



**IJIRCCCE**

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 11, Issue 5, May 2023

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

**Impact Factor: 8.379**

9940 572 462

6381 907 438

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www.ijircce.com

# Classmeet: A Student Friendly Video Calling Web App

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**ABSTRACT:** In many nations, there is a much greater demand for positions in the traditional educational system than there are job openings. Under the correct conditions, open and remote learning systems have demonstrated their ability to offer many people high-quality education and training at lower per-unit costs than traditional educational institutions. It is not practical economically in remote or sparsely inhabited places to by using the traditional institutions, offer a wide variety of educational options and professional training. Delivering education and training at a distance is made easier and more affordable by the use of video conferencing. The assumption that a student is trained as a young person for the same career for their entire lives is becoming less realistic due to the quick development of technology. Throughout their lives, the majority of people are likely to switch careers at least twice or three times. Some of the technologies and standards for video conferencing are presented in this paper. It also lists several fundamental video conferencing formats and technical specifications.

**KEYWORDS:** Vanilla JS, node JS, HTML, CSS, JavaScript, etc.

## I.INTRODUCTION

The importance of communication in modern life cannot be overstated. As we all know, over the past two years, all aspects of social life have gone online. As a result, apps for online video calling, such Zoom, Discord, and Skype, are being used more frequently for business, education, and personal interactions with loved ones. As the popularity of these apps increased, I saw that their services weren't always operating as intended. The major goal of this project was to create a straightforward website that family members and close friends could use to communicate without fearing that another web chatting application wouldn't function. and Chat Communication by uses WebSocket (WS) It is a web-based protocol that permits continuous and bi-directional TCP or secured Transport Layer Security (TLS) connections between a web client and a remote/webserver. It maintains the communication channel open for both parties. It is a transport protocol built in JavaScript that permits two-way, real-time communication between web browsers and a host. Socket.io was built on Node.js, which has since been the primary backend. JS Vanilla Vanilla JS is a rapid, lightweight, cross- platform platform for building stunning, powerful JavaScript apps. Additionally, the Vanilla JS team, who also put a lot of effort into keeping it clear and simple, maintains every line of code in the platform. In fact, compared to Prototype JS, MooTools, YUI, and Google Web Toolkit, Vanilla JS is now more widely utilised on websites. The Node.js web server's capability can be expanded by adding the lightweight Express framework, which also improves new collaboration structures. The functionality of the application can be structured more easily with middleware and routing [5]. It adds helpful features to Node.js's HTTP classes and facilitates the display of dynamic HTTP objects. Talk to each other This research is based on a certain framework. A text box for writing messages, a send button, and a "RTCDatChannel" that leverages a portion of the index.html interface to show sent and received messages are used to transmit messages. For chat and video connections, the signalling system in this study uses a WebSocket-based socket.io method. This signalling system produced four different sorts of control messages: "peerChannel," "Initiator Receiving Broadcasting Stream," exchange, and SDP (SDP). Initially, Peer X will send the "request" to the server, and after receiving the control message and the contact broadcasting stream, it will instruct the server to create the user media. The node modules file allows downloaded npm data to be kept on the currently used PC in order to assist the operation of the application. Furthermore, Package.json is a crucial part of numerous apps whose code is built using the node environment. Additionally, it specifies the functional properties of the project that npm uses to instal dependencies, run scripts, and establish the entry point to our package.

It does this before releasing the requested project to npm. Thus, the interconnection was established via a LAN network (wired and wireless). Including, many functions have been created and set up in the main HTML of this implementation, with establishing chat communication between two distinct users (PCs)/mobiles employing Chrome and Firefox (audio and video), activating full-screen, employing volume slider, and taking a screenshot.

