WEBSKOOL- INTEGRATED PLATFORM FOR ONLINE EDUCATION

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Abstract - *Since the COVID -19 pandemic situation has disrupted the normal lifestyle of people, the virtual world has come to the rescue. Many of the institutions, schools, colleges etc have shifted their lifestyle to depend on virtual platforms to conduct online classes. So the entire classes from pre-primary to university level have changed to e-learning. It has been found that the existing platforms were not designed as a complete system for online education. Webskool is an integrated platform for all activities and communication that happen in an academic institution. This includes a learning management system and a platform for digital classes. The proposed system can also check whether a student is active or not using Tensorflow. We hope that this innovative solution can help the students and teachers in making e-learning easier.*

Keywords : Learning Management System, *Digital Classroom. Web App, Tensorflow*

1.INTRODUCTION

The Covid-19 pandemic has struck the lives of millions of people around the globe. This forced the educational institutes to shut down and switch to an online mode of teaching. Thus online platforms such as Google Meet, Zoom, etc became the classrooms of the students. But these platforms have a lot of limitations when it comes to providing education. Webskool is an integrated platform for all communication between a student and a teacher. It includes a video conferencing tool for the teachers to conduct the classes and a platform for sharing notes of the respective courses with the students. The integrated video conferencing tool checks whether a student is attentive in the class or not by monitoring their facial expressions using Machine Learning. The proposed system is implemented using Tensorflow js and can be done on the client-side to reduce the network load. It can also monitor the attendance of each student and a report will be generated automatically and send to the teacher for validation. Teachers have the provision to create classrooms and enroll students with respect to their courses. Each classroom can be used for scheduling and conducting classes, sharing notes, and conducting exams. The final solution will help the students and teachers to manage their courses better by bringing everything under a single roof.

2. PURPOSE

Nowadays, students face an obstacle in traditional education, this project enables teacher and student to set their own learning pace. Watching students through a webcam and generating a complete record of the attendance of each student automatically. It also has an integrated platform where the teachers can share notes, conduct exams, and the students can post queries on any topic.

3. PROBLEM STATEMENT

The novel coronavirus pandemic has forced the closure of schools all around the world. Over 1.2 billion children are out of school around the world. As a result, education has experienced considerable changes, with the emergence of e-learning, which allows students to receive instruction remotely and through digital platforms. According to studies, online learning improves information retention and saves time, signalling that the coronavirus's changes are here to stay. As a result, a platform that can meet all of the needs of both students and teachers is urgently needed. This project will seek to relieve many of the issues that students and teachers have by utilising existing platforms such as Zoom, Google Meet, Cisco Webex, and others. One of the difficulties within focus is determining whether or not a kid is paying attention in class.

4. OBJECTIVE

To solve the problem of monitoring attendance in an online mode by constantly watching the student through the webcam and detecting a face as well as recognizing the face:

● A single platform for interaction with teachers and students with all features and necessary controls.

● To Solve the dependency on third party applications for attendance monitoring.

● Solve the problem of checking the active participation of a student in an online mode by constantly watching the student through the webcam and providing the feedback.

● Also make a Learning Management System that is easily accessible by students and teachers.

5.EXISTING SYSTEM

5.1 Big Blue Button

Big Blue Button is an open source web conferencing system for online learning.It provides high-quality audio, video, and screen sharing using the browser's built-in support for web real-time communication (WebRTC) libraries.A viewer can chat, send/receive audio and video, respond to polls, display an emoji such as their raised hand), and participate in a breakout sessions.[5]

5.2 Google Meet

Google Meet is a video conferencing service. It's a great solution for everyone to meet on audio,chat and video calls. Everyone can create and join high-quality video and audio meetings for less than 250 people. Anyone can easily pin, mute, or remove participants from the meet. Also for some privacy issues, we cannot unmute another person's call.They can ask them to unmute their audio. We can share entire screen or an application window to share presentations or collaborate on documents.[6]

5.3 Zoom

Zoom is a video conferencing tool mainly for virtual meetings and hangouts. It can be used for businesses, individuals and to livestream things like classes while we're all in self-isolation. Zoom allows you to see the users in a chat, face-to-face conversation, on a phone, tablet, or computer. Also users can upgrade by subscribing to a paid plan, with the highest allowing up to 1,000 participants concurrently, with a 30-hour time restriction.[7]

5.4 Cisco Webex

Webex Meetings is Cisco's cloud-based web and video conferencing service that enables global and virtual teams or individuals to collaborate on mobile devices or computer and standards-based video systems in real time. Main features of Cisco Webex are Web and Video Conferencing, Call Sharing, Multimedia Content screen Sharing and Conferencing.[8]

6.SYSTEM STUDY

The system is divided into three modules:

(1) Registration and login

(2) Teacher dashboard and Student dashboard

(3) Attendance evaluation and Attention monitoring

6.1 Registration and login

For a new user to get access for login,they have to provide their name, email and password. Already registered users can login using their login credentials. Once the user enters the login ID and password it will be validated by checking in the database. If the user is found or he is redirected to the corresponding dashboard.

