BRAUDE
College of Engineering, Karmiel

SkillBridge

SkillBridge - Learning and Teaching Platform

Students: Raed Haddad. Adam Hasarme
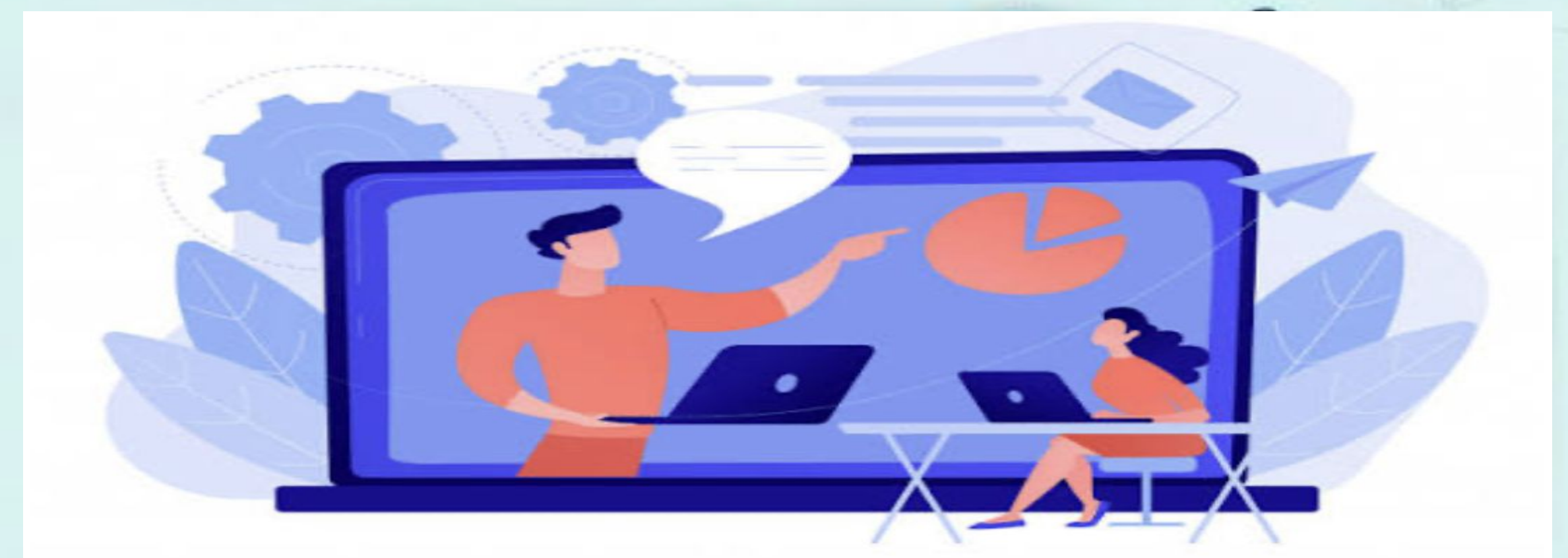Supervisor : Dr. Zeev Frenkel

Abstract:

SkillBridge is a peer-to-peer learning platform that connects learners and mentors for real-time skill exchange. Unlike traditional learning systems, SkillBridge emphasizes live interaction through audio, video, and screen sharing, enabling personalized and collaborative learning sessions. The system integrates web and mobile clients with a real-time backend and a WebRTC-based communication infrastructure to support low-latency, interactive learning.

THE PROBLEM:
PASSIVE & DISCONNECTED LEARNING

- PASSIVE CONTENT & INTERACTION
- DISCONNECTED PEER-TO-PEER
- LACK OF REAL-TIME INTERACTION
  - Poorly Integrated
  - No Immedite Feedback
  - Peer Learning

Existing platforms rely on passive content, lacking real-time, reaisnlized interaction. Current solutions are often poort pororoly integrated or not desid for true peer-to-peeer learning, matg imedbate feedback difficult.

OUR SOLUTION:
REAL-TIME PEER-TO-PEER CONNECTION

SkillBridge enables live, interactive learning using WebRTC. Our matching and gamification algorithms drive personalized, engaging sessions for effective, immediate feedback.

