FULL STACK WEB DEVELOPMENT INTERNSHIP

INTERNSHIP REPORT 10.10.2023-10.11.2023

SUBMITTED TO

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INTERNSHIP REPORT 2023

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CERTIFICATE OF COMPLETION

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ACKNOWLEDGEMENTS

I would like to convey my gratitude to Dr. Duggayala Raman, HOD of the CSE Dept. and I.Srujana , my mentor from CBIT for motivating me to apply for the internship.

I would like to thank the team at Bharat Intern for giving me the internship opportunity and the proper technical guidance which helped me successfully complete the project.

This internship provided a glimpse of the work-life in the software industry and the experience of working with mentors and fellow colleagues, and most importantly the encouragement to learn new things without hesitation.

This exposure has been a great learning experience and I'll be looking forward to more such opportunities in the future.

ABSTRACT

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This report details the development of two full-stack web applications during a two-month training program. The first project replicates the core functionalities of a blog website, allowing users to create accounts, manage posts, and edit content.

The second project showcases a real-time video-calling application utilizing WebRTC and Agora SDK. Users can make secure peer-to-peer video calls through HTML, CSS, and JavaScript

Both projects highlight essential full-stack development skills acquired during the training period, showcasing efficient problem-solving and implementation using relevant technologies. They provide a foundation for further development and exploration within the exciting realm of web application creation.

ORGANIZATION INFORMATION

Bharat Intern, is a privately-owned company, passionate about empowering innovations that shape a better future for businesses and individuals alike. Their goal is to empower the next generation of tech leaders. Their internship program offers hands-on experience in different fields.

TABLE OF CONTENTS

INTRODUCTION

This report summarizes my four-week training experience in the field of full stack development as part of Internship-1 in the 3rd semester. During this period, I gained valuable knowledge and hands-on experience with various technologies and skills necessary to build complete web applications. This report will discuss the training objectives, the technical skills I acquired, and the two projects I developed a content management system and a video-calling application.

TRAINING OBJECTIVES:

The primary objective of the training was to equip me with the essential skills and knowledge to become a competent full stack developer. This included:

- **Front-end Development**: Gaining proficiency in HTML, CSS, and JavaScript for building user interfaces and interactive web pages.
- **Back-end Development**: Learning server-side scripting languages like PHP and frameworks for building robust and scalable web applications.
- **Database Management**: Understanding fundamental database concepts and using SQL to manage application data effectively.
- Version Control: Mastering Git for version control and collaboration.
- Learning how to **integrate APIs** into web applications to access external data

TECHNICAL SKILLS ACQUIRED:

Through the training and project work, I have acquired the following technical skills:

- Front-end: HTML, CSS, JavaScript, Bootstrap, jQuery
- Back-end: PHP
- Database: MySQL
- Version Control: Git
- Web APIs: Agora SDK, WebRTC

PROJECT-1 CONTENT MANAGEMENT SYSTEM

PROJECT OVERVIEW

For the first project, I developed a content management system (CMS) using PHP and MySQL. This system allows users to create accounts, manage posts, and publish content on a blog website.

