

VIDEO CONFERENCING SYSTEM USING WEBRTC

Prof. Shyamsundar Magar¹, Vidyasagar Bommera², Sayali Ghorpade³, Karthik Gaddam⁴

Dept. of Information Technology Engineering, Terna Engineering College, Nerul, Navi Mumbai, Maharashtra, India

Abstract— The studies offered on this paper introduces video conferencing, that is a device orientated to offer its customers with an extra communicate availability thru the convergence of traditional telephony and real-time multimedia in web browsers. The device consists of Internet software that provides a video conference room for multiple customers without the need to download additional software. The prevailing task intent is to recommend a unified communications device that stands out from the rest, particularly on the side of interacting with the telephony community directly from an internet browser as well as an animated video conference that allows for a switch in real-time media flows between these technologies. The device was realized using WebRTC (Web Real Time Communications) for real-time audio and video transmission, Node.js as web server and signaling.

Keywords— WebRTC, Video Conferencing System, Real Time Communication.

1. INTRODUCTION

Video conferencing is a conversation system among or extra contributors wherein audio, video, and records indicators are transmitted electronically to allow real-time conversation. Much extra expert and powerful than audio conferencing, everybody concerned can see the face visage and gestures which might be so vital to our conversation. Communication is a totally vital a part of existence and has hence developed from natural voice conversation to video conversation. With the arrival of the Internet, real-time video conversation has ended up a reality. We want to increase a video conferencing internet utility in the use of WebRTC that lets in each voice and video conversation, it may be one-to-one or among a couple of users. Due to the browser-primarily based totally nature of the utility, it's miles device-agnostic and might run on a huge variety of devices, making it platform-agnostic. We're going to create a totally easy utility, so one can permit us to transmit audio and video to the related device: an easy video chat utility. WebRTC permits media devices (virtual camera and microphone) to transmit audio and video amongst connected devices.

2. LITERATURE SURVEY

A. Video Conferencing System Based WebRTC with Access to the PSTN

In this [1] gives its customers a big communication accessibility thru the concurrence of classical transmission and real-time interactive application in internet browsers. The device includes a web utility that has a multi-consumer video room at the same time as now no longer the need to switch greater software. In times everywhere a purchaser without an internet association might also additionally want to wait a conference, it's far cap potential to dial and answer telecast telephone calls to/from the PSTN straight away within the net browser, permitting the telecast telephone purchaser to act with others exploitation their voice.

B. Video Conferencing And Its Application Using Distance Learning

Video conferencing (VC) has emerged as increasingly well-known and trusted as a tool to bridge the space hole, even as excursion isn't always an alternative, impractical or undesirable. Video conferencing uses audio and video telecommunications to convey people in one-of-a-kind locations collectively. Knowledge of what's required for video conferencing and its application has grown to be one of the essential subjects studied by way of numerous educational establishments and entrepreneurs. This record offers a creation to video conferencing with a focal point on its software in distance mastering.

C. Towards Seamless Authentication for Zoom-Based Online Teaching and Meeting

In this paper, they suggest a basis for an unbroken authentication mechanism for zoom-primarily based totally completely instructions and conferences. This approach is primarily based totally mostly on image graph reaction non-uniformity based totally completely virtual camera authentication, which could authenticate the digital virtual camera of a tool carried out in a zoom assembly without requiring the assist of the contributors (e.g. The participant providing biometric records provide). The outcomes of a small-scale check validate the proposed approach.

D. An Open Source Multiconference System for Web and Mobile Devices

Web-primarily based totally video conferencing systems, or internet conferencing systems, run in an internet browser and

show Adobe Connect14 and BigBlueButton15. The advantage for clients of net conferencing systems lies in the ease of implementation: customers nice need to open a hypertext hyperlink of their browser to start the device. Another advantage is the interoperability among super strolling systems: clients can run chrome on Linux, internet explorer on Windows, safari on macOS, and so forth., however all of them have the identical enjoy. Check Validate the proposed method.

