

Automated Examination System

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Abstract - Examination is a core activity of any educational institution. It is a web and android application that can be used by students and faculties using their smart phones or PCs. As the examination arrives there exists a lot of work like consolidating the time table, seating arrangement and invigilation allotment which will be done manually and it takes a lot of time and requires man power. Thus, an automated system would solve the above stated problem in just few clicks of work. The project keeps track of various details in modules such as Admin Details, Student Details and Faculty Details. Admin can add all the details of the faculty and the details of student and details of rooms allocated to students and faculty. This application gives the accurate information about the allocated room numbers to the respective faculty and student which saves a lot of time and effort. It also has some features to generate reports for attendance management and IA marks.

Key Words: *Firestore, Node js, Java Script, Json, Cloud Storage, Firebase Storage, Automation.*

1. INTRODUCTION

The proposed system is an android and web based application that is designed to manage and handle the operations in an educational institution during examinations. It is an application that can be used by all the students and faculty in an educational institute in order to facilitate the communication between them. The application is easily adaptable as it is used on a desktop systems and mobile devices. The Automated Examination system was developed for the educational institute to simplify the allocation of rooms, seating arrangement of students and allocating faculty to the examination halls. The project keeps track of various details in modules such as student details, Faculty Details and Admin Details with proper descriptions. This proposed system provides information which is accurate and no worry of data misplacement. All the information will be automatically stored in the database which is easy to search, modify or delete. Information related to room allocation can be added by admin and sent to the respective faculty or student from anywhere or at anytime which saves lot of time and effort.

Most of the important processes in an educational institute are carried out manually such as faculty details, student information and number of rooms available for the

examination as all these process is done manually it increase the work load and easily prone to errors. The current systems are traditional systems which support manual processes leading to an immense time consumption and pile of hard copies. Existing system is inefficient. Ineffective and less accurate, in such a situations report generation is not a simple task also if report is generated calculations has to be done manually which will surely results in errors.

2. LITERATURE REVIEW

“Automatic Exam Seating & Teacher Duty Allocation System [1]” by Apurva Inamdar, AnandGangar, Arun Gupta, Varsha Shrivastava describes a system where the Students Seating Arrangement (SSA) and the Supervision Duties Allocation (SDA) algorithms discussed in this paper are used to allocate the seating arrangement and the duties during an exam. This software helps the Exam Coordinators to allocate the duties to the respective teachers and also to develop a student seating allocation plan for examinations. The project aims at allocating the duties with much greater effectiveness. The software serves the purpose of saving the manual work and time put into the allocation. Optimum use of the resources available will be done without wasting extra classrooms and the allocation of the duties to the teacher will be done by checking their availability. “A distributed algorithm [2] for least containing slot allocation in MPLS optical TDM networks” by Hassan Zeineddine and Gregor V. Bochmann proposed a distributed approach for the least constraining slot allocation scheme. Basically, it reduces the rate of resource status updates from once per call to once per few calls, and measure the impact on network performance. After specifying the node database, the proposed system defines new parameters that need to be added.

“Exam Scheduling [3] mathematical modeling and parameter estimation with the analytic network process approach” by Mujgan Sagir and Zehra Kamisli Ozturk describes a system where an invigilator is a person who supervises students during examinations in educational systems. In this paper, an ANP model is used to prioritize the objectives of the invigilator-exam assignment problem. The quality of the solution of such a model depends strongly on the estimated values of the parameters of the problem. “Examining the examination [4]” by Stephen Minot describes the situation calls for a hard look at three

reassuring myths we have built around this thing called an examination. The poor student would not be convinced of his intellectual poverty. His grade could be excused on the basis of professorial prejudice and the blame in this way conveniently externalized. It is "good" because it was designed to give the student a fuller awareness of the intellectual process.

3. PROJECT FORMULATION

The purpose of developing the Automated Examination System is to automate the regular way of organizing the examinations in an educational institute and generating reports according to the examination type and time, allotment of rooms.