Pseudocode (Core Matching Algorithm)

```
FOR each available mentor
    Calculate skill similarity score
    Calculate availability score
    Compute total match score
SELECT mentor with highest score
RETURN matched mentor
```
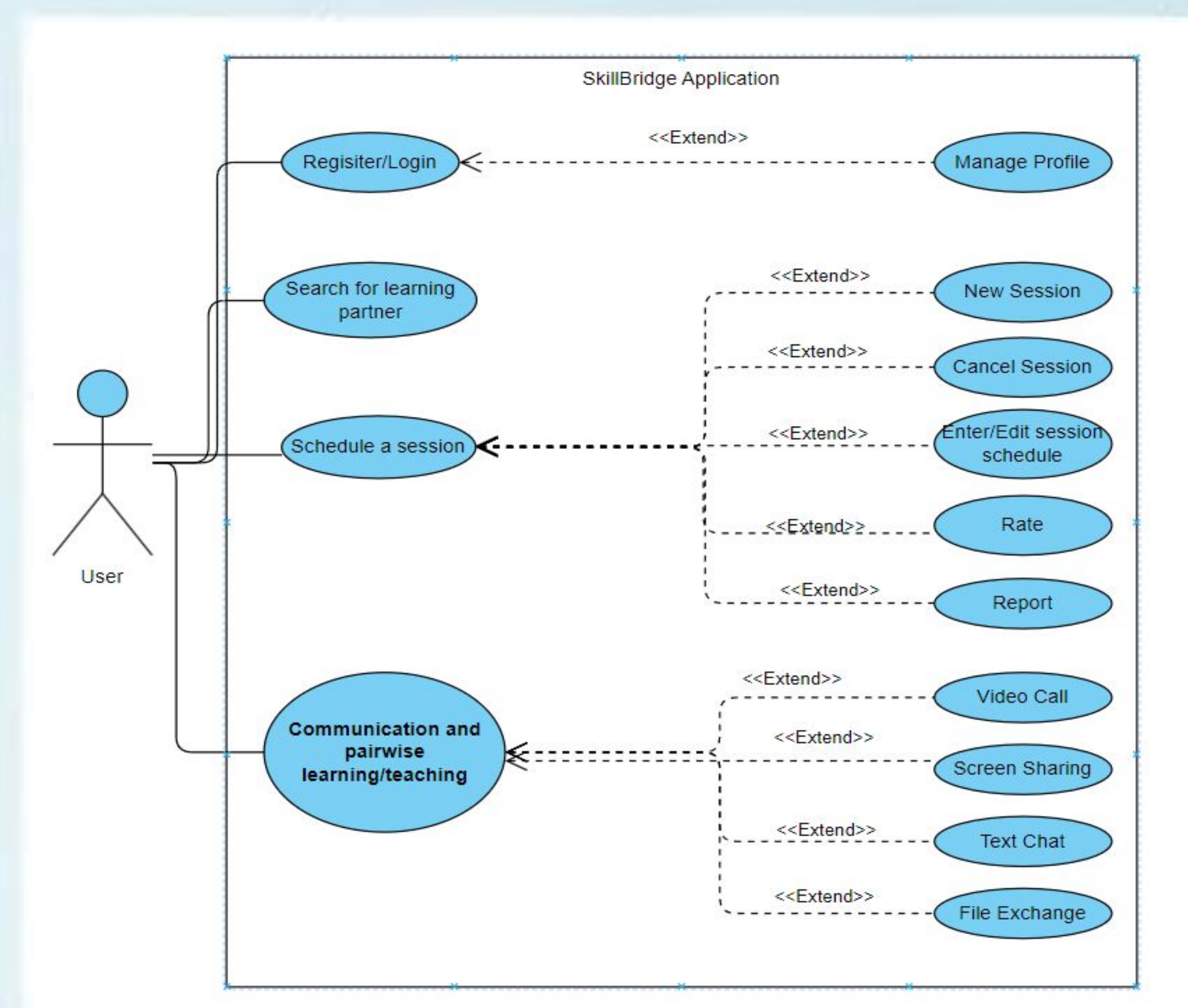
Pseudocode – Gamification Algorithm

```
ON session completion:
