



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 12, Issue 7, July 2023

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.423

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The Progressive Learning Network for Dynamic and Innovative Educational Practices

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ABSTRACT: This study attempts to investigate and synthesize previous research investigations in order to appreciate the viewpoints and comments of learners as well as educators on the usage of contemporary online learning technologies. It is vital to recognize the ideas and issues raised by university and college instructors and students as a consequence of the transition towards virtual classrooms as their response to distance learning. This study digs into how users see online courses by evaluating a number of research publications, emphasizing crucial elements that impact satisfaction. These characteristics include rapid and efficient interaction between students and professors, making recorded lectures accessible, and properly managing participation and scheduling.

KEYWORDS: Video Stream, Recorded Lectures, Attendance, Schedule, Online Polls, Meetings, Host, Guest.

I. INTRODUCTION

The emergence of distance learning during the age of technology has tremendously moved contemporary education ahead. However, both instructors and students sometimes encounter restrictions and obstacles while employing standard video conferencing options. To address these shortcomings, it is vital to build cutting-edge solutions that promote online learning and promote cooperation among participants. This project attempts to address such constraints by establishing an online course software that provides a collaborative and intuitive environment for educators and learners alike. Harnessing the potential of cooperative technology, web apps have emerged as a viable option for changing online education. These web-based applications vend a scalable and adaptable technique to construct unique apps available via any device having a web browser. By exploiting the power of web applications, this project strives to increase the simplicity, dynamism, and interaction of educational programs online, thereby altering the present state of virtual education.

In conclusion, the fundamental purpose of this undertaking is to change online education by building an interactive website that empowers both instructors and students. By harnessing the features of web-based apps, the project intends to overcome the constraints of standard online educational platforms. The primary benefits of the envisioned solution include an intuitive user interface, simplified meeting setup, session recording plus storage capabilities, attendance monitoring, and increased social interaction. The ultimate objective is to establish a fully immersive and interactive atmosphere for learning that allows instructors to provide captivating knowledge and stimulates students to actively engage in the process of learning. Moreover, this approach understands the significance of adaptability in the constantly developing environment of education. As technology progresses and new educational techniques emerge, the distance learning application will be structured to handle future enhancements easily. This future-proof strategy guarantees that the website stays relevant, adaptive, and successful in serving the growing demands of both educators and students. By embracing innovation and valuing collaboration, the project aims to close the gap between traditional educational experiences and the ever-changing environment of online learning, enabling educators and students to flourish in the digital age.

Scope

The purpose of the recommended videoconferencing application is to increase the remote working experience, especially in educational organisations, by solving constraints identified in current video conference platforms. The main amenities within the undertaking's scope are automated recording and safe cloud-based storage of video

conversations, automatic attendance monitoring, live polling capabilities, and scheduling management. Additional features, including as chat, sharing screens, sharing of files, and interactive whiteboards, may be incorporated depending on project objectives and available resources. The established scope guarantees a focused and controllable development approach to offer an enhanced video call solution.

Technologies Used

WebRTC: is a web-based technology that provides real-time communication in both audio and video between users without the need for extra plugins or applications.

Socket.IO: supports instantaneous, two-way interaction between the client and server, allowing for immediate data updates and event-based messaging.

React.js: for designing user interfaces (UIs), giving a component-based approach and fast rendering for generating dynamic and responsive online apps.

Node.js: enables developers to construct scalable and high-performance applications, offering a non-blocking, event-driven design.

II. LITERATURE SURVEY

[1] This research underlines the benefits of implementing instructional videos, such as more flexibility in retrieving course materials, better auditory and visual comprehension of material, and the flexibility to review topics at any time. [2] The outcomes of this article show that the created system for storing and retrieving video lectures that have been recorded will simplify remote instruction for students [3] This research stresses the need for a move towards integrated education involving recorded classes, interactive technology, and active learning, signalling a long-overdue change in lecture delivery. [4] The research indicates that learners favour recorded educational videos over live internet-based lectures, and it suggests that faculties continue generating excellent pre-recorded lectures consistent with learning goals. [5] This study finds that building a web-based course scheduling and instructor loading platform is feasible and proposes its deployment for efficient utilization of resources and faster decision-making procedures. [6] This research demonstrates that the vast majority of pupils in middle school view online lessons to be valuable, enjoying the flexibility, ease, and accessibility afforded by the online educational setting. [7] The purpose of this research is to give essential knowledge and resources for educators, learners, entities, parents, and governments in order to establish policies and successfully conduct virtual education. [8] The research indicates that faculty might adopt ways to capture interest and enhance engagement, including developing relationships with students and incorporating purposeful approaches into online courses. [9] The research done in this study suggests that online learning has had significant effects on the educational environment during the shutdown era. [10] This experiment underlines the significance of providing adequate assistance, assets, and instruction to both students and professors to increase the standard of online education.

