

Project Approval System

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Abstract: Projects play an important role in the education system. At the end of 2019, COVID came into existence making people live in isolation. At that time learning and teaching did not stop. Learning through video calls and watching videos made learning easier at the time but delivering projects and maintaining them was tedious. Adherence to the project title, project presentation, project management, HODs and proper communication were difficult. This has created the need for an automated system that assists in managing all the project related activities. An effective project accreditation system not only ensures significant student and teacher time savings but also ensures the availability of data collection and storage. In this regard, this research paper presents the development of a web-based software tool - Project Approval System. The primary objective is to develop an integrated framework for the process of authorizing and managing project activities. This is a web-based framework that supports students, project managers, HOD, administrators and investors. The focus is to connect the students and teachers in carrying out the project related activities smoothly. The system facilitates to save students and teachers time by connecting them all in one place without the automatic project approval process and data exchange such as project approval, project presentation, project reports, etc. The developed system employs a Chatbot designed to provide an easy-to-use visual interface, allowing teachers to interact with students and cloud data storage to improve data management and project data retention.

Keywords: COVID, Connectivity, Project, System, Software, Chatbot, Automation.

1. Introduction

In the world of today, nobody holds the initiative to check for notices on the notification boards. Many students skip details on some relevant news and updates about their projects for their final year [1]. Academic Project management is a major issue that is faced by many educational institutes, the main reason for this is there is no automated system followed in any institute [2]. The project plays an important role at the university level. Working on a project clarifies the knowledge students have and the practice they have developed. Project titles and project management were easy to do without communication, prior to the existence of COVID. Discuss all these important topics directly with a respected college project manager. But at the same time, it was time-consuming. Explaining the project idea to the project in charge, we got permission from him and explained the idea to the HOD. Most important of all is waiting for the authorities to take the time to hear the opinion. Time is

running out for this process. Sometimes just presenting an idea was not enough to approve projects, it gave students a greater risk of having the idea canceled. Teachers will also have time to look at the project and related documents. That is what took the process of stretching and time to complete the project. If the student is in the fourth year and this thing happens there's a risk of promotion to the next semester. This will result in extending the student's year of study and affect the job search process.

These problems necessitated the use of software to perform the process automatically. Development of a software application can be accomplished using different programming tools however, what carries importance is not the completion of task but the flexibility and efficiency that it offers [3], [4]. Over the years, several works have reported the benefits of automation and software in varied fields through developing and the presentation of some software tool [5] have presented the data mining driven forecasting software tool for QFD. The authors also presented the database design for the same. [6] has presented a novel software tool to generate customer needs for the effective design of online shopping websites.

Automatically performing this process saves time and effort. The automation of this process ensures that the use of time is less than before, allowing the project manager and HOD to use the same data at the same time and reducing the time required and the risk of project cancellation. It provides a clear website for students, in charge of the project and HOD for managing and monitoring project activities. All device modules have a specific user ID and password. The module can access the device using its id and password for further verification. This study allows a group of students to have project management and the HOD assigned to a director. Allow students to have a conversation with their respected project management. Outside of this web application allows students to receive financial support from investors. Investors can also invest in a student project by considering the potential of the project and students moving forward with the project to get it started.

So, in this paper, we are researching web applications. A web application is an application program that is usually stored on a remote server, and users can access it using Software known as a web browser. A web application can be developed for several uses, which can be used by anyone like it can be used as an individual or as a whole organization for several reasons. Some of them also use client-side scripts such as JavaScript, and HTML to represent the data/information in front of the users,

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and some of the web applications are also using both server-side and client-side at the same time. It allows the users to communicate with the organization or companies by using the online form, online forums, shopping carts, content management system, and much more. [7]

2. Literature Review

As the epidemic was always on its way students could not connect to the center. Students were not connected to physical education but were connected to online teaching. The problem that students face while studying at the highest level is in the curriculum. Issues such as project title completion, sharing project details in the guide, project updates from teachers, etc. Traditionally, we meet with our guide to approve our project, discuss minor project issues, and provide and take suggestions with the project guide. But now we are unable to meet our guide because of the social distance. That's why the project came into being existence. Anxious work is a common way of approving student projects using a hands-on process. The motto of the project is to develop an integrated framework for the process of authorizing and managing project activities. This is a web-based framework that supports students, project managers, HOD, administrators and investors. As some web applications do not focus on the authorization part of the project system. Therefore, here we focus only on the authorization process that plays a key role in the development of the project.