    IF session was completed successfully THEN
        Award base points to both users
        IF user was mentor THEN
            Add mentor bonus points
        ENDIF
        Update user level based on total points
        Unlock achievements if thresholds are reached
    ENDIF
STORE updated scores and achievements
```
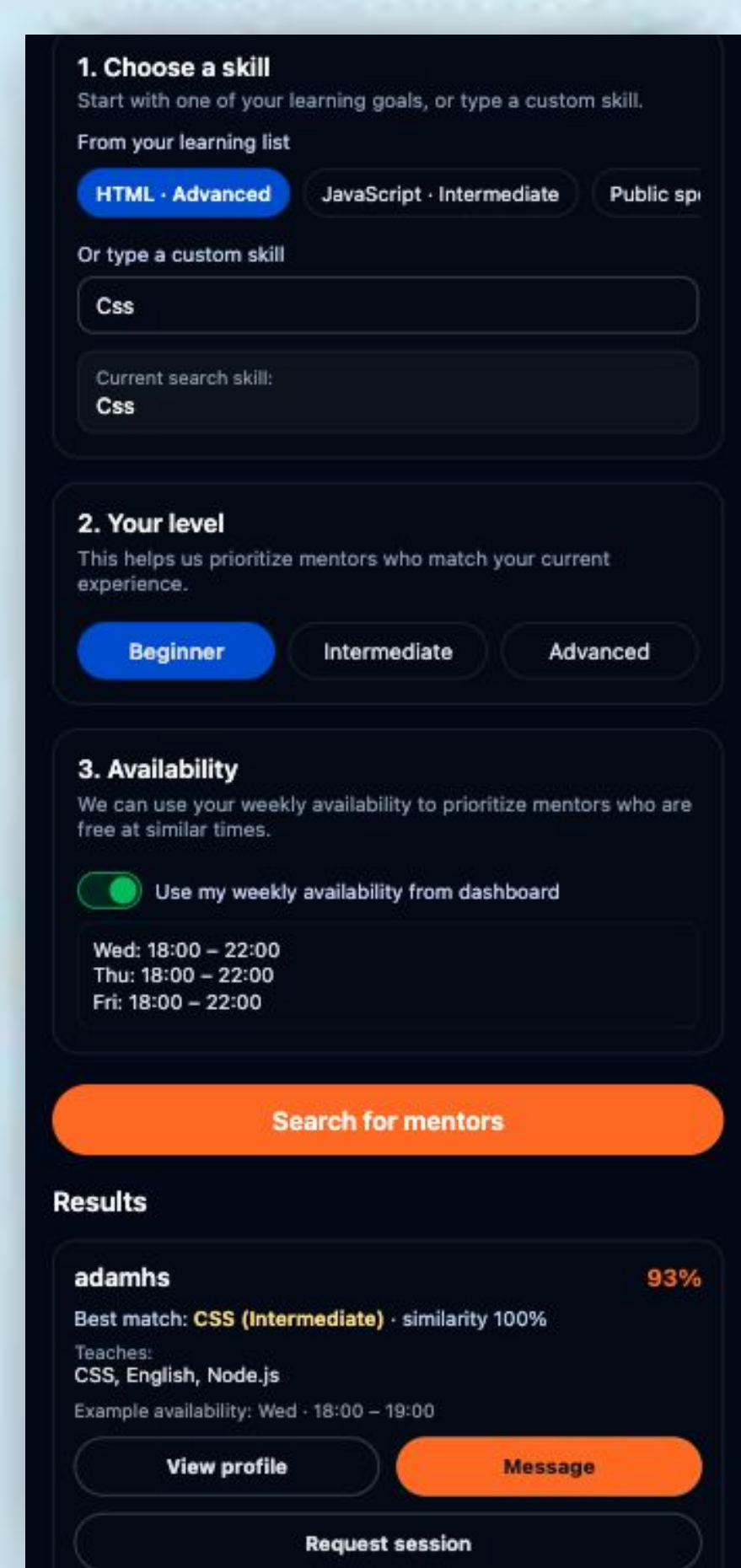