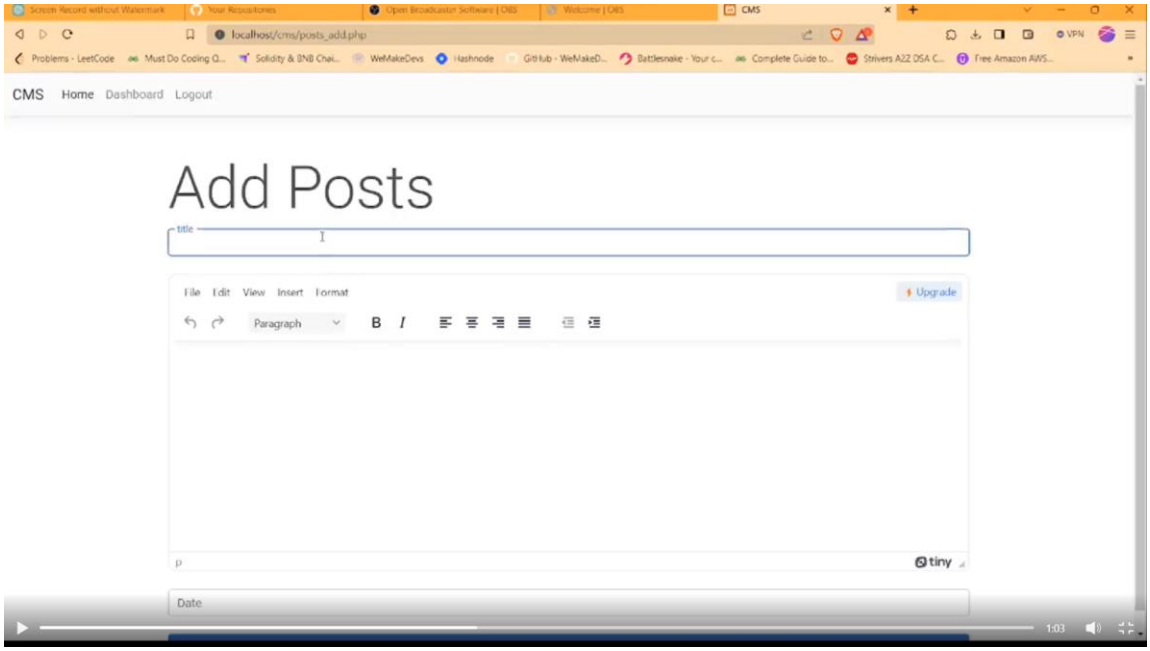
TECHNOLOGIES USES

- PHP
- MySQL
- HTML
- CSS
- TINYMCE JAVASCRIPT PLUGIN (FOR TEXT EDITOR)
- XAMPP CONTROL SYTSTEM

SYSTEM ARCHITECTURE

The CMS architecture follows a three-tier model:

- Presentation Layer: Responsible for user interface and interaction (HTML, CSS, JavaScript)
- Business Logic Layer: Handles user authentication, post creation, and data management (PHP)
- Data Layer: Stores user and post data (MySQL)



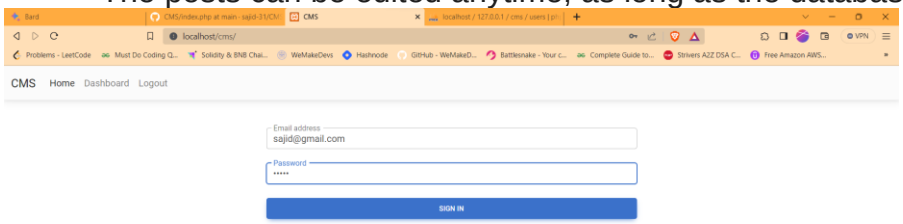
IMPLEMENTATION DETAILS

USER MANAGEMENT:

- There are two types of users. They are authors and viewers. Authors are the original writers of the posts and can edit the posts.
- Users can go to the homepage and login through email and password.
- Implemented MySQL's SHA1 hashing algorithm to encrypt the users' passwords.

POST MANAGEMENT:

- Users can create, edit, and delete posts if they are the author of the post.
- I have used to plugin for the text editor, which comes with line spacing, indexing , various font families and font styles, which lets you customize your blogs.
- The posts can be edited anytime, as long as the database is active.



CHALLENGES FACED AND SOLUTIONS IMPLEMENTED

- Security: Implemented secure user authentication and data validation to prevent unauthorized access and malicious attacks.
- Performance: Optimized database queries and code structure to ensure efficient data retrieval and responsiveness.
- User Interface: Designed a user-friendly interface with clear navigation and easy-to-use functions.

LESSONS LEARNED

- Building a CMS from scratch provided a comprehensive understanding of full stack development principles.
- Applying MVC architecture improved code organization and maintainability.
- Importance of security considerations in web application development.

DATABASE:

I have used MySQL to store the data in tables.