E. Mconf: Collaboration Proposal to form a Global Infrastructure for Web Conferencing based on Open Source.

The reason of this file is to introduce and advocate to the arena a collaboration to enroll in the global internet conferencing network, this is a federated, scalable, and allocated worldwide open supply net conferencing gadget. With mobileular access, together with 4 vital devices: 1) a customizable net portal that offers get right of entry to net meetings, shared documents, regions and extra; 2) a load balancer that lets in the gadget to scale to loads of customers; three) a web conferencing device powered thru bigbluebutton; 4) a cellular internet conferencing client. The most effective requirement to enroll in the global network is to offer a server with sufficient assets (CPU and network) to meet the desires of its customers.

F. Multipresence : Towards Video Conference and Collaboration in Multi-use Environments

The aim of this newsletter is to give an architectural and technological imaginative and prescient of a state-of-the-art video conferencing and collaboration device called multi-presence that adapts to first-rate bodily environments and allows interoperability of diverse technology. Telepresence room in immoderate definition (whole HD). Extremely telepresence room in extremely immoderate definition (UXD 4k). Sharing content material fabric among participants (concurrently loading, rearranging and showing pix, text and Programs) legacy video conferencing structures. High-definition video conference via a laptop application. Web conferencing (internet browser). Cell gadgets and sip telephones

G. SquashCord: Video Conferencing Application Using WebRTC

Webrtc is a framework that allows real-time communication amongst browsers. It gives services via the software programming interface (API), allowing packages and websites to trade video and audio streams in real time. It's miles open deliver software program software evolved through google. The research supplied in this text addresses

addresses the development of a multi-peer video conferencing application that is evolved the use of era together with Webrtc, Node.js, and Socket.io.

H. Video Conferencing Using Packet Radio Technology

This thesis examines the technology of packet radio networks that may be used to help video conferencing packages. Commonplace network protocols, i. H. Beginner x.25 (ax.25), delivery manipulate protocol/net protocol (TCP/IP) and different protocols significantly applied in packet radio era. The utilization of the TCP/IP file transfer protocol (ftp) popular, the common tempo and time of severe report sizes on a 1/2-duplex radio channel, an emulated complete-duplex radio channel and a rs232 connection.

I.A Study on Video Conferencing using Overlay Network

The cutting-edge document introduces the 2 strategies to the video conferencing machine, with a focal point on structures the usage of the overlay community approach. Describes the stressful conditions and answers for dispensing movies over specific sorts of overlay networks with a focus on software-layer multicast and peer-to-peer (p2p) networks.

3. METHODOLOGY

A. Software Overview

Video Conferencing the use of WebRTC presents a platform in which customers can create room themselves to have created actual time communicate with character to character in a conferencing manner. The User can percentage screen, chat and document the video conference.

Video conferencing is a manner of verbal exchange among or more locations in which audio, video and information signs are transmitted electronically to allow simultaneous interactive verbal exchange. Far more non-public and effective than audio conferencing, every person worried can see the facial expressions and frame language which may be so vital to our communiqué. Communication is a completely crucial a part of lifestyles and has as a result developed from natural voice communicate to video communicate. With the arrival of the Internet, actual-time video verbal exchange has come to be a reality. We want to broaden a video conferencing net utility the use of WebRTC that lets in each voice and video communicate, it may be one-to-one or among a couple of customers. Due to the browser-primarily based totally nature of the utility, it's far device-agnostic and may run on a huge variety of devices, making it platform-agnostic. We're going to create a completely easy utility with a view to permit us to transmit audio and video to the linked device: an easy video chat utility. WebRTC permits media devices (virtual camera and microphone) to transmit audio and video amongst connected devices.

B. User Architecture

The preliminary components of the internet site is the net portal.

- ❖ Room Creator
 - Creates Room with the aid of using coming into require details
 - After Successfully created room, a hyperlink could be generated.
 - Link Should be shared to invitee for video conference
- ❖ Invitee
 - Invitee ought to pass the hyperlink and input required details, then simplest invitee will input withinside the video chat room.
 - Room Creator and Invitee each could be in video chat room as a peer-to-peer actual time communication. Each peer can use different functions like Screen Share, Chat field and Recording.