The basic objective of this project is it provides complete website solution and application, which includes admin login, faculty login and student login. The Automated Examination System adds attendance, exams and university exams which is convenient to the students and faculties. Each user must be identified by user username or email id and password authentication policy is applied to secure the automated examination system. This system generates number of reports for administrator like total number of students registered, faculties registered and total number of exams. Each user has the ability to see their respective profile.

3.1 SYSTEM DESIGN

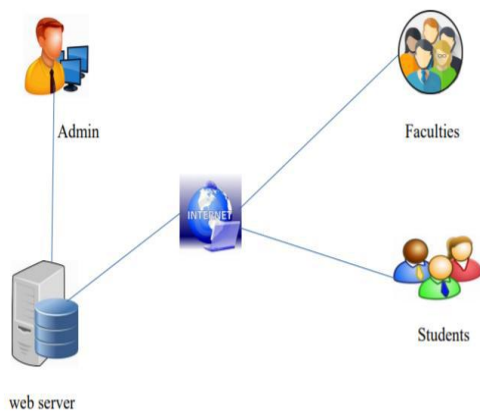


Fig. 1 System Architecture

- System Architecture consists of three users.
- The Administrator module, faculty and student module include their part of functions to the automated examination system.
- The initialization of this system is done by admin, who gives proper credentials to the users.
- Admin adds registered information of the users to the system database and edits or deletes it as needed.

The database used is Firebase:

- Implementing firebase database completes module which is hosted and supported by google.
- Firebase provides the tools and infrastructure you need to develop, grow, and earn money from your app.
- This package supports web (browser), mobile-web, and server (Node.js) clients.

Firebase Real time Database:

- The Firebase Real time Database lets you store and query user data, and makes it available between users in real time..
- Data is stored as JSON and synchronized in real time to every connected client.
- When you build cross-platform apps with our Android, iOS, and JavaScript SDKs, all of your clients share one Real time Database instance and automatically receive updates with the new data.
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Firebase Storage

- Firebase Storage lets you upload and store user generated content, such as files, and images.
- Cloud Storage for Firebase provides a declarative rules language that allows you to define how your data should be structured, how it should be indexed, and when your data can be read from and written to.
- By default, read and write access to Storage is restricted so only authenticated users can read or write data

Firebase Authentication

- Firebase helps you authenticate and manage users who access your application. Firebase Authentication provides backend services, easy-to-use SDKs, and ready-made UI libraries to authenticate users to your app.
- It supports authentication using passwords, phone numbers, popular federated identity providers like Google, Facebook and Twitter, and more.

3.2 MODULES

A. Admin

- Admin is the super user.
- Admin handles all the users(faculty and student).
- Admin can add, edit(modify), delete any user.

- Admin has the authority to handle all Internal marks based on branch and semester.
- Admin has the authority to handle all attendance based on branch and Semester. Example adding clear attendance, adding shortage attendance and deleting them
- Admin has authority to handle exams. Ex. Adding exam based on semester wise, date and time slot wise and deleting them.
- Admin has authority to generate seat plans based on date and time slot.
- Admin can send notice to all users.

B. Faculty

- Faculty has the authority to add IA marks branch wise & sem wise.
- Faculty has the authority to Add Attendance (List of Students with shortage of attendance & Clear attendance).
- See All generated Seat Plans.
- View notice sent by admin.
- View all files for IA Added by admin.
- View all files for attendance added by admin.

C. Student

- Student can view all the IA Marks added by admin and faculty.
- Only the file for his/ her semester will visible and Student has the ability to download them.
- Student can view all the Attendance added by admin or teacher.
- Only the file for his/ her semester will visible and Student has the ability to download them.
- File will be separate for Shortage of Attendance and Complete attendance.
- Student can view and download generated seat plans for upcoming exam and download it.

Disadvantages of current system:

- Takes a lot of time
- Resembles like a complex problem while allocating faculty to different rooms.
- Less accurate.
- Requires more manual work.

Advantages over current system:

- Easy to handle and operate.
- Friendly interface.
- Less human effort.
- Smart way of communication.

