FULL-STACK DEVELOPMENT INTERNSHIP REPORT – YouTube Clone

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# Introduction

This internship focused on enhancing a YouTube-like platform by integrating advanced features such as multi-quality video playback, a premium user system with payment handling, and real-time video calling with screen sharing and recording capabilities. The goal was to create a modern, feature-rich media platform that offers an engaging and premium experience to its users.

# Background

The project aimed to build a user-friendly web application with seamless video playback and robust features. To achieve this, multiple video qualities were encoded to support various bandwidths, a premium upgrade system was implemented with Razorpay, and real-time video communication was enabled using WebRTC and MediaRecorder APIs. These features are crucial for platforms that want to deliver high-quality, customizable content to their users.

# Learning Objectives

✅ Implement adaptive video playback with multiple quality options  
✅ Integrate Razorpay for secure premium user payments  
✅ Enable VoIP calls with screen sharing and local recording  
✅ Deploy and scale a full-stack application

# Key Activities and Tasks

🔹 Video Player with Quality Switching  
- Used FFmpeg to encode videos into different resolutions.  
- Created a video player with a quality selection dropdown, enabling smooth playback even on lower bandwidth connections.  
- Tested the player across various devices for compatibility and performance.

🔹 Download Feature with Razorpay Payment Integration  
- Implemented a feature that allows users to download one video per day for free.  
- Integrated Razorpay to allow users to purchase premium access, unlocking unlimited downloads.  
- Ensured secure payment handling and provided clear feedback to users post-purchase.

🔹 VoIP Video Calling with Screen Sharing and Recording  
- Integrated WebRTC to allow real-time video calls.  
- Added support for screen sharing using getDisplayMedia(), perfect for collaborative viewing.  
- Integrated MediaRecorder to enable users to locally save their recorded sessions.

# Skills and Competencies Developed

✅ Full-stack development (ReactJS, Node.js, Express)  
✅ Video streaming technologies (HLS.js, FFmpeg)  
✅ Razorpay payment gateway integration  
✅ Real-time communication (WebRTC, MediaRecorder)  
✅ Responsive design and deployment best practices

# Challenges and Solutions

🔸 Challenge: Razorpay integration issues during payment verification.  
🔹 Solution: Used test keys, verified payments through Razorpay’s dashboard, and added proper error handling.

🔸 Challenge: Ensuring download limits for non-premium users.  
🔹 Solution: Moved download limit checks to the backend, using date-based restrictions to prevent bypassing.

🔸 Challenge: Recording shared screens during video calls.  
🔹 Solution: Updated MediaRecorder logic to include screen capture, ensuring full recording capability.

# Outcomes and Impact

The project successfully added critical, modern features to the YouTube clone, including seamless quality switching, secure premium upgrades, and robust real-time communication features. These enhancements greatly improved the platform’s value and usability, delivering a truly modern experience for all users.

# Conclusion

This internship was a deep dive into full-stack development, teaching me the complexities of handling adaptive video playback, integrating payment systems, and building real-time communication tools. The experience significantly improved my understanding of modern web development practices and solidified my skills in deploying robust, user-focused features.