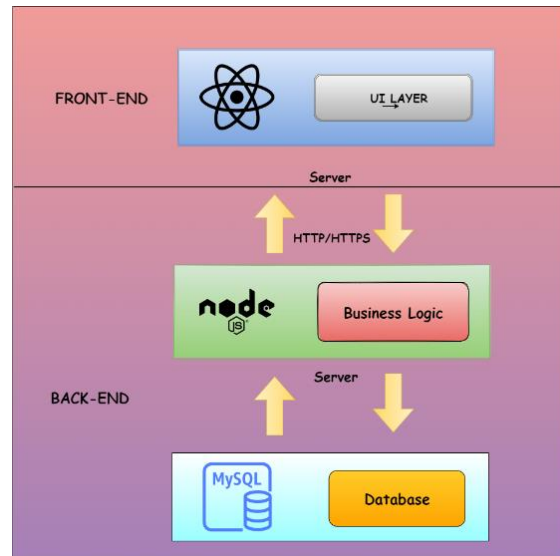


Fig -1: Software Architecture Diagram

4. PROPOSED SYSTEM

A. System Architecture

An average structure diagram of the device is a client-server-primarily based totally structure, particularly server-aspect rendering structure. Figure 1 indicates the general structure of the device. The person triggers a http request to the internet software server and in flip receives the reaction from the internet server. The internet server is attached to the database server to speak with the database, to the record server to keep and retrieve photos and different documents and to the mail server to carry out e-mail operations. Based on the queries received from the internet server, the statistics are retrieved from the database and again to the internet server. The database used right here is the relational database. The internet server transforms this statistics with inside the styles of perspectives, after which returns it to the person. The structure of the device become additionally designed primarily based totally on the server-aspect rendering structure.

B. Use Case Diagram of the System

The following Use Case Diagram shows the different ways the user can interact with the system. It mentions the frequent interactions that a user might have with the system and also shows the basic flow of events occurring during the use of the application.

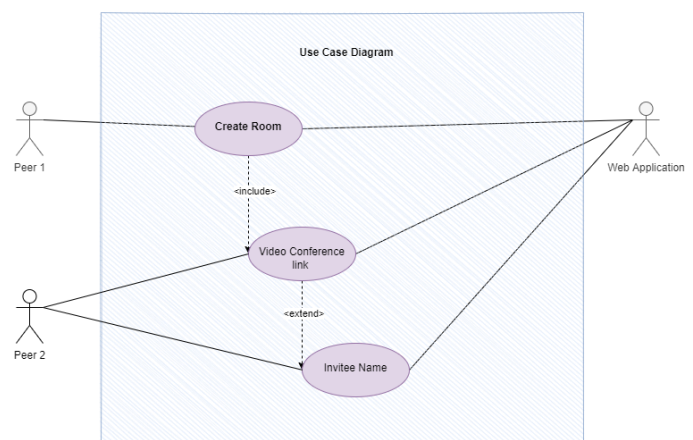


Fig -2: Use Case Diagram

C. System Flow Diagram

The following Sequence Diagram of the entire system explains how the various entities interact with each other and also provides a sequence of the general events that occur during the use of the application. To access the system, users must first create a room. After submit, room link will be generated. Room Creator should Share this with invitee for Video Conferencing. Each Peer in video chat room can on/off camera, mute/unmute audio, Chat, Share Screen and Record

