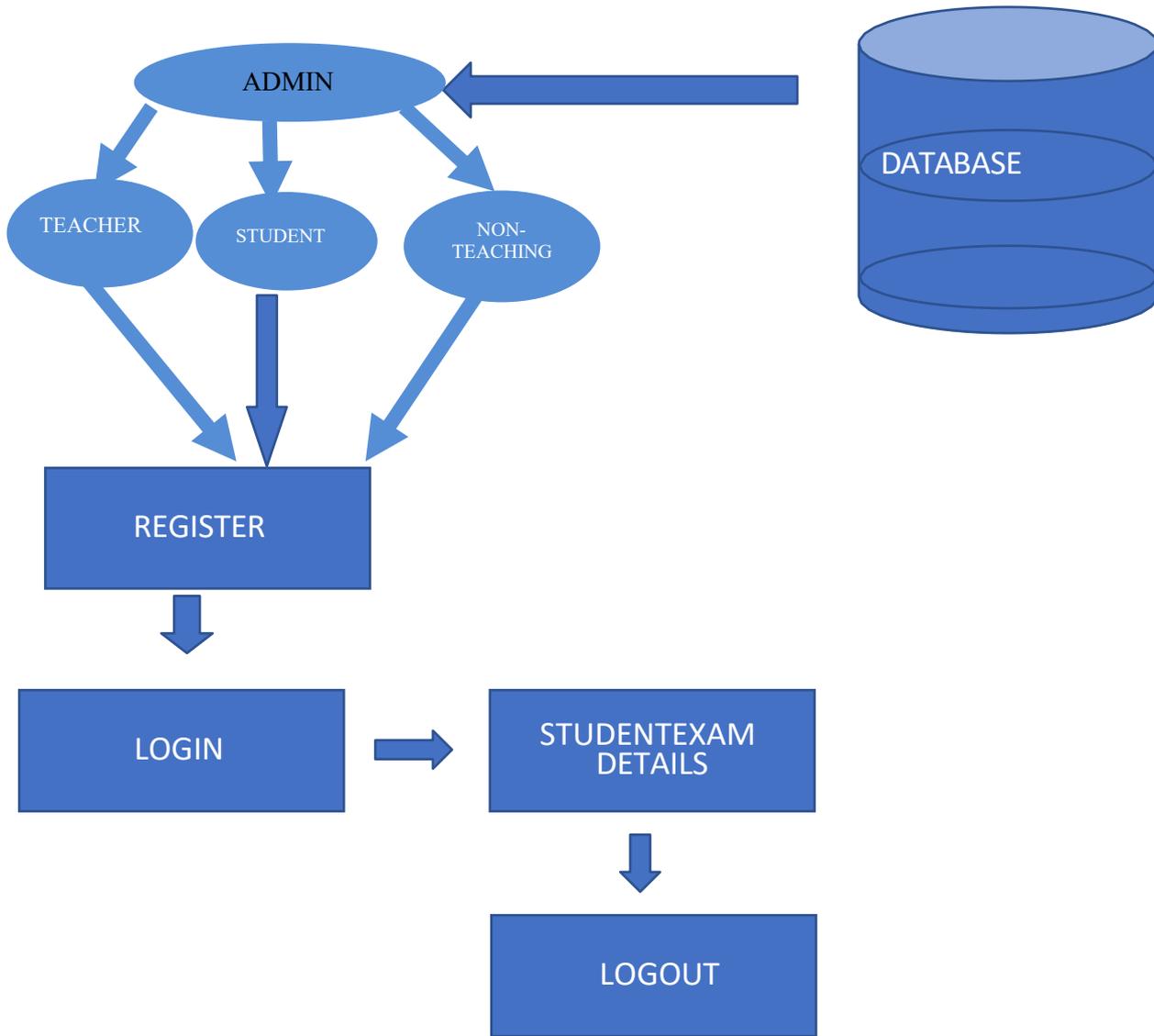
Non-teaching staff :- (such as exam coordinators, hall supervisors, or administrative personnel) use the mobile app to manage backend operations related to exam arrangements. After logging in with a verified account, they can check hall readiness, access seating charts, print or export arrangements if connected to a network printer, and receive alerts regarding logistics, maintenance, or emergencies. Their role ensures smooth coordination during examination periods.

LOGIN: The login module is responsible for login into the website to view the user interface. The login module verifies whether the student's email is verified or not whether the user enters the current password or not. The login module renders to the user interface if the user satisfies all the conditions specified in the user module if not it redirects to the login page.

