Integrated Classroom for Augmented Learning-ICAL

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Software Requirement Specification

1. Introduction

1.1 Purpose

With this sudden shift from offline to online teaching, the huge issue is that there is no proper application to manage all the academics related activities. Teachers and students need to have multiple applications for different purposes. e.g.- one application for taking online class, another for an exam and another for attendance alone. This often leads to confusion and frustration. With the present system there are no features to record the class by default, we need to record manually or use a third party app which is not convenient, so if a student misses a class there is no proper way to access that class. There is no proper way of communication between students and teachers. To clear any doubt students have to either email or wait for the next online class, which may take too much time and the process becomes too frustrating for both student and teacher.

1.2 Scope

The Scope of this document includes mainly the developers of this project to refer to the requirements and the functionalities in the design and testing phases. The scope of this document is also to the customers, in this case it is the evaluator of our project.

2. Overall Description

2.1 Objectives

- Video-Conference-classes. An integrated video conferencing system which allows better quality and performance as it is integrated into the project and allows you to record classes.
- To simplify Online Education by bringing all the needs of teachers and students in one single web app. So that we can spend more time learning and teaching than managing the web/apps.
- Notes making is the most important aspect of learning. So one of the objectives is to make taking notes easier.
- Reduce gaps between student and teacher, the only way students can contact teachers or vice versa, is to whatsapp, e-mail or to wait for the next live class. By providing an inbuilt discussion feature the project aims to ease the communication.

3. System Features and Requirements

3.1 Functional Requirements

There will be two separate interfaces, one for Teachers and other for Students, with some minor changes. Each Student and teacher will be enrolled with some subjects and in those subjects there will be all the functionalities related to that subject.

Following are some steps to explain the basics –

(1) Authentication - Through a signUP and Login system, users will be verified and authenticated and once authenticated, user will be redirected to the Homepage.

(2) HomePage -The homepage consists of all the subjects users are enrolled to, with some info like batch name and Faculty name.

(3) Subject -On clicking a particular subject, the user can access the subject. which consists of four 'tabs' Class-For accessing the Online class and the previously recorded classes, Notes- To upload and access the Notes, Assignments- where teacher can provide assignment, Discussion a place to clarify doubts.

(4) Class - In class, User can directly join the online live class

(5) Notes- for teachers there is an option for uploading the notes, and a list of all the previously uploaded notes, for students, they can write their own notes and save it and a list of all the notes provided by the teacher.

(6) Assignment - For Teachers, there will be an assignment option along with a due date and 10 marks. On uploading the assignment, students will be notified about the assignment and can access the PDF and have to submit in time.

(7) Discussion - students can ask any doubt directly to the teacher.

3.2 Non-Functional Requirements

- **Scalability :-** Since we are using jitsi the maximum number of participants in a meet is around 150, which is sufficient for a class. The number of users who can use the application is around 5000-6000 which is sufficient for our whole college. Also the single-threaded nature of Node.js and Express.js makes it easy to scale as well if needed.
- **Security :-** Admin based teacher's login so only verified teachers can host the class meet for a course.

4. Software Requirements

4.1 Tech Stack:

1) Node.Js and Express.Js are used for backend .
2) React.Js is used for frontend development.
3) MongoDB is used as database
4) Socket.io for real-time bidirectional communication
5) Jitsi-meet (API integration) for video conferencing server
6) Some other tools and setups used are
    - Git for project management
    - Mongoose, Nodejs lib for better management of MongoDB
    - BcryptJs and JWT Nodejs libraries for authentication.
    - Bootstrap and CSS for responsive and better User interface.
    - PostMan Development tool