## II.RELATED WORK

Video Conference Room Implementation with WebRTC and React by Phuc Truong talks about Network managers and developers can follow the OSI model concept to troubleshoot and navigate the problem sources whenever computer networking systems are down [3]. On the other hand, tech merchants can use the model to explain and advertise the device's features to customers. In the OSI model, the transport layer is the middle layer, lying at the boundary between the physical hosts and the internetwork of routers, communication links that delivers information between hosts. The transport layer handles the data transfer process between networking systems and end hosts. According to Suherman, Suwendri and Marwan, there are two types of transport layer protocol: reliable and unreliable protocols [4]. The representative protocols which are suitable for TCP are listed as follows: • Hypertext Transfer Protocol (HTTP) • Secure Shell (SSH) • File Transfer Protocol (FTP) • Simple Mail Transfer Protocol (SMTP) • Post Office Protocol (POP) • Internet Message Access Protocol (IMAP). For the connection maintenance, the project applied Socket.IO in order to take advantage of those open connections to establish real-time and event-based transmission for the application. Socket.IO allows bilateral communication between the client and the server. In contemplation of organizing the connection and data transferring between end devices, Socket.IO uses Engine.IO, which is an undisclosed lower-level repository operated for the server implementation. At this stage of the project, Engine.IO-client was used for the client [5]. Nodemon To simplify the development of the project, the author also integrates Nodemon as the dependency specialized for local implementation and testing. Nodemon is a library resource that supports Node.js application development by automatically recompiling the app as soon as any updates in the code base are recognized. After installing the necessary dependencies and generating the project folder from scratch, it is time to integrate those resources into the project. Technically what needs to be done beforehand for the application is to initialize a server module which listens to events on a particular port number. This depends on the selection of developers. The app consists of three main view components: Video Presentation view: This expands for the largest area of the main screen, containing the video footages of the participants in a flex displaying grid of rounded rectangular shapes. Chat view: This component has the second largest area of the page and is placed permanently on the right-hand side. The view contains the text conversation between the participants within the conference room. Users may input the message in the dialog box at the bottom of the view and press the Enter key to send it. Options view: The view is located at the very bottom of the page and expands the smallest area. Consisting of the fundamental action buttons to control the media during the communication, the component includes the End button to close the call and leave the meeting room, the Microphone Mute/Unmute and the Camera toggle buttons [2].

Developing Video Chat Application with Reacts and WebRTC by Abhinav Paudyal mainly focuses on Real-time web application allows use of a web socket to view data that is continuously sent by the server at the client end [1]. WebSocket's allow continuous data transmission over an already- established network, which speeds up the application. JSX is a syntax extension to JavaScript. JSX specifies how the user interface appears. The primary purpose of JSX is to write HTML structures inside the same file as JavaScript code, which simplifies the code's comprehension and debugging. This avoids the usage of complicated JavaScript DOM frameworks. A virtual DOM reflects the DOM in a virtual environment [6]. It is essentially a memory within ReactJs for the individual items being generated for the website. It is implemented as a JavaScript Object. Virtual DOM was one of the primary reasons of React.js's speciality and simplicity. There are two types of components, Functional component, and Class component. Functional components have no state of their own and can only use or only have a render method whereas Class components can have their own state and have a different specific render method for returning JavaScript syntax extensions on the screen. State is a built-in object in React [7]. Value that belongs to the component is stored in the state object. The state object is where you keep all the component's property values. The component re- renders when the state object changes. Another critical issue that could be considered is where state can be used. Initially, state could be found only in class components, it could not be used in functional components. The term "one-way data binding" refers to data that can only flow in one direction and cannot be reversed. This ensures the data is communicated effectively. The parent component transmits data to the child component, but the child component cannot transmit data back to the parent component. This is how React.js's one-way data binding functions. A virtual DOM reflects the DOM in a virtual environment. It is essentially a memory within ReactJs for the individual items being generated for the website. It is

implemented as a JavaScript Object. Virtual DOM was one of the primary reasons of React.js's speciality and simplicity [8].