3.3 TIER ARCHITECTURE OF A WEB APP

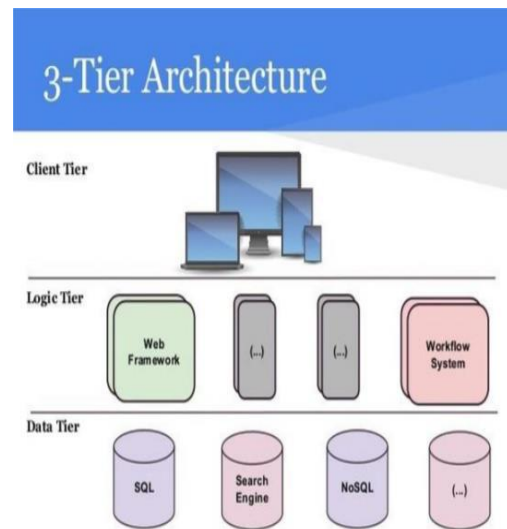


Fig. 2 Tier Architecture

- A. Client Tier
- B. Logic Tier
- C. Data Tier

A. Client Tier

The client tier is the logical group of components that provide a user interface. These components can include server pages, forms and reports, the components allow the users to interact with the application, but they do not process data, handle business rules, directly access databases or other storage media. The Front end of the Examination Cell Automation System is called as Client tier was designed using Hypertext Markup Language (HTML), Cascading Style Sheets (CSS), Bootstrap and JavaScript. Presentation tier is the GUI, from where the user can request the server and view the results that were displayed on the screen. The client tier consists of three different user interfaces based on the type of users.

- Admin UI.
- Student UI.
- Staff UI.

B. Logic Tier

The logic tier is a heavy weight processing, validation, logic rules, workflow and interfaces to external systems. Logic tier components run on the middle tier and thus have historically been referred to as middleware. These components run within an application server, which provides the container for the components. The logic tier consists of components that provide the business logic for

an application. The logic tier is the intermediate between the client tier and the data tier. All the business logics are performed in this tier, it takes the input from the client tier execute the query and fetches the data from database. It uses server and node JS for doing the operations.

C. Data Tier

A data-tier application is a body that contains all databases and instance objects which were used in an application. A data tier provides a single unit for authoring, deploying, and managing the data-tier objects instead of having to manage them separately. A data tier allows tighter integration of data-tier development with the development of the associated application code. It also gives administrators an application level view of resource usage in their systems. The end tier of the architecture is data tier in which all the data is stored in Firebase database.

4. IMPLEMENTATION AND RESULT

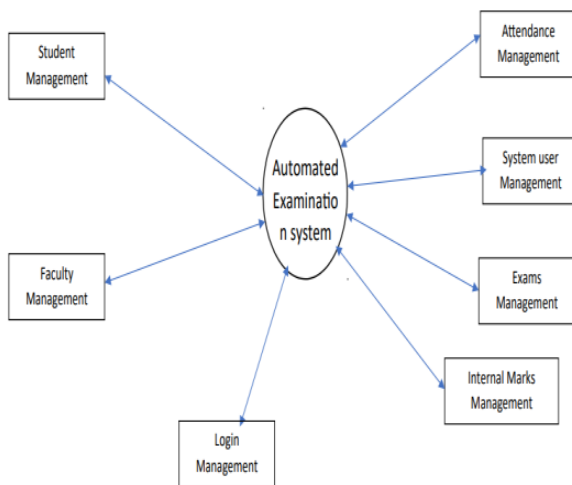


Fig. 3 Data Flow diagram

A data flow diagram (DFD) uses a very small number of primitive symbols to represent the functionality performed by the project and the flow data among the different functions of the project. The data flow diagram depicted in figure below shows the relationship among the entities in the Automated Examination system.

Admin: Admin can manage both the users that is faculty and student. Admin has the ability to display students and faculties registered which is generation of report.

Student: In this panel the admin enters the students into the database by clicking on the add student icon. Unlike staff the admin can directly upload the excel sheet of student details into the database. The admin can delete entire students list or can be done on individual. There is also a feature to view and finally edit and update the

student details by giving the inputs like academic year, year of study and semester.

Faculty: In this panel the admin can add the faculties into the database by clicking on the add faculty icon, details required for adding the faculty are Faculty name, department, email and contact number. The admin can delete, view and finally edit and update the staff details and acknowledgment can be displayed.