6.2 Teacher dashboard and Student dashboard

The Teacher Dashboard is where teachers can monitor upcoming classes and schedule them. They can enroll students in various courses and view scheduled upcoming classes. They can also build a room where students can be admitted to online classes and conduct them. In these spaces, they will exchange notes with regard to their course. In the student dashboard, the students will be able to see their upcoming classes. They can access and view their enrolled courses and the notes shared with them. They can join the online class scheduled for them.

6.3 Attendance evaluation and Attention Monitoring

Most of the solutions available in the market don't provide the teacher the facility to record the live attendance of the students in the classroom. Details of the students who have joined the room are recorded to the database and can be viewed by the teachers. To record the attention span of students tensorflow js is used to identify the position of the students face. The data from the tensorflow is given to the teacher via an API, where the teacher can view it in real time.

7.SYSTEM DESIGN

7.1 ER Diagram

The entity-relationship diagram depicts the basic structure of the database we use in our system. The ER diagram for our proposed system is given in fig 7.1 which shows the relationship between the entities of our system. We have seven entities in our project which are Faculty, Admin,Room, Student, Courses, Attendance, and Login. The admin is responsible for maintaining the system. He has a userid as the primary key along with a name, and password. He also maintains the accounts of the faculty. The faculty monitors the attendance of the students and is responsible for creating and maintaining the records of their corresponding courses. The faculty has userid, name, email, password, branch, and phone number. The faculty can also create classrooms for the students to interact in live classes. The room will have a roomid and the userid of the students who have joined the class. The attendance of each student will be recorded and saved with their corresponding date, time, and attendance mark. The courses created by the faculty will have courseid, course name and details of the notes. The students can access the courses assigned to them and also join their directed classrooms. The student has a userid as the primary key along with email, username, admission number, batch,

contact, and branch. Both the student and faculty have a login which has a login id and password.
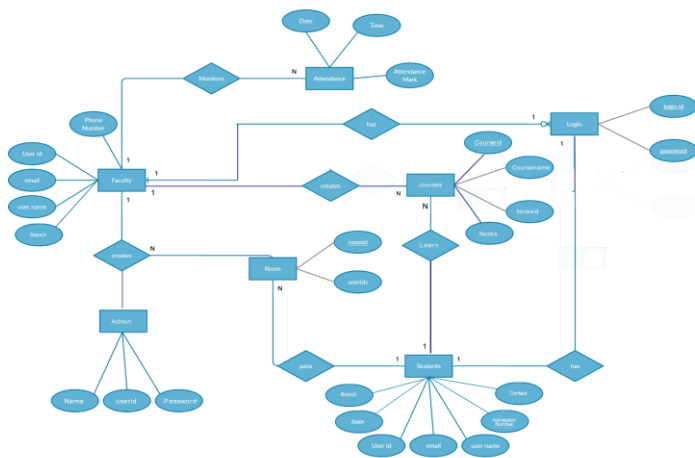

Fig 7.1 : ER Diagram

7.2 Use case diagram

The use case diagram, given in figure 7.2, for the proposed system is described as follows:

The Different users in the system are Teacher and Student.

First of all both the teachers and students must register to the system. For the further login they had to use their registered username and password. They have to verify the identity of the users. Admin is the one who validates the user, maintains the system and provides the various services for both teacher and student. The teacher creates room for the classes and the students join. Teachers and students can communicate using the chat option. The teacher monitors the attendance of the students and is responsible for creating and maintaining the records of their corresponding courses. The note will be shared by the teacher and the students can access the note.
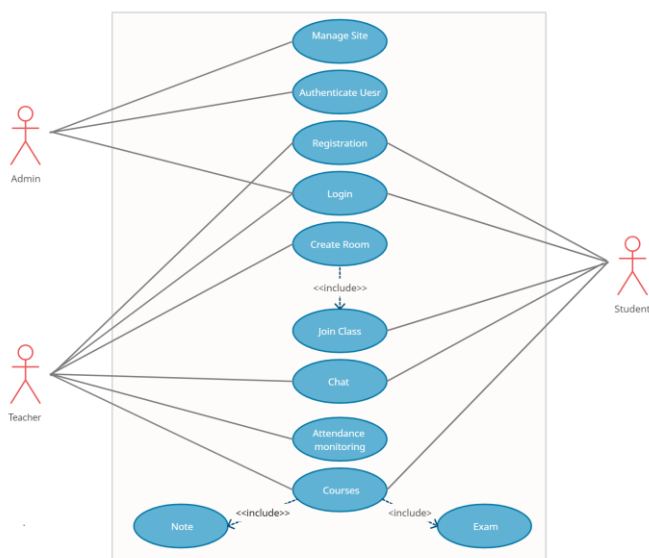