### III.METHODOLOGY

Following are the technologies that are being used in the application

#### NODE.JS

Node.js is an open source, cross-platform runtime environment for developing server-side and networking applications. Node.js applications are written in JavaScript on OS X, Microsoft Windows, and Linux.

Node.js also provides a rich library of various JavaScript modules which simplifies the development of web applications using Node.js to a great extent.

Node.js is a platform built on Chrome's JavaScript runtime for easily building fast and scalable network applications. Node.js uses an event-driven, non-blocking I/O model that makes it lightweight and efficient, perfect for data-intensive real-time applications that run across distributed devices.

#### HTML

HTML stands for Hypertext Markup Language. It is used to design web pages using the markup language. HTML is the combination of Hypertext and Markup language. Hypertext defines the link between the web pages and markup language defines the text document within the tag that define the structure of web pages. HTML is used to create the structure of web pages that are displayed on the World Wide Web (www). It contains Tags and Attributes that are used to design the web pages. Also, we can link multiple pages using Hyperlinks.

#### CSS

Cascading Style Sheets, fondly referred to as CSS, is a simply designed language intended to simplify the process of making web pages presentable. CSS allows you to apply styles to web pages. More importantly, CSS enables you to do this independent of the HTML that makes up each web page. It describes how a webpage should look: it prescribes colours, fonts, spacing, and much more. In short, you can make your website look however you want. CSS lets developers and designers define how it behaves, including how elements are positioned in the browser.

While html uses tags, CSS uses rulesets. CSS is easy to learn and understand, but it provides powerful control over the presentation of an HTML document.

#### JAVASCRIPT

JavaScript (JS) is the world's most popular lightweight, interpreted compiled programming language. It is also known as a scripting language for web pages. It can be used for Client-side as well as Server-side developments.

#### BOOTSTRAP

Bootstrap is a collection of reusable pieces of code written in HTML, CSS, and JavaScript. However, it is a free and open-source front end web development framework to help you create responsive websites and web applications.

#### WEBRTC

WebRTC (Web Real-Time Communication) is a free and open-source project providing web browsers and mobile applications with real-time communication (RTC) via application programming interfaces (APIs). It allows audio and video communication to work inside web pages by allowing direct peer-to-peer communication, eliminating the need to install plugins or download native apps.

### IV.RESULTS AND DISCUSSIONS

The projects successfully complete all its goals and has all the necessary functionalities. The web application developed is efficient and also it is attractive in nature.