The literature study shows the relevance of combining recorded lectures, live polling, automated attendance, and timetable administration for online education. Recorded lectures give versatility in accessing course content and the option to revisit subjects at any time. Live polls promote pupil participation and interaction, delivering real-time feedback and promoting active learning. Automatic attendance systems expedite attendance monitoring, minimizing administrative load and assuring accurate data. Schedule management tools eliminate disputes between class schedules, enhancing organization and planning. Overall, these characteristics lead to a more flexible, interesting, and effective distance learning experience for both students and instructors.

III. PROPOSED METHODOLOGY

The suggested technique for constructing an online conference application with automated recording, video archiving, automatic attendance, live polling, and schedule management capabilities contains many critical elements. Firstly, a detailed study of user needs will be undertaken, obtaining input from students, instructors, and administrators. This will assist determine the main features and functions required. In the planning stage, a structure for the system will be built, along with straightforward user interface (UI) layouts as well as information models for storage. The backend work will

comprise creating capabilities utilising platforms such as Node.js integrating apis for recording videos, attendance tracking, live polling, and scheduling administration. Cloud-based storage facilities will be connected to securely store lectures that are recorded. The frontend development will concentrate on establishing interfaces for videoconferencing controls, attendance monitoring, live polling, and managing schedules employing frameworks like React.js. A appropriate database management system like Mysql will be configured, with acceptable data formats. Comprehensive testing will be undertaken, comprising complete tests. Deployment and integration into the cloud will be completed, assuring scalability and availability. Documentation will be generated, including user manuals and technical guidance, and continuous support and maintenance will be supplied. Regular evaluation of security, scalability, and performance is going to be accomplished, with updates and changes as appropriate.

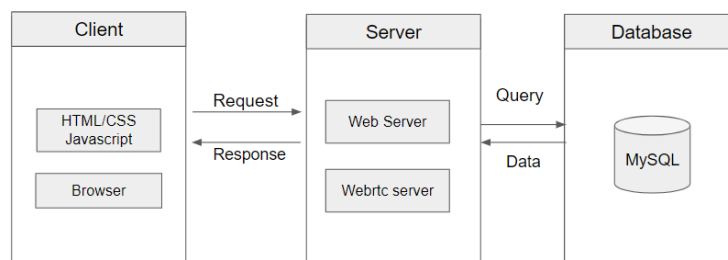


Fig 1: Architecture Diagram

The application's architecture includes React.js for the application's front end and Express.js for the backend server. For instantaneous interaction and multi-peer associations, the application implements a WebRTC server that leverages Socket.IO for managing real-time interactions between clients. WebRTC offers direct peer-to-peer connection between web browsers, providing streaming video in real time and voice chat without the need for extra plugins. Socket.IO, built on the basis of WebSockets, offers a reliable and quick mechanism to create and manage the real-time connections, allowing smooth cooperation between both instructors and learners in the virtual classroom applications.

IV. CONCLUSION

The creation of a web-based educational application offers a huge step in establishing more cooperative and efficient online educational settings, successfully resolving the constraints of platforms such as Zoom and Meet from Google. This program distinguishes out by streamlining the procedure of setting up and attending conferences, eliminating the manual creation and exchange of links by hosts. As a consequence, it dramatically enhances accessibility as well as ease for both presenters and attendees.

In addition, the application's storage and recording functions contribute to improved adaptability and accessibility of instructional information. Furthermore, the scheduling as well as attendance functions of the program give essential administrative resources for hosts, helping them to better plan and monitor sessions. Overall, our collaborative live video application shows significant promise in boosting the quality of online education by successfully addressing the shortcomings of current platforms and building a more engaging and welcoming virtual classroom atmosphere.

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