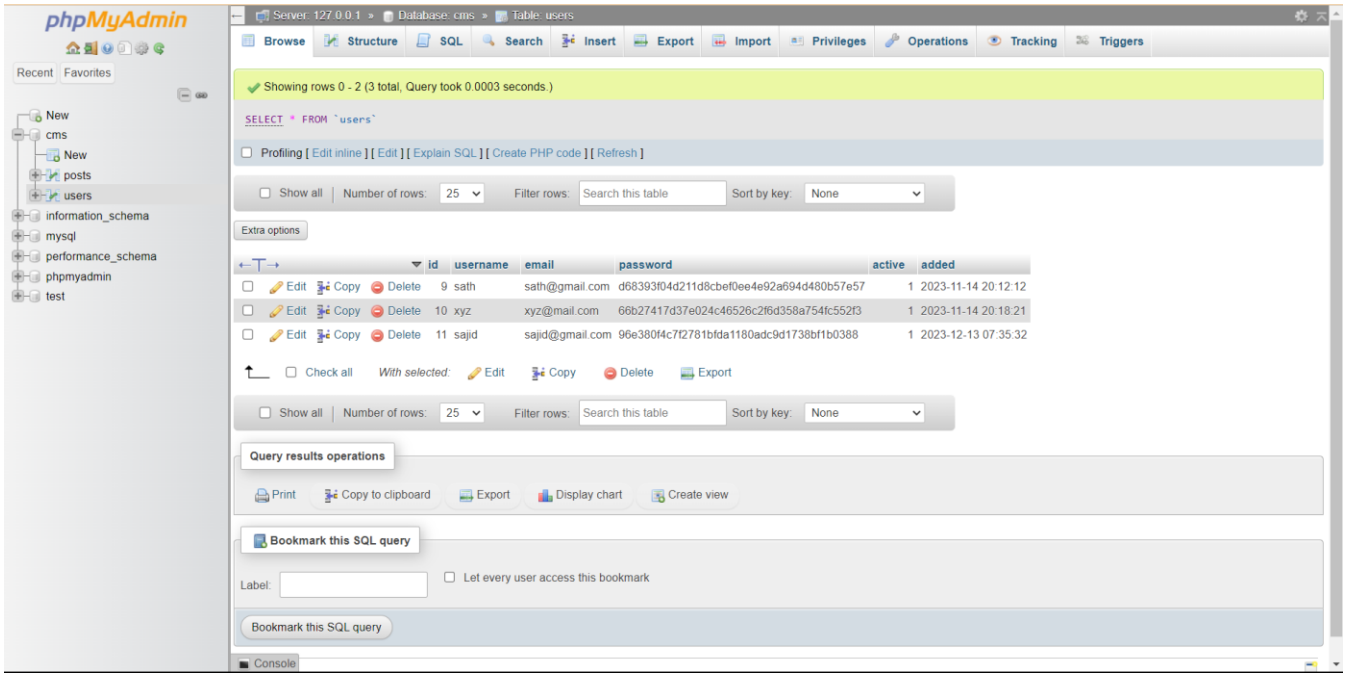
For the user management, there are 6 columns name, id , hashed password, mail address and time stamp.

For the posts management , there are 5 columns id, title, content , author and date.