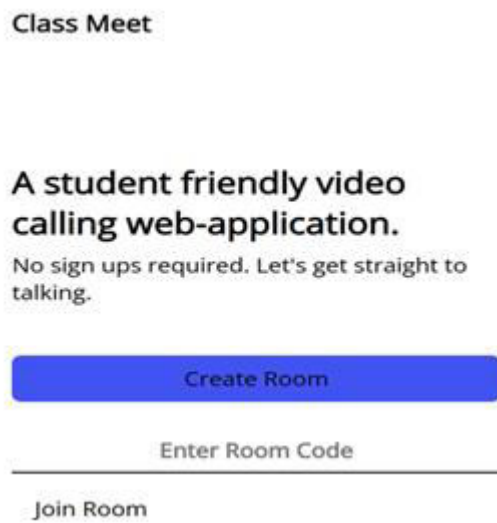


Fig 1. Home Page

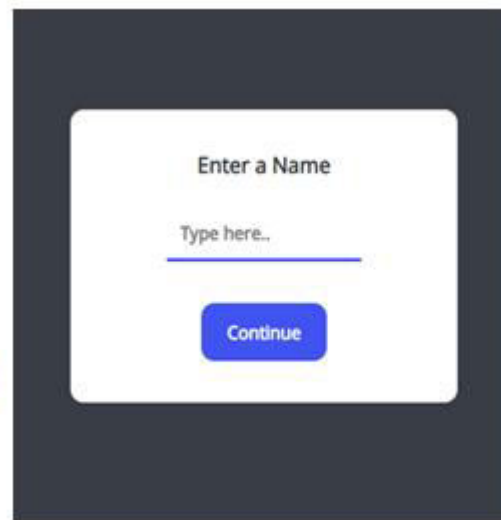


Fig 2. Create Room Functionality



Fig 3. Multiple User Functionality

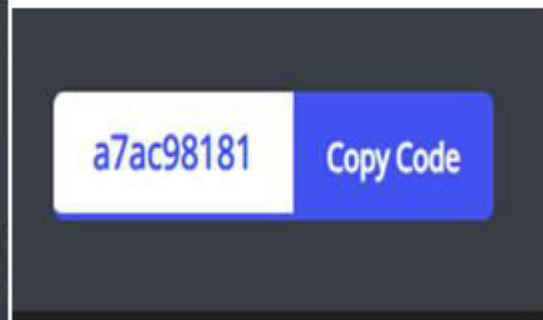


Fig 4. Unique Meet Code



Fig 5. Chat Functionality

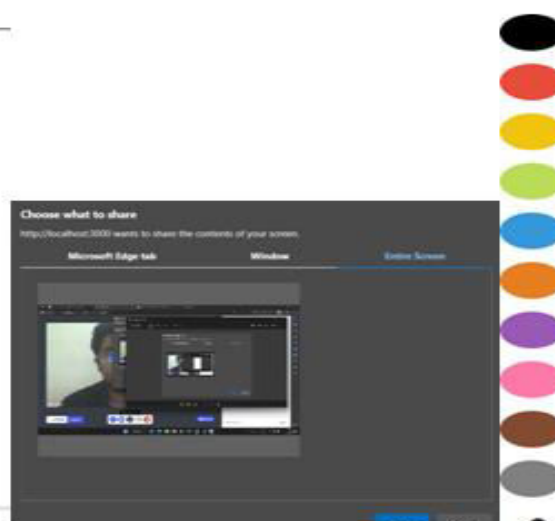
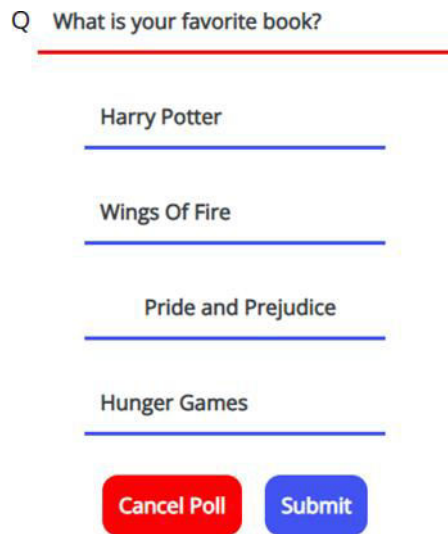


Fig 6. Share Screen Functionality

Fig 7. Whiteboard Functionality



Q What is your favorite book?

Harry Potter

Wings Of Fire

Pride and Prejudice

Hunger Games

Cancel Poll Submit

Fig 8. Create Poll Functionality

## V.CONCLUSION

As the world continues to adapt to the evolving landscape of remote education, a student-friendly video conferencing web app has become an indispensable tool for modern learning. Its ability to bridge the gap between physical and virtual classrooms, foster effective communication, and promote active engagement has proven crucial in maintaining the quality and accessibility of education.

In conclusion, the developed web app holds great potential in revolutionizing the virtual learning experience for students. By addressing the unique needs and challenges of remote education, it serves as a catalyst for enhancing student engagement, collaboration, and knowledge retention. As we navigate the future of education, it is essential to prioritize the development and implementation of such innovative technologies to create a truly student-centred learning environment

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**INNO**  **SPACE**  
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**Impact Factor: 8.379**



**ISSN** INTERNATIONAL  
STANDARD  
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