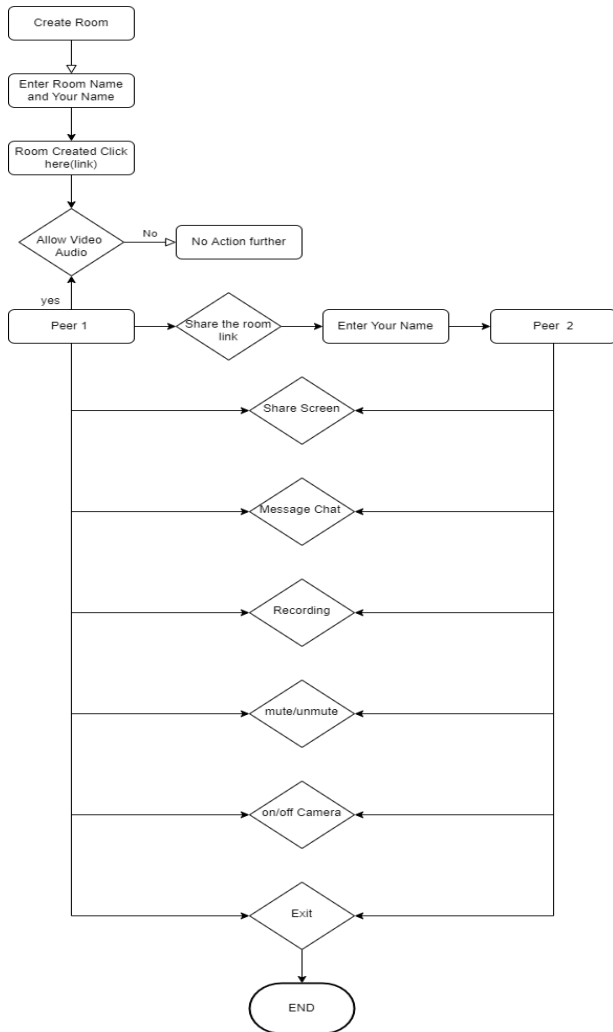


Fig -3: System Flow Diagram

D. Data Model

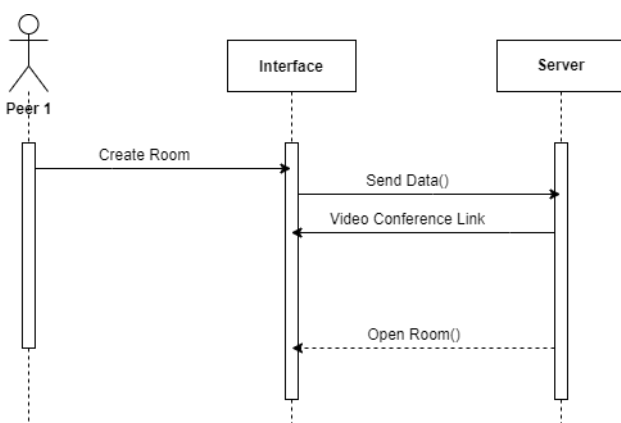


Fig -4: Peer 1 Sequence Diagram

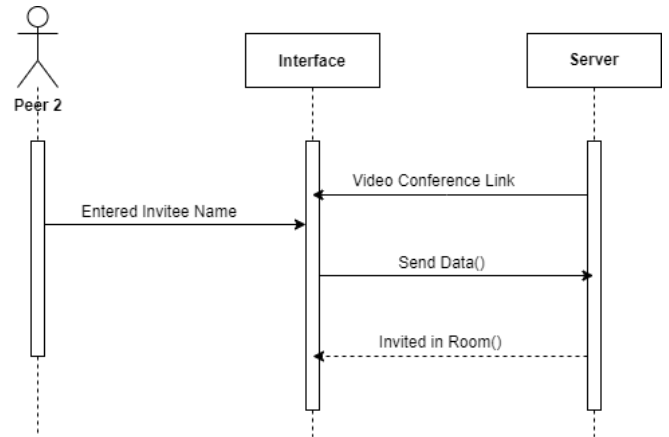


Fig -5: Peer 2 Sequence Diagram

5. RESULTS

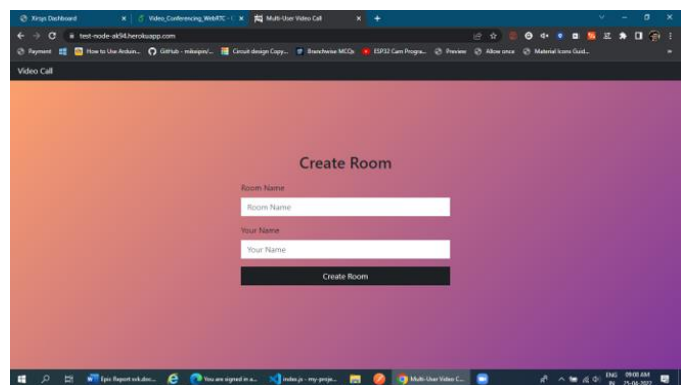


Fig -5.1: Main Page

As Shown in [Figure 5.1] Video Conferencing web application has a clean and easy interface. This justifies the idea of the project by making it clear about the functioning of the platform. This Image show procedure of making video chat room.

