Proposed Solution – *Video Conferencing Web App*

🔹 1. Problem Statement

Many users—students, remote workers, freelancers—face difficulty in conducting smooth and secure video meetings due to:

- Heavy or complex tools requiring installation
- Laggy performance in low-bandwidth conditions
- Disconnected systems for chat, screen sharing, and participant control
- A lack of fast, secure, browser-based options with minimal friction

🔹 2. Idea / Solution Description

The solution is a **web-based video conferencing app** built using:

- **React.js** for a fast and responsive frontend
- **Node.js + Express.js** for backend APIs and routing
- **Socket.io** for real-time messaging and signaling
- **Agora Web SDK** for high-quality audio/video streaming
- **MongoDB** for storing user sessions, chat logs, and meeting data

✅ **Key Features**:

- One-click meeting creation and join via room code
- Real-time video/audio without downloads
- In-browser **screen sharing**
- Live chat during meetings
- Host controls for muting/removing participants
- JWT-based secure login
- Optional room password or token for private sessions

🔹 **3. Novelty / Uniqueness**

- ⚡ **No download required** – runs directly in the browser
- 🎯 **Minimalist UI** – built for speed, accessibility, and mobile responsiveness
- 🔒 **Secure token-based authentication** using JWT
- 🧠 **Scalable architecture** using Socket.io rooms and Agora channels
- 📽️ **Optional meeting recording** for future versions
- 🛠️ **Easy deployment** via Vercel (frontend) and Render (backend)

🔹 **4. Social Impact / User Satisfaction**

- Empowers students and teams to collaborate seamlessly across devices
- Promotes accessibility by working well on low-end hardware
- Reduces technical barriers to virtual communication
- Saves time and effort with zero-installation access
- Strengthens data privacy and trust through encryption and role-based access

🔹 **5. Business Model (Optional / Future Scope)**

- **Freemium model**: Basic access free; paid plans offer premium features (recording, custom branding)
- **SaaS for schools & teams**: Offer team dashboards and analytics
- **Custom white-label solutions** for enterprises or institutions
- **Meeting add-ons** (recording, transcripts, translation) as paid extras

🔹 **6. Scalability of the Solution**

- Designed using **microservice-friendly architecture**
- Easily scalable to support hundreds of concurrent rooms
- Future enhancements include:
    - React Native mobile app
    - Support for low-bandwidth optimization
    - AI-based noise cancellation
    - Cloud recording and analytics dashboard