Existing System:

Students complete the work done by the consultant or guide and use it manually, all the work is done in this way, which allows more time to work on the project. The project coordinator or guide needs attention when students complete the task, so it becomes difficult for the project coordinator or to direct who and when the student has completed the task. Some of the programs available are (Click-up, Kissflow, process street, etc...) all providing a platform to distribute the work to employees and their team performance. They also provide guidance (guidance) to the group. But their greatest interest is in companies and employees.

They have some disadvantages in terms of our problem statement and are as follows:

- Time-consuming.
- Inconsistencies inaccuracy in data storage.
- Changing student/staff information is a broad process that can lead to confusion and mistakes.
- Accurate timely information not found.
- It is very difficult to understand the system by the average person and, if an inexperienced person is to be used by a student knowledge system, adequate instructions should be provided for the operation of the system and then the whole system
- Not very efficient.
- The problem is solved in companies and employees. There is no such program for academic and student universities.

3. Proposed System

This study is designed to see how the proposed software might increase accuracy and reliability. The parameters for software construction should primarily aim at the following primary characteristics: Functionality, reliability, usability, efficiency, and maintainability [8]. Creating a software system contains three main tasks or phases: the functions and features of the expected software must be defined; the software must be implemented, and it must be deployed in an operating environment. [9]

The proposed software tool is designed and built using ReactJS, Firebase, MongoDB Atlas, Typescript, and ExpressJS as the software interface. The interface acts as a junction to interact with human being and allows for effective operations and control of the machine from the human end. An interface comprises commands or menus through which a user communicates [10].

Some applications do not focus on the project approval component of the project but, here, we do the project accreditation component. Here we have one director overseeing all the roles assigned to a director such as HOD, project manager, and student. Here the administrator can create roles for system members. If the administrator wants to add an employee to assist the administrator, then the administrator can add an employee and can remove it if it is not needed. Employee details employee name, date of birth, and employee address. To assign member roles, you must provide them with a username, role, and department to create their account. For students, there are two additional items to be added which are semester this year. To assign a role to their HOD, project manager, and students, the director must select and assign a task as shown in the picture. The administrator can then view the test role assigned to the administrator.

After the director the main role is HOD. The HOD can view the assigned project with the students on the dashboard. It can also view recent messages provided by the project manager and student in the event of any changes. To authorize, view, and edit student groups, there are options provided in the dashboard. In approving a student group project, the project manager must first approve the project and the HOD may review the project and approve it at will. In the HOD-approved project module, there are a few project details that can give an idea of a project that helps HOD approve if HOD likes this idea. By looking at the project details, the HOD can download useful information available in the form of a document and a presentation file. Also in the proposal module, if certain changes are to be made to the project, feedback can be provided here.

The project manager has arrived at this location. The functions of the project management module are generally like the HOD module. But the only difference is that if the project manager rejects the idea of a student group, the HOD cannot see the list of groups in his dashboard and vice versa.

The student module plays an important role because everything goes in this module. Anyone who is a project leader among students, is the only person who can use this web application. That is why the admin must know who the leader

of the group is. Students can add a member to any number as the student wants but usually the group should be 3-4 members. Here the group number is automatically generated by the system. Students must add the project name, project type, cause selection paper, technology to be used in the research paper and have the option to upload a text file and presentation file and send it to the program. The person can then view the details of his project, edit the information submitted to the program and can view their project status if it is approved or rejected. Approval and rejection both can be considered from the relevant project manager and the HOD.

Role management is a module in which all roles are managed by a director. As there are various roles available here as project manager, project manager, HOD, student, investor.

Here we present our new feature which is the chat feature. This discussion feature is available to the project manager and students. The link is also the same. Only the students in charge of the project can communicate with each other because the establishment of communication should be between them. As they can use our discussion feature, the project manager is able to provide all the necessary suggestions to the reader about project ideas. Now we only offer project management and students to contact on our web application Project Approval Program. In the future we can extend this feature to others.

The same feature as the chat box feature that introduces the AI powered chatbot. Chatbot will automatically mimic human interactions with users. This chatbot will provide answers to basic questions asked by users. Chatbot uses a keyword recognition method and a written / quick response to a seamless conversation between a user and a chatbot.