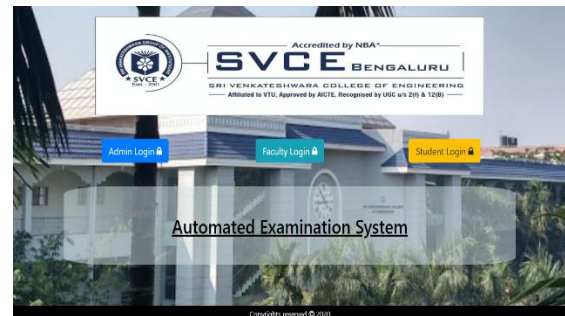


Fig. 4 Home Page

This is the home page of the automated examination system. Home page contains login of all the users. It contains Admin login, Faculty login and Student login.

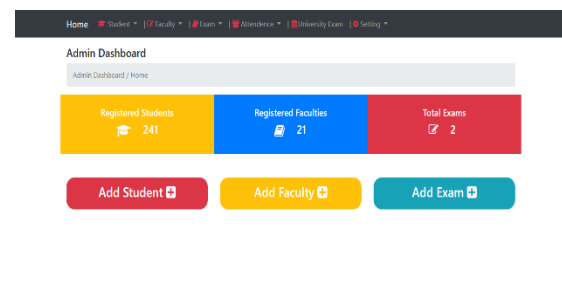


Fig. 5 Admin Dashboard

Admin is the user where it handles the details of students and faculties added. Admin dashboard contains the number of students registered, number of faculties registered, number of exams in total. It is basically the report generation of whole criteria. It updates whenever new data is added.

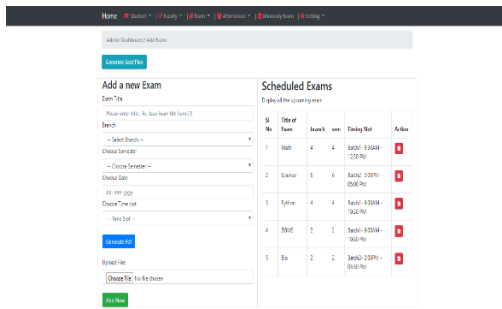


Fig 6 Add Exam

Admin adds a new which contains title of the exam, subject and sem wise. It is going to generate a new pdf based on the five data. Admin can choose a file in order to upload a file which will be shown in faculty and student Profile.

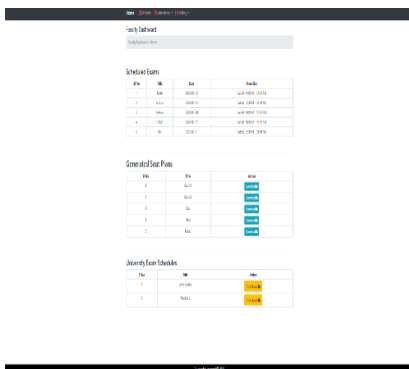


Fig 7 Faculty Profile

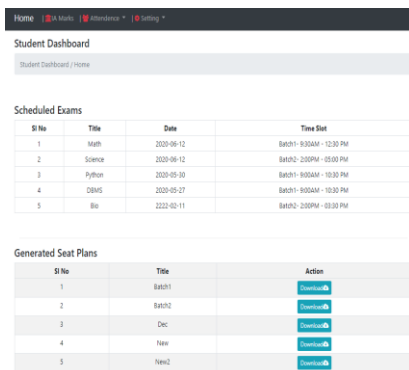


Fig 8 Student Profile

Fig 7 and Fig 8 are the one which shows Faculty and Student Profile. Scheduled exams, Generated seat plan and university exams schedule will be displayed. It also displays clear and shortage of attendance of students.

5. CONCLUSION

Ultimately the output of the project reduces the manpower, workload on students as well as staff. It benefits all the educational institutes by reducing the

complexity involved while allocating the exam duty for the staff, examination rooms for the students. All these data is stored in a centralized database which can be accessed whenever needed. Our fully functional, stand alone website which uses real time database with no latency along with security which we all can trust on firebase as service is provided by Google.

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