Fig 7.2 : Use Case Diagram

8. TECHNOLOGY USED

8.1 React

React is an open source front end library used to build webapps. Webskool makes use of react to build its front end most of the webskools styling is dependent on tailwind css, a utility first css framework. The interaction between the backend server is done using axios library which is used to make http requests.

8.2 Django

Django is a web framework used to design scalable web apps. Webskool makes use of django to build its backend. Django rest framework is used to design the api schema that is used to communicate with the react based front end of webskool.

8.3 Postgres

Postgres is a relational database that is found to be scalable and used by applications that require high performance. Webskool makes use of postgres to store all user information and other related data.

8.4 WebRTC

Webrtc is an open source project that makes browsers capable of having real time communication using API's. Webskool makes use of Openvidu WebRTC media server's community edition to implement video calls in the project.

8.5 Face API js

Face API.js is a browser based facial recognition and detection library built on top of tensorflow js. It is used to identify the facial features of a student to identify whether a student is attentive.

8.5 Git

Git is a distributed version control system. Git is used in Webskool to manage its source code. It has helped in making the development process easier as a team.

9.RESULTS & DISCUSSION

Webskool is a web application that brings together all the necessary features needed for quality education. This project mainly focuses on two users - Teachers and Students. A student can easily register by filling the registration form on the website. But, a teacher must go to a specific URL to register as a tutor. Fig 9.2 shows the registration page, a new user can sign up using their name, email and password.
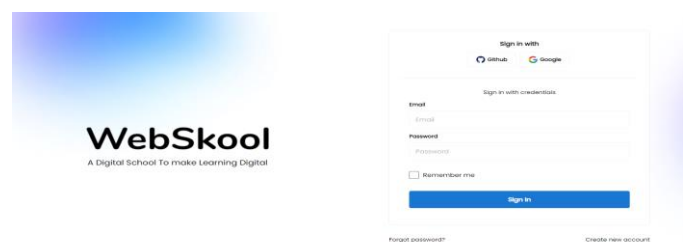

Fig 9.1 : Login page

After successful registration, they can login and they will be directed to their respective dashboards. Fig 9.2 shows the login page. The student and teacher can login to the platform using this form. The already registered user can sign in using their login credentials.
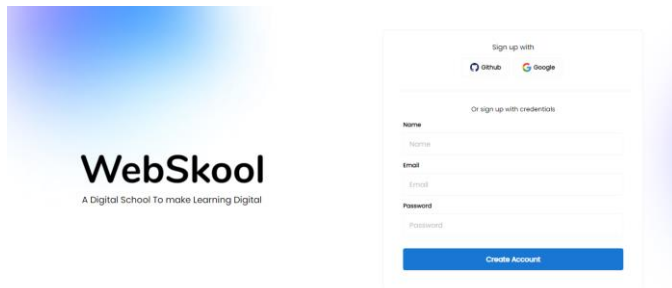

Fig 9.2: Sign up

There are two types of dashboards, one for students and the other for teachers. Fig 9.3 shows the dashboard. The student's dashboard has all the fundamental essentials required for uncomplicated and easy learning. They can self enroll in the courses they are interested in as shown in fig 9.5. After this, they can view or download the notes that have been uploaded by the teachers for a particular lesson. The students can access the scheduled online class by joining the video room for live lessons by the tutor.
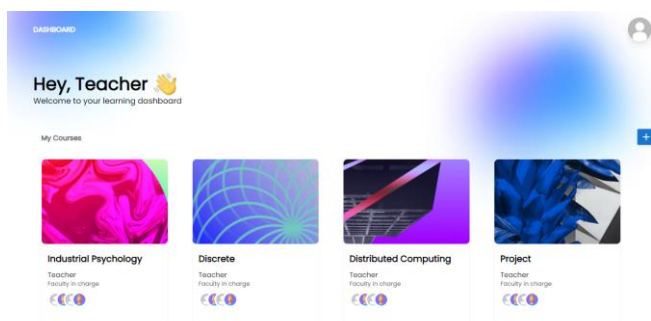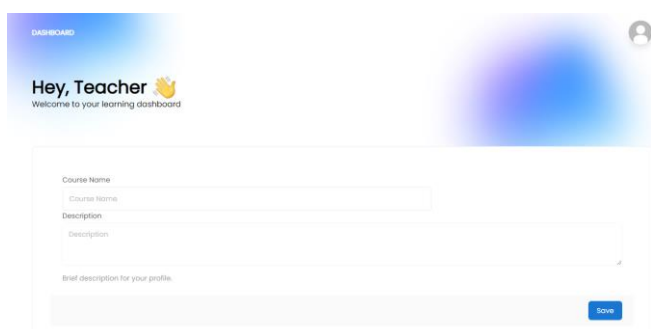