Those who are interested in investing in our project are listed in this module. In the Investor Module, there is a dashboard where all the investors' names are mentioned and the names of the team members, the title, and the description of the project. Investors can also view details of a project uploaded by students.

The accreditation process is therefore terminated because it is the main purpose of the research paper we are developing, which is the project approval process.

System modules:

The developed system comprises of following modules:

1. Admin
2. HOD
3. Project in charge
4. Student
5. Investor
6. Chatbot
7. Chat box

Admin:

Admin should have all authority, i.e., he can add the role, stream, Academic year and Employee his Credential and Department. Admins have all authority in this project

1. Add Role
2. Add Stream
3. Add Academic Year

4. Add Document Category
5. Add Sem-Year
6. Add Department
7. Add Sub Department
8. Employee Credential
9. Add Employee
10. Upload Student Details

Student:

Students can login and post all his project details and he can view his project details online.

1. Encrypted Login
2. Upload project Details
3. View all his project details
4. Modify details
5. View his project status

HOD:

Hod plays vital roles in our application projects posted by students are first viewed by HOD if HOD approves then only next level people can view the project details:

1. Privacy Login
2. View project details.
3. Authorize project details
4. Automatic project update (if the HOD enters the site if there are unread project details, those items are highlighted on the user's main home page).
5. Project Feedback (HOD can provide feedback on projects that can be viewed by that work-related student).
6. Downloading / Deleting Project / Feedback.

Project in charge:

After the project is accepted by HOD, the project in charge can view the project details.

1. View Project details.
2. Modifications in project (feedback).
3. Downloading documents.
4. Approve projects

Investor:

1. Dashboard
2. View project detail

Chat box:

1. For project in-charge and students.

Chatbot:

1. For solving basic queries generated by the users.

4. System Design and Technologies

Development of software can be accomplished using a suitable programming language. This requires exploring the various available programming languages, analyze them and pick a suitable one for the QFD software. Evaluation of programming tools for the development of software has been reported by. The software tools utilized for the development of

proposed system are discussed below:

Software Tools:

VS-code IDE:

Visual Studio Code is a source-code editor made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git.[11]

Platforms:

UI-framework: ReactJS

ReactJS is a declarative, efficient, and flexible JavaScript library for building reusable UI components. It is an open-source, component-based front-end library which is responsible only for the view layer of the application.[12]

Server runtime env.: NodeJS

Node.js is a single-threaded, open-source, cross-platform runtime environment for building fast and scalable server-side and networking applications. It runs on the V8 JavaScript runtime engine, and it uses event-driven, non-blocking I/O architecture, which makes it efficient and suitable for real-time applications.[13]

Web application framework: Express.JS

Express.js, or simply Express, is a back-end web application framework for Node.js, released as free and open-source software under the MIT License. It is designed for building web applications and APIs. It has been called the de facto standard server framework for Node.js.[14]

Cloud application platform: Heroku

Heroku is a cloud platform as a service supporting several programming languages. One of the first cloud platforms, Heroku has been in development since June 2007, when it supported only the Ruby programming language, but now supports Java, Node.js, Scala, Clojure, Python, PHP, and Go. [14]

Database: MongoDB Atlas

MongoDB Atlas is a fully managed cloud database that handles all the complexity of deploying, managing, and healing your deployments on the cloud service provider of your choice (AWS, Azure, and GCP). MongoDB Atlas is the best way to deploy, run, and scale MongoDB in the cloud.[15]

Windows OS:

The Windows operating system (Windows OS) for desktop PCs is more formally called Microsoft Windows and is a family of operating systems for personal computers. We installed all our essentials on the Windows 11 64-bit operating system.

System Architecture:

An architecture diagram is a visual representation of all the elements that make up part, or all, of a system. Above all, it helps the engineers, designers, stakeholders and anyone else involved in the project understand a system or app's layout [16].

The system architecture uses only one integrated model to define multiple concepts such as planning, analysis requirements, design, implementation, deployment, composition, behavior, input data and output data view, is a type of system model as shown in (Figure 1).

