WebRTC Real-time Voice Chat Webapp A Major Project Report submitted in Partial fulfillment, The requirementth, Degree

## OF

## Bachelor of Engineering & Technology

**Submitted By** **Miss. Ritika Giri**

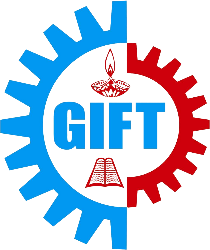
**Under the guidance of**

**Mr. Jagannath Ray (Assistant Prof. Department Of CSE)**

**Gandhi Institute For Technology, Bhubaneswar**

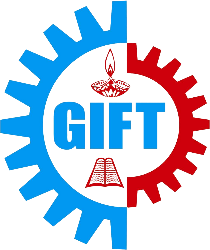
**For the**

**Session 2023-2024**



**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING GANDHI INSTITUTE FOR TECHNOLOGY (GIFT), BHUBANESHWAR**

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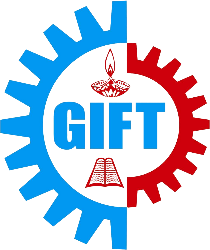
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**DECLARATION**

I, Soumya Ranjan Das hereby declare that this written submission represents our ideas in

our own words and where other’s ideas or words have been included, It has been adequetly cited and referenced the original sources. We also declare that we have adhered to all the principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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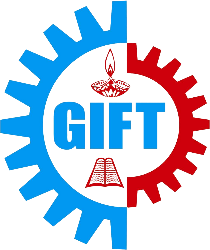
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**CERTIFICATE**

This is to certify that the project work titled “ WEBRTC REAL TIME VOICE CHAT” is a bonafide record of the work done by **Ritika Giri (2001298168)**  in partial fulfilment of the requirements for the award of the degree B.Tech Computer Science Engineering from the Gandhi Institute For Technology (GIFT) under BIJU PATNAIK UNIVERSITY OF TECHNOLOGY (BPUT),ODISHA.

**Project Project Head External**

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**ACKNOWLEDGMENT**

I am grateful to Mr. Jagannath Ray, Project guide, Gandhi Institute For Technology,Bhubaneswar, for the assigning me this innovation Project and modeling us both technically and morally for achieving success in life.

It is great senses of satisfaction that my first real live venture in practical computing is in the from of project work. I extend my humble obligation towards **Dr.Satya Ranjan Pattnaik**, H.O.D, Dept. of computer Science & Engineering, Centre for Post Graduate Studies, GIFT for Providing us with an environment to study and build our career.

Above all, I thank the almighty without whose grace and blessings. I would not have been able to complete my work successfully.

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**(2001298168)**

**ABSTRACT**

WebRTC is a powerful open-source project that enables real-time communication directly in web browsers, eliminating the need for third-party plugins or applications. The primary objective of this project is to create a seamless and efficient voice communication platform accessible through web browsers. The web application architecture is built upon the WebRTC API, allowing users to establish peer-to-peer connections for secure and low-latency voice communication. The report details the design and implementation process, encompassing key components such as signal processing, user authentication, and real-time data transfer. Additionally, the project explores user interface considerations for an intuitive and user-friendly experience. The report delves into the technical aspects of WebRTC, including its underlying protocols such as Session Description Protocol (SDP) and Interactive Connectivity Establishment (ICE). Security measures, such as encryption and authentication mechanisms, are thoroughly examined to ensure user privacy and data integrity during communication sessions. Furthermore, the project investigates the scalability of the application to accommodate a growing user base, optimizing network resources and ensuring a reliable user experience across various devices and network conditions. Performance metrics and testing methodologies are employed to evaluate the application's responsiveness, audio quality, and overall robustness. In conclusion, this project showcases the successful implementation of a real-time voice chat web application using WebRTC, providing a comprehensive understanding of the technology and its practical application. The report aims to contribute valuable insights into the development t of web-based communication platforms and serves as a foundation for future enhancements and extensions to the project.

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**1.Introduction**

In an era characterized by the increasing demand for seamless and interactive online communication, the development of real-time communication applications has become paramount. This project endeavors to contribute to this technological landscape by introducing a Real-time Voice Chat Web Application utilizing WebRTC (Web Real-Time Communication). WebRTC, an open-source project, empowers web browsers with the capability to establish real-time communication channels, eliminating the need for external plugins or applications. The motivation behind this project stems from the recognition of the evolving nature of online interactions, where users seek not only visual but also auditory engagement. Voice communication, as a fundamental aspect of human interaction, adds a layer of richness and immediacy to online conversations, making it an essential feature for modern web applications. The primary objective of this project is to design, develop, and implement a web application that facilitates seamless voice communication between users. Leveraging the power of WebRTC, this application aims to provide users with a reliable and secure platform for real-time voice conversations directly within their web browsers. The project encompasses various facets, including signal processing, user authentication, and the incorporation of WebRTC protocols such as SDP and ICE to enable peer-to-peer communication.

As the project unfolds, it delves into the technical intricacies of WebRTC, exploring its architecture and components to ensure a comprehensive understanding of the underlying technology. Security considerations are of paramount importance, with the implementation of encryption and authentication mechanisms to safeguard user privacy and data integrity during communication sessions. Furthermore, this project addresses the practical challenges associated with scalability and performance optimization, ensuring that the application remains responsive and efficient even under varying network conditions and user loads.

**1.1 Problem Statement**

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