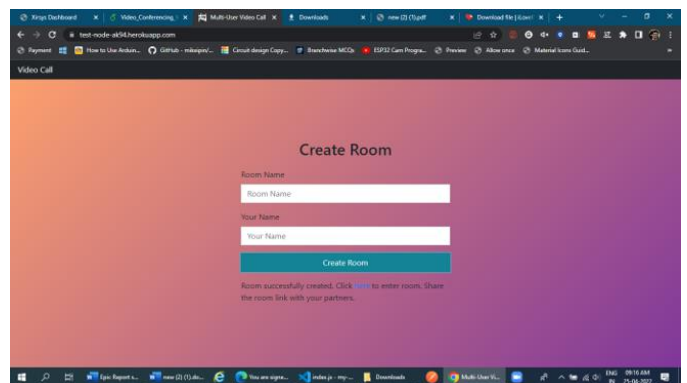


Fig -5.2: Link Generation Page

As shown in [Figure 5.2] represents the page where users get the room link after creating room successfully. Now, anyone with this link can join the video chat room. Room Creator should share this link with invitee for adding peers in a chat room.

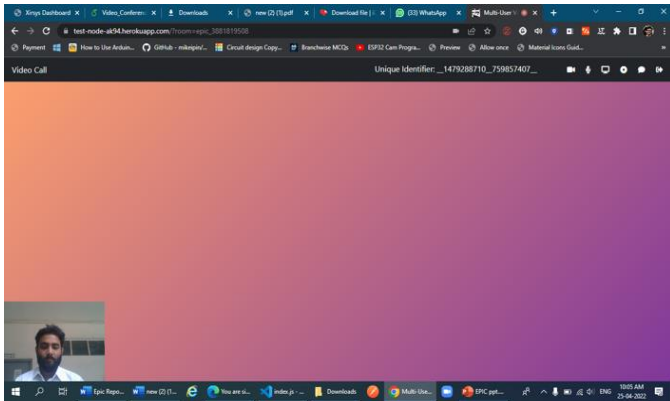


Fig -5.3: Room Page

As shown in [Figure 5.3] Peer 1 is there in video chatroom, still no invitee is joined. Only that peer can join the room who as a room link which was created by the room creator.