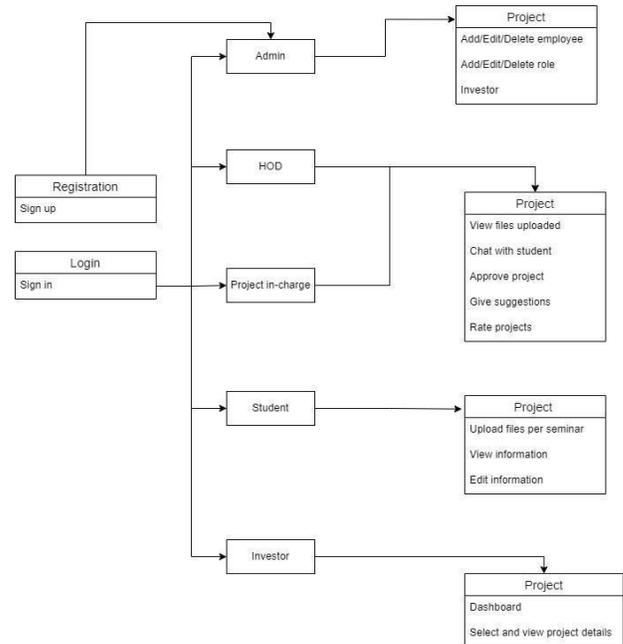


Fig. 1. This is the system architecture of the proposed system

Use case diagram:

A use case diagram is a graphic representation of how a user interacts with a technology. The administrators and customers are the users in this system. In the Unified Modeling Language (UML), a use case diagram can summarize the details of your system's users (also known as actors) and their interactions with the system. To build one, you'll use a set of specialized symbols and connectors [17]. (Figure 2).

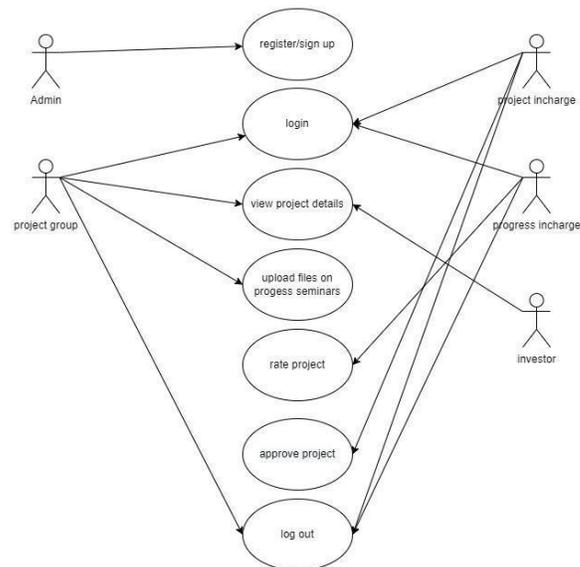


Fig. 2. Use case diagram of the proposed system

Activity diagram:

An activity diagram visually presents a series of actions or flow of control in a system like a flowchart or a data flow diagram. Activity diagrams are often used in business process modeling. They can also describe the steps in a use case diagram. Activities modeled can be sequential and concurrent.

In both cases an activity diagram will have a beginning (an initial state) and an end (a final state).[18]