Fig 9.3 : Dashboard

Fig:9.4: Creating a new course

The teacher's dashboard on the other hand has made a teacher's life much easier. Using this, they can create courses on their own. They can upload the necessary documents/materials required by the students for

learning. They can also schedule video rooms for live sessions on various topics for teaching.
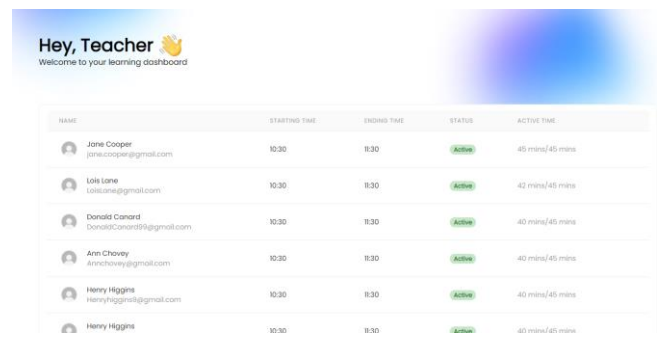

Fig 9.5: Attendance Report

Fig 9.5 shows the details of the student who joined the class. Teachers can take attendance of each student and view their active time, joining time and ending time.
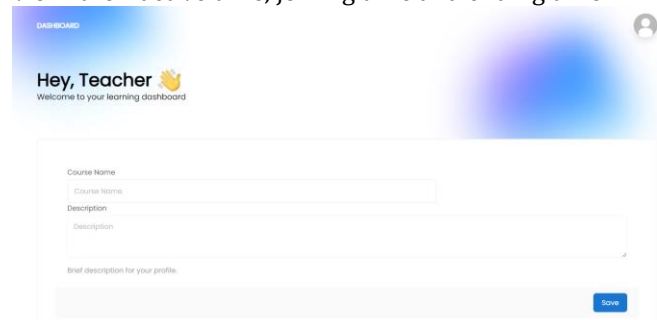

Fig 9.6: Create new course

Fig 9.6 shows the page where the tutor can create a new course and fig 9.7 shows the entire details associated with a course. This includes the number of students enrolled and their details and all the modules along with their respective learning materials. A new video room can be created using the start video call button, and others can join in. The teacher can also view the attendance report of each class from this page.
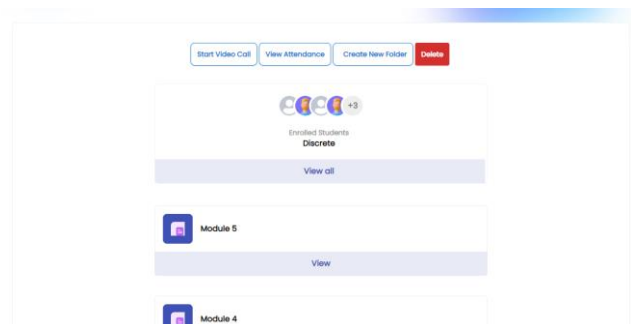

Fig 9.7: Course page

9. CONCLUSIONS

In the era of digitization the scope of online education has increased even more and the quality of education has improved. When compared to traditional classroom

instruction, e-learning is also a more engaging and interactive option. The project takes care of all the fundamental necessities needed by a tutor to conduct classes online. The integrated platform consists of a dashboard for the students and teachers to easily manage and interact with each other. This project also makes learning fun and seamless by having a dedicated video conferencing tool, so that the students don't have to switch from one platform to another. This tool can track a student's attendance by utilizing Machine Learning to determine whether or not the student is in front of the webcam. This will greatly assist teachers in determining whether or not a pupil is paying attention. Overall, this initiative will address the drawbacks of the current systems, making online education more accessible and easy.

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