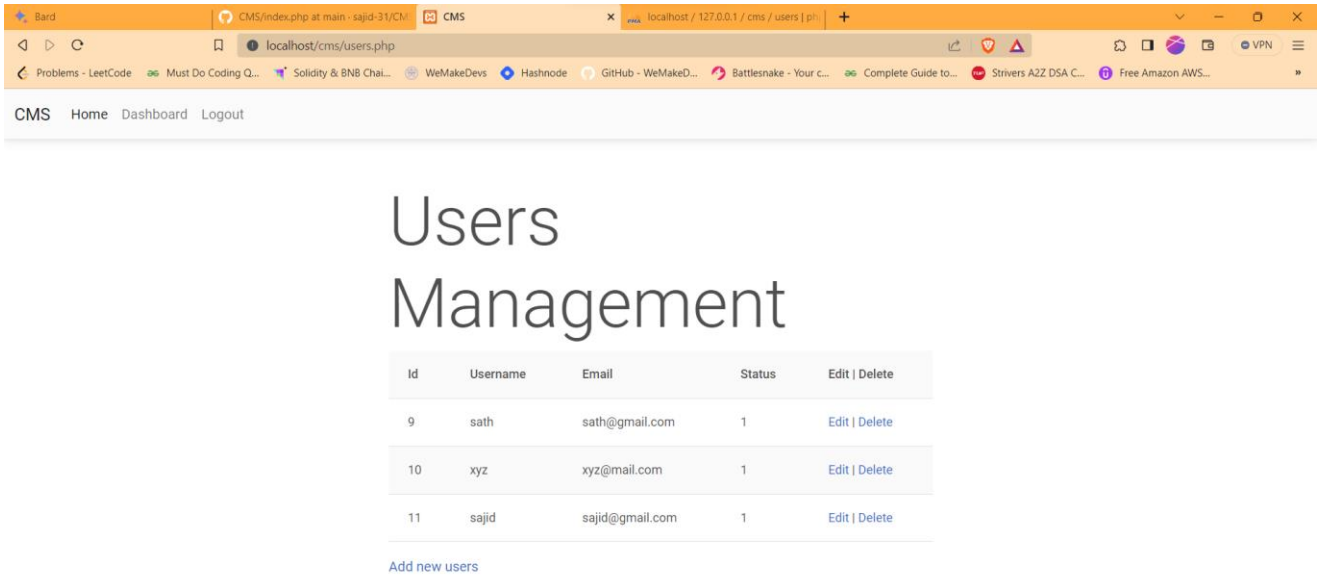
The posts are compiled into UTF-8 configuration which allows to dynamically write blogs.

Also, users and posts can be deleted from the website directly.

The password is maintained in an encrypted format, and so, even the owners of the application cannot see the actual password which ensures the security of the application.



TEST OUTPUTS:



PROJECT RESULT:

Overall Goal: This project successfully replicated a basic blog website functionality using PHP, CSS, and MySQL. Users can create accounts, publish posts, and edit existing ones.

KEY FEATURES:

- User Management: Users can register, log in, and have their passwords encrypted using SHA1 MySQL encryption for enhanced security.
- Post Management: Users can create, edit, and delete their own posts, including title, content, and publishing date.
- Database Integration: MySQL effectively stores user and post data, ensuring organized and persistent information

TECHNICAL ACHIEVMENTS:

- Successfully implemented user authentication and authorization to manage user access.
- Utilized PHP to handle dynamic content generation and processing of user actions.
- Secured user passwords through SHA1 encryption, protecting user privacy.
- Demonstrated understanding of database connectivity and data manipulation using MySQL.

GITHUB : https://github.com/sajid-31/CMS

LINKEDIN POST : CMS

PROJECT-2 VIDEO CALLING APPLICATION

PROJECT OVERVIEW

The second project involved building a video-calling application using HTML, CSS, JavaScript, Agora SDK, and WebRTC. This application allows users to make video calls with each other in real-time.

The website is publicly available and is hosted on : https://sajid-31.github.io/video-app/