LOGOUT: The logout module logs out the student from the website and returns to the home page. The abstract should concisely state the purpose of the investigation and summarize the important conclusions. It should be a single paragraph of generally no more than 200 words.



4.3. Architecture:



V. METHODOLOGY

The development of the Exam Hall Seating Arrangement System follows a modular and iterative software engineering approach, specifically the Agile Development Methodology. This enables continuous development, testing, and improvement with regular feedback and updates.

Requirement Analysis

Gathered detailed requirements from stakeholders such as college administrators, faculty, and students. Identified user roles (Admin, Student) and their respective features.

Architecture Design:

Developed a scalable client-server architecture using Django as the backend framework and PostgreSQL as the relational database.

**UI/UX Design:**

Designed responsive and accessible front-end interfaces using HTML5, Tailwind CSS, and JavaScript to ensure compatibility across devices.

5.1 Implementation**Backend Development:**

Built backend logic using Python (Django), with secure RESTful APIs using Django REST Framework (DRF).

Frontend Development:

Implemented clean and responsive UIs for login, student dashboard, and admin panel using HTML5, CSS, and JavaScript.

Authentication System:

Integrated JWT (JSON Web Tokens) for secure user login and session management.

Seating Algorithm:

Developed custom logic to dynamically generate seating charts based on hall capacity, departments, and student count

Testing

Performed unit testing for backend modules and integration testing for frontend-backend communication.

Conducted user acceptance testing (UAT) to ensure the system meets user expectations

Used tools like Postman for API testing and Django's built-in test suite for backend logic.

Deployment

Deployed the system on a local server initially for testing. Used Docker (optional) for containerization to ensure consistent environments across development and production.

VI. FUTURE WORK**A. Admins:**

can manage users, assign invigilation duties, post seating arrangements, and monitor the system from their mobile app interface with real-time updates and full backend access.

B. Analytics and Reporting:

The system generates real-time reports for student attendance, hall utilization, and invigilation duty coverage. Admins can export reports in PDF or Excel formats directly from the mobile app.

C. Clean and Responsive UI:

Designed with a mobile-first approach using tools like Flutter or React Native, ensuring a smooth and responsive user experience across Android and iOS devices.

D. Duty Management for Teachers:

Teachers can view their assigned invigilation duties, access hall-specific student lists, and receive duty-related notifications via the mobile app.

E. Exam Schedule Viewing:

Students and teachers can view the examination timetable and subject-specific schedules directly from their mobile dashboard.

F. Intelligent Seating Arrangement

The system dynamically allocates seats based on department, subject, and hall capacity. Optional Machine Learning algorithms can further optimize arrangements.

G. Login and Authentication

Secure login for all users with email or mobile OTP verification. Roles are authenticated using JWT for session security.

VII. CONCLUSION

The development of the Mobile-Based Exam Hall Seating Arrangement System provides a modern, efficient, and scalable solution to the long-standing challenges of manual exam hall management in educational institutions. By integrating user



roles such as Admin, Student, Teacher, and Non-Teaching Staff into a unified mobile platform, the system ensures seamless coordination, clear communication, and real-time access to critical information.

Through the use of Django and Python on the backend and a responsive mobile interface built using technologies like Flutter or React Native, the application offers secure login, dynamic seating allocation, push notifications, and duty management — all from the convenience of a mobile device. The project not only reduces administrative burden and minimizes human error but also enhances the user experience for students and staff alike. With scope for future improvements like cloud deployment and machine learning-based seating optimization, this system stands as a valuable tool for digital transformation in examination management. In conclusion, this mobile application demonstrates how technology can simplify institutional processes, promote transparency, and improve overall efficiency during critical academic operations like examinations.

REFERENCES

- [1]. IJRASET. (2023). Automation of Seating Plan for Examinations using Round-Robin Policy. International Journal for Research in Applied Science and Engineering Technology (IJRASET). Retrieved from <https://www.ijraset.com/research-paper/automation-of-seating-plan-for-examinations-using-round-robin-policy>
- [2]. Fahimad.(2023). Role-Based Access Control (RBAC) in Django. Medium. Retrieved from <https://medium.com/@fahimad/role-based-access-control-rbac-in-django-1955b31d93a5>
- [3]. ResearchGate. (2014). Algorithm for Efficient Seating Plan for Centralized Exam System. Retrieved from https://www.researchgate.net/publication/305421470_Algorithm_for_efficient_seating_plan_for_centralized_exam_system
- [4]. IJNRD. (2023). SMART EXAMINATION HALL. International Journal of Novel Research and Development (IJNRD). Retrieved from <https://www.ijnrd.org/papers/IJNRD2402061.pdf>