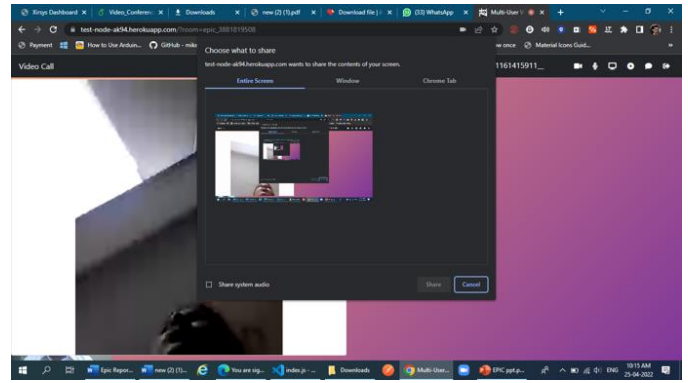


Fig -5.6: Screen Share Option

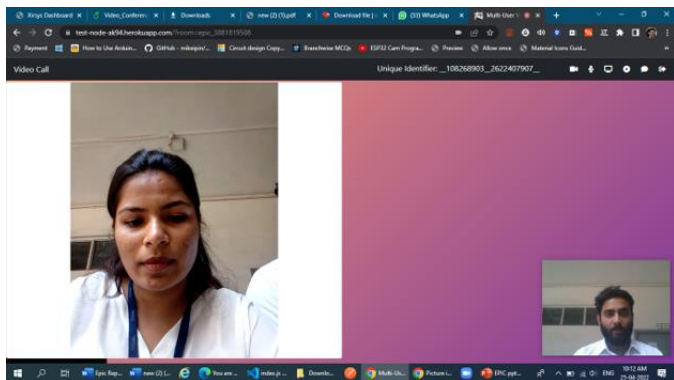


Fig -5.4: ChatRoom Page

[Figure 5.4] As we can see peer 2 as join the video chatroom.

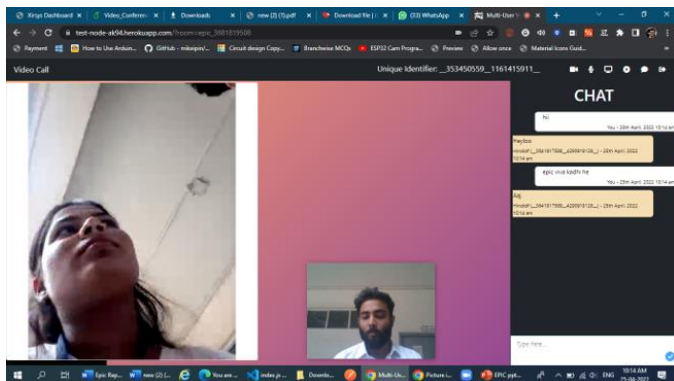


Fig -5.5: ChatBox

[Figure 5.5] Everyone in a video chatroom can message each other in a video conference by using chat box option.

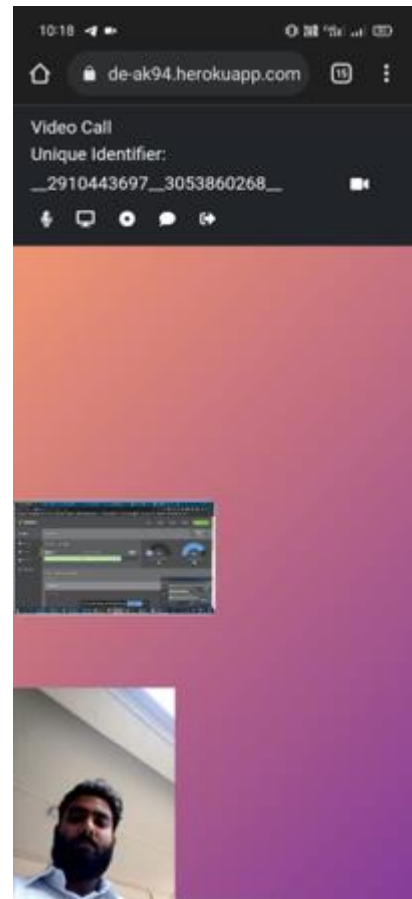


Fig -5.7: Mobile View

As shown in [Figure 5.6 and Figure 5.7] Everyone in a video chatroom can share their screen to everyone in a video conference by using the screen share option.

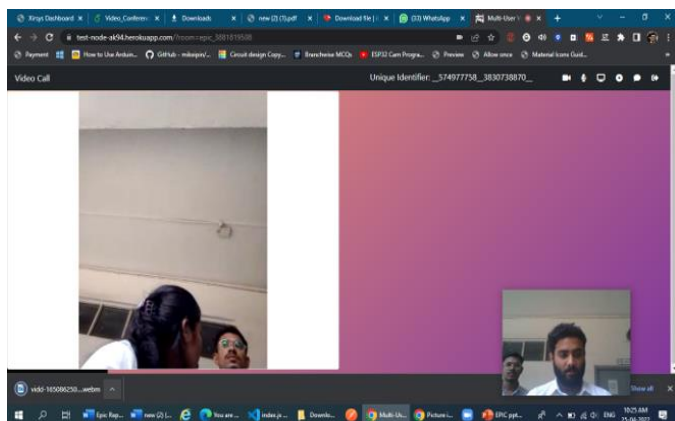


Fig -5.8: Record

As shown in [Figure 5.8] Everyone in a video chat room can record in a video conference by using the record option. As soon as recording stops, the video file be directly downloaded in the browser.