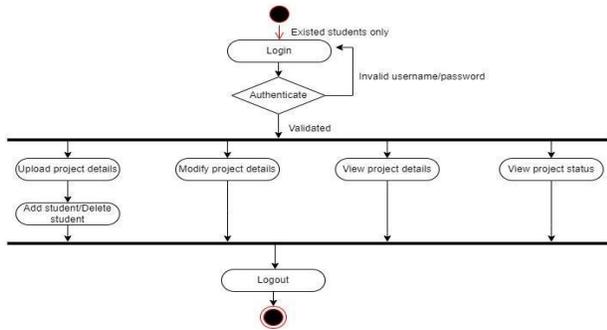


Fig. 3. Activity diagram of Student

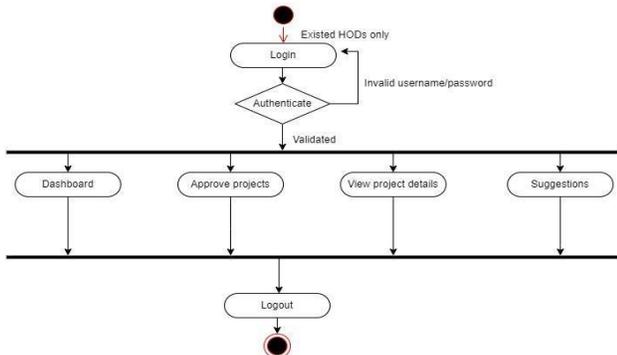


Fig. 4. Activity diagram of Project In-charge

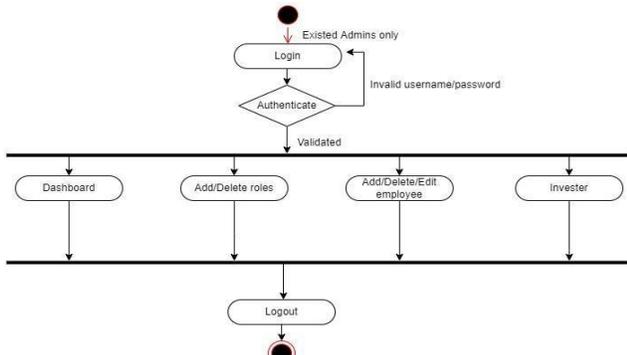


Fig. 5. Activity diagram of Admin

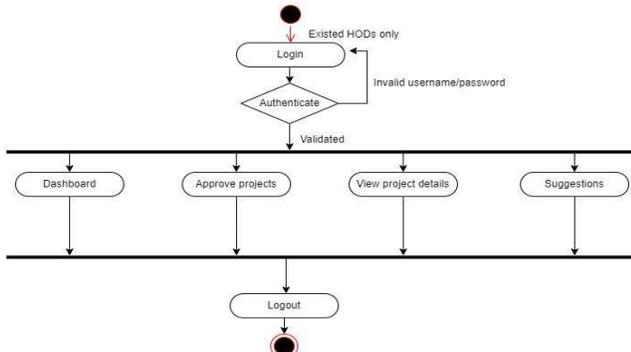


Fig. 6. Activity diagram of HOD

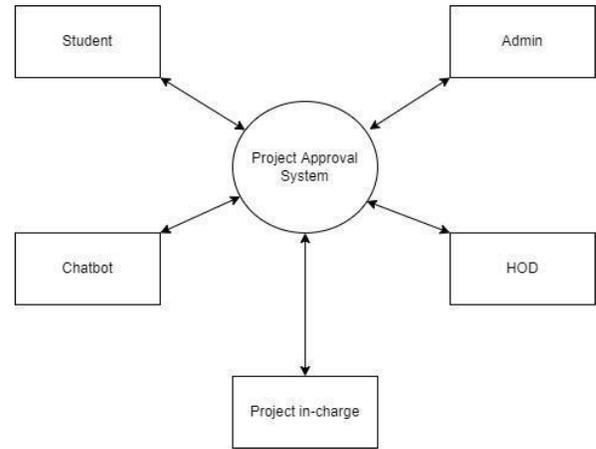


Fig. 7. Data Flow of the project

Flowchart:

A flowchart is a diagram that depicts a process, system, or computer algorithm. They are widely used in multiple fields to document, study, plan, improve and communicate often complex processes in clear, easy-to-understand diagrams. [19]

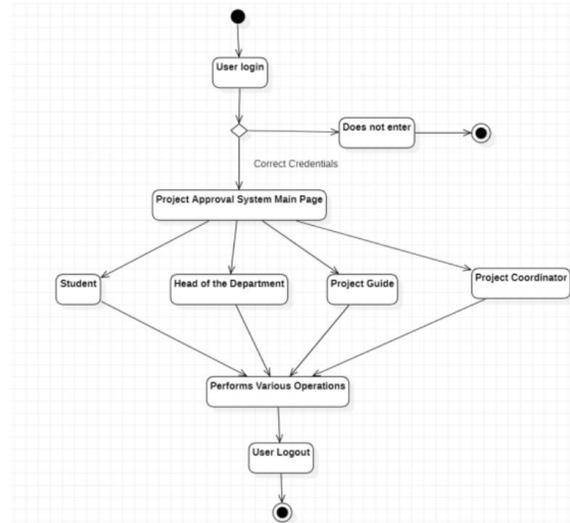


Fig. 8. Flow chart [20]

5. Result

The result of this implementation is presented and discussed in this section. There are four elements involved in the following study: HOD, director, project manager, student. To start using the system, new users sign up to sign up for the program. Once you have successfully registered, login credentials are usually issued to users allowing them to access the services available to them.

The main login pages:

The login page is common for all the users of the application (Fig. 9).