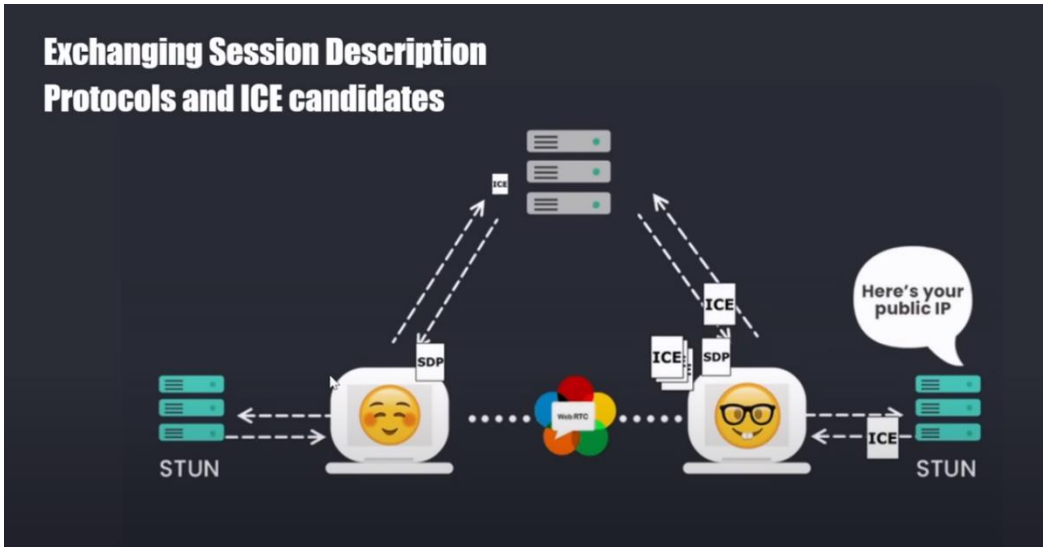
TECHNOLOGIES USES

- HTML
- CSS
- JavaScript
- Agora Real Time Connection SDK
- Google Stun Servers
-

SYSTEM ARCHITECTURE

The video-calling application uses a peer-to-peer architecture for real-time video communication:

- Users connect to the Agora server and exchange signaling messages.
- Users establish a direct connection through WebRTC for audio and video streaming.
- **WebRTC** is a set of javascript APIs that allows us to establish peer to peer connection between two browsers to exchange data such as audio and video in real time.
- As there are no main servers involved in WebRTC, also considering the fact that it works on UDP, WebRTC offers low latency
- The initial signaling between the peers done through a process known as signaling, which requires SDP(session description protocol) and setting up of ICE candidates.



IMPLEMENTATION DETAILS

- Users can create and join video call rooms.
- WebRTC API is used to capture and transmit audio/video data.
- Agora SDK facilitates signaling and connection management.
- User interface displays video streams and controls for call management.

CHALLENGES FACED AND SOLUTIONS IMPLEMENTED

- Optimizing video quality: Configured Agora SDK parameters for efficient video streaming across different network conditions.
- Debugging connectivity issues: Implemented error handling and logging mechanisms to troubleshoot connection failures.
- Ensuring cross-browser compatibility: Tested the application on various browsers and addressed compatibility issues.

FRAMEWORKS

I have implemented WebRTC framework to real time connectivity and also used google stun servers and agora SDK to set up ICE candidates.

DEPLOYMENT

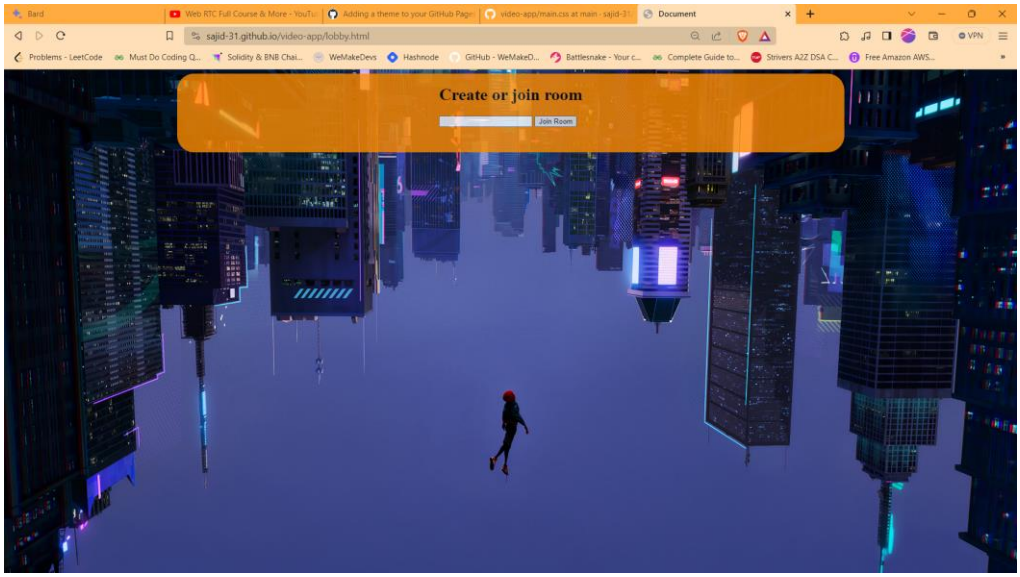
I have deployed the application on to the web using Github Pages, which lets to host your github repository for free.