6. CONCLUSION AND RECOMMENDATION

A. Conclusion

The proposed technique facilitates customers to create room and feature actual time conversation among one and one or one and many. It includes no join up and sign up process. This affords a dynamic, well-carrier oriented, user-pleasant website. Flexible to apply and extremely good internet utility in order to offer a time saving device wherein the proportion display, video recording and display recording may be without problems achieved in the video chat room.

B. Future Scope

The future scope for the above system consists of integrating the above system by making our own turn server to get advantage related to more peer connections. Another function can be added by implementing the whiteboard. According to the current situation due to the major pandemic that has occurred, education, industry, etc. have been online, so this feature can be helpful for effective teaching and other fields as well.

ACKNOWLEDGEMENT

We take this opportunity to express our deep gratitude and sincere thanks towards our project guide, Prof. Shyamsundar Magar Department of Information Technology, Terna Engineering College, Nerul for providing the technical guidelines and suggestions regarding line of work. We would like to express our gratitude towards his constant encouragement, support and guidance through the development of the project. We thank Dr. Vijayalaxmi Kadroli, BE project coordinator, Department of Information

Technology, Terna Engineering College for being encouraging throughout the course and for guidance. We thank Dr. Vaishali Khairnar, Head of Department of Information Technology, Terna Engineering College for her encouragement during progress meeting and providing guidelines to write this research paper.

REFERENCES

- [1] Thorat, Adhiksha & Bhute, Avinash. (2022). SquashCord: Video Conferencing Application Using WebRTC. 10.1007/978-981-16-9885-9_35.
- [2] Thompson, Janet & Arunachalan, Bhuvanawari. (2005). Video Conferencing Using H.323 Standard.
- [3] Nimitbunan, Narongchai & (U.S, Naval. (1997). Video Conferencing Using Packet Radio Technology.
- [4] Alalousi, A. & Osman, Azlan & Noori, S. & Alezzi, Ayad & Munther, A. & El-Taj, Homam. (2011). A study on video conferencing using overlay network. European Journal of Scientific Research. 59. 284-294.
- [5] Rachel Roberts (2009). V1]. Sami Andberg (2008). Post Graduate Thesis: Video Conferencing in Distance Learning. Department of Computer Science, University of Helsinki
- [6] Roesler, Valter & Luiz, Eduardo & Coelho, De & Longoni, Guilherme & Marins, André & Daronco, Leonardo & Ciuffo, Leandro & Duarte, Renato. (2016). Multipresence: towards videoconference and collaboration in multi- use environments.
- [7] Dr. Lynne (2007). Video Conferencing in Higher Education", Institute of Computer Based Learning, Heriot Watt University, Edinburgh.
- [8] Bertin, E. and Beltran, V., Unified communications as a service and WebRTC: An identity-centricperspective, Computer Communications
- [9] Cisco Systems, "Cisco Webex Web Conferencing, Online Meetings, Desktop Sharing", <http://www.webex.com/>
- [10] Roesler, Valter & Cecagno, Felipe & Daronco, Leonardo & Dixon, Fred. (2012). Mconf: An Open Source Multiconference System for Web and Mobile Devices. 10.5772/36047.
- [11] W. A. Wibowo, B.D. Rahmawati, and H. Mastriswadi, "Video conferencing as a face-to-face online meeting app: user preference based on usability testing", j. sist. manaj, ind. vol. 5, no. 2, pp. 98-104, Dec 2021.