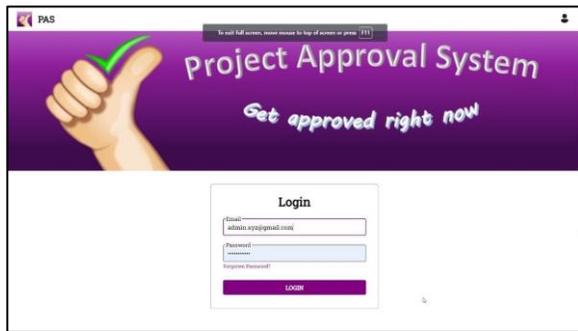


Fig. 9. Login page

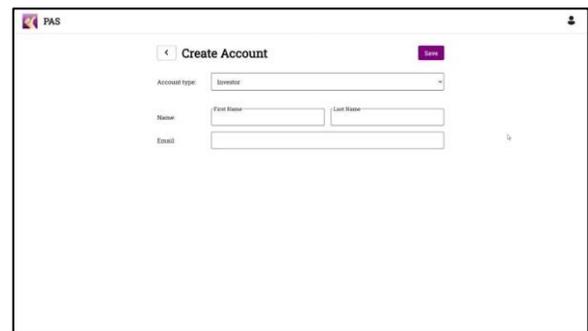


Fig. 13. Create account (Investor)

Home page:
The home page of the application is common for all the users (Fig. 10).

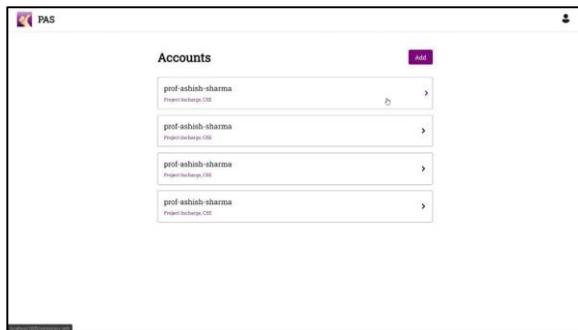


Fig. 10. Home page

Create account:
The create account is this page where the admin can create the account of the following members: admin, HOD, project in-charge, investor, student (Fig. 11, Fig. 12, Fig. 13, Fig. 14).

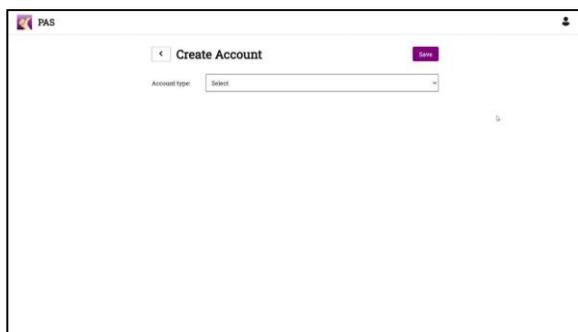


Fig. 11. Create account (admin)

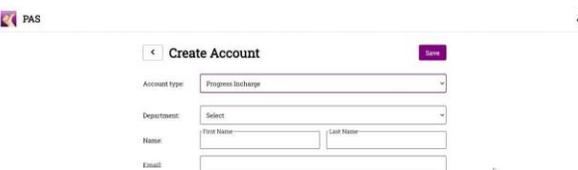


Fig. 12. Create account (In charge)

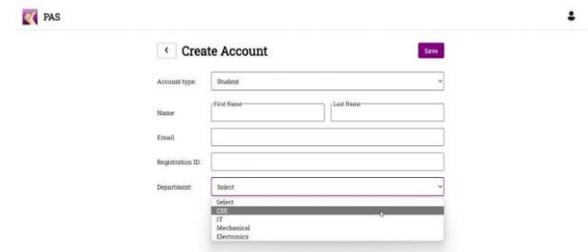


Fig. 14. Create account (student)

Project in-charge:
(Fig. 15) shows the project which has been assigned to the project in-charge.

(Fig. 16) shows the project which has been approved by the project in-charge.