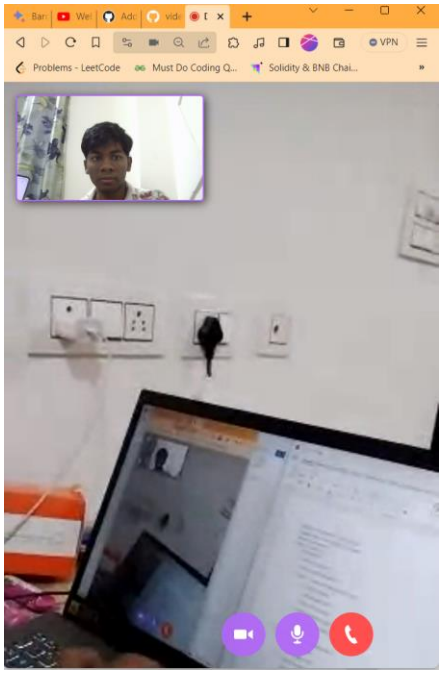
You can click the below link to use the application.

Website link: https://sajid-31/github.io/video-app/

Github's services automatically integrate the application if any changes have been made.

TEST OUTPUTS:





PROJECT RESULT:

OVERALL PERFORMANCE:

The application is intended only for two peers to interact, it can expanded to facilitate multiple users to communicate at once.

The application shows low latency and better quality of video was observed in mobile phones due to the dimensions (smaller dimensions leads to better resolution) .

The concept of joining rooms to talk to people was ideal and was implemented successfully.

GITHUB: https://github.com/sajid-31/video-app

LINKEDIN POST: VIDEO CALL APP

Website link: https://sajid-31/github.io/video-app/

FUTURE SCOPE:

Looking ahead, the possibilities are endless. My video app can evolve into a bustling communication hub for larger groups, offering features like screen sharing and chat. The PHP website, too, can blossom with user profiles, interactive comments, and social media integration, fostering a vibrant online community. But my journey doesn't end there. I'm hungry to master advanced PHP frameworks, delve into database optimization, and explore new technologies like cloud platforms and mobile development. This journey is just beginning, fueled by my passion for solving real-world problems and building impactful web applications, one line of code at a time.

CONCLUSION

This report has served as a journey through the FOUR-WEEK intensive training program, culminating in the creation of two distinct yet impactful full-stack web applications. The blog website replica served as a springboard, solidifying fundamental skills in user management, data manipulation, and secure server-side scripting with PHP. Building upon this foundation, the video-calling application delved into the world of real-time communication, harnessing the power of WebRTC and Agora SDK to create a seamless and low-latency peer-to-peer experience.

From conceptualizing the projects to tackling technical challenges and overcoming various hurdles, the journey has been one of constant learning and growth. Each line of code and every hurdle conquered represents a valuable lesson learned, enriching the understanding of full-stack development principles and practices.

Looking beyond the present, these projects lay a strong foundation for future endeavors. The blog website offers a solid platform for further development, ready to be transformed into a dynamic and engaging social space. The video-calling application, with its efficient and secure communication tools, presents endless possibilities for integration into diverse applications and platforms.

As this training program concludes, the excitement for what lies ahead remains palpable. Armed with the acquired knowledge, hands-on experience, and a thirst for exploration, the path forward in the realm of web development beckons with countless opportunities. Whether it be tackling new challenges, refining existing projects, or venturing into uncharted territories, the journey continues, fueled by the passion for building intuitive, impactful, and innovative web applications.

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