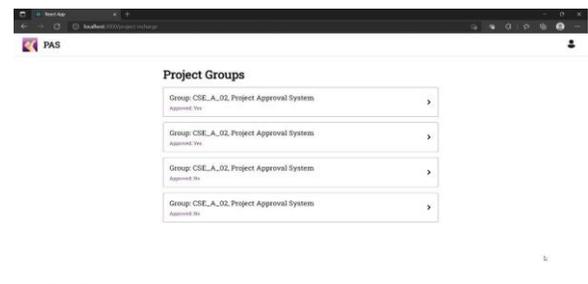


Fig. 15. Home page of in charge (project group under them)

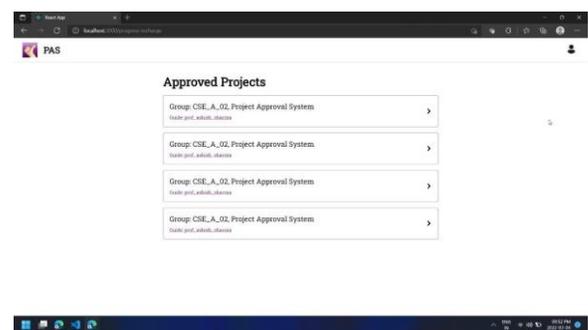


Fig. 16. Home page of in charge (project approved under them)

Student:
(Fig. 17, Fig. 18). This page shows the page where the student can fill in all the details of the project.

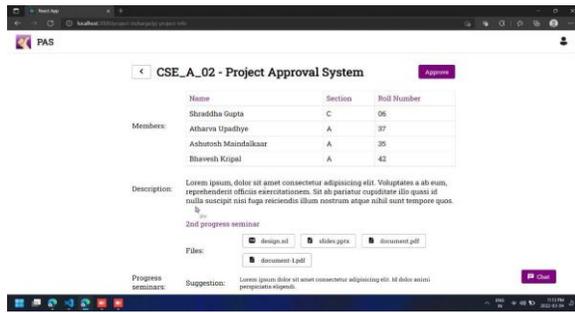


Fig. 17. Descriptions of the project

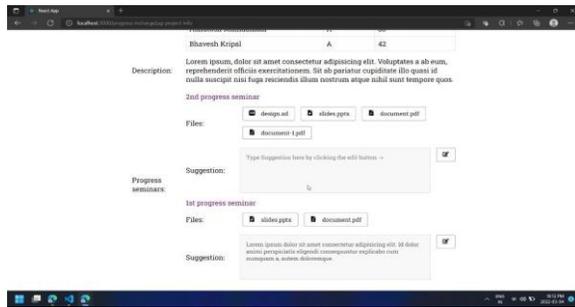


Fig. 18. Descriptions of the project

Rating:

(Fig. 19). This figure shows the rating system for the projects.

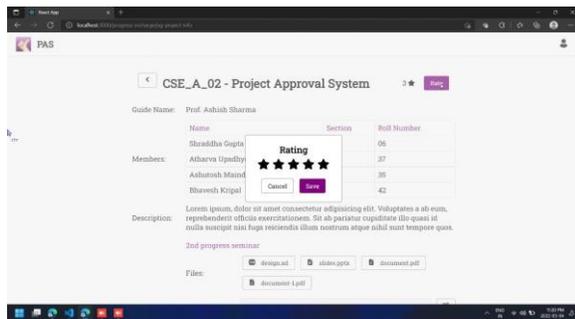


Fig. 19. Rating system

Suggestions:

This page shows the suggestions of the project in-charge, HOD to the students.

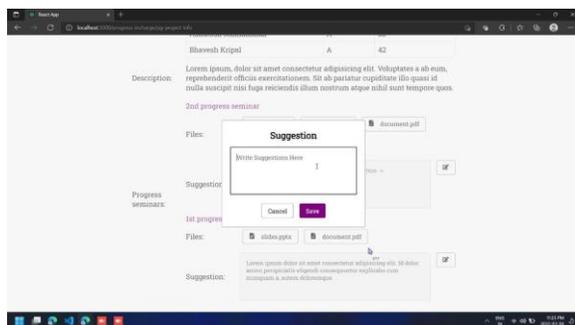


Fig. 20. Suggestions for the project

6. Conclusion

This research has presented the web-based framework called the Project Approval System (PAS). It is very efficient and can be widely used. PAS offers many benefits in the normal way. Some of these benefits are centralized information, status monitoring, formal communication, and ease of use. This application eliminates the extra time and resources needed to plan and track projects in end-of-year facilities. Assign different instructions to student groups to make the process easier. It also provides a good visual interface that is easy for users to understand and helps them adapt to the use of this web service.

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