Tools & Technologies
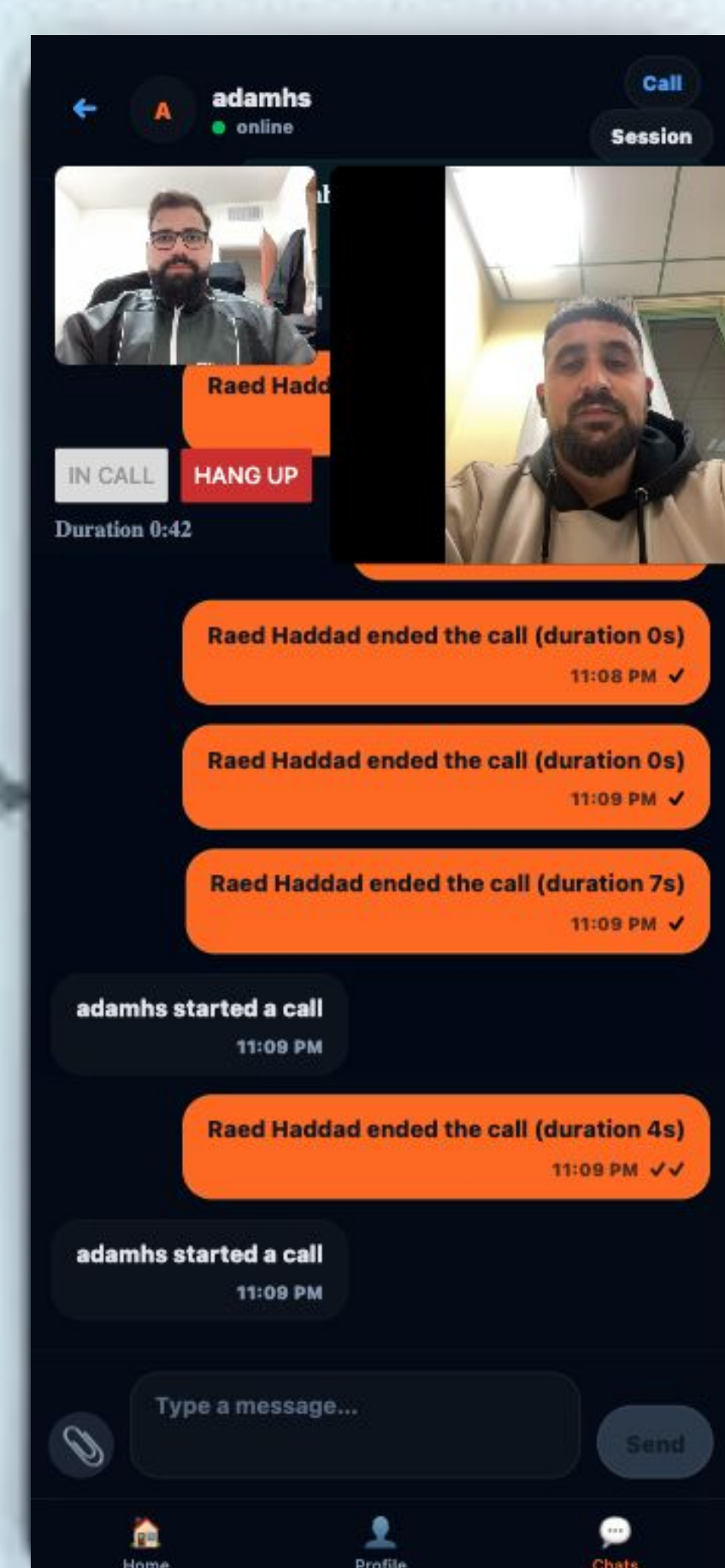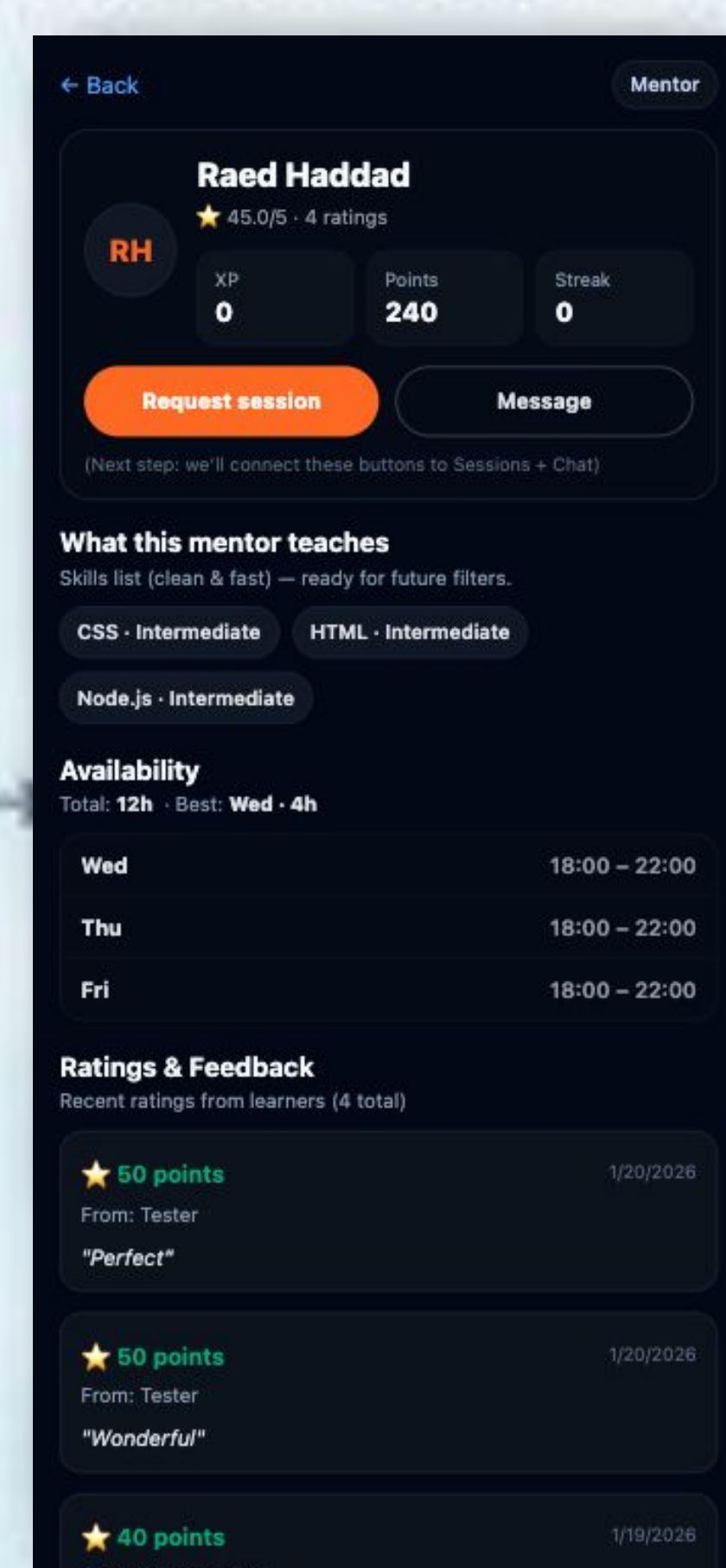

Frontend: React

Backend: Node.js, Express.js

Database: MongoDB

Real-Time Communication: WebRTC

Protocols: HTTPS, WebSocket

Version Control: GitHub

Use Case:

SkillBridge Application

- Register/Login — <<Extend>> — Manage Profile
- Search for learning partner
- Schedule a session
  - <<Extend>> — New Session
  - <<Extend>> — Cancel Session
  - <<Extend>> — Enter/Edit session schedule
  - <<Extend>> — Rate
  - <<Extend>> — Report
- Communication and pairwise learning/teaching
  - <<Extend>> — Video Call
  - <<Extend>> — Screen Sharing
  - <<Extend>> — Text Chat
  - <<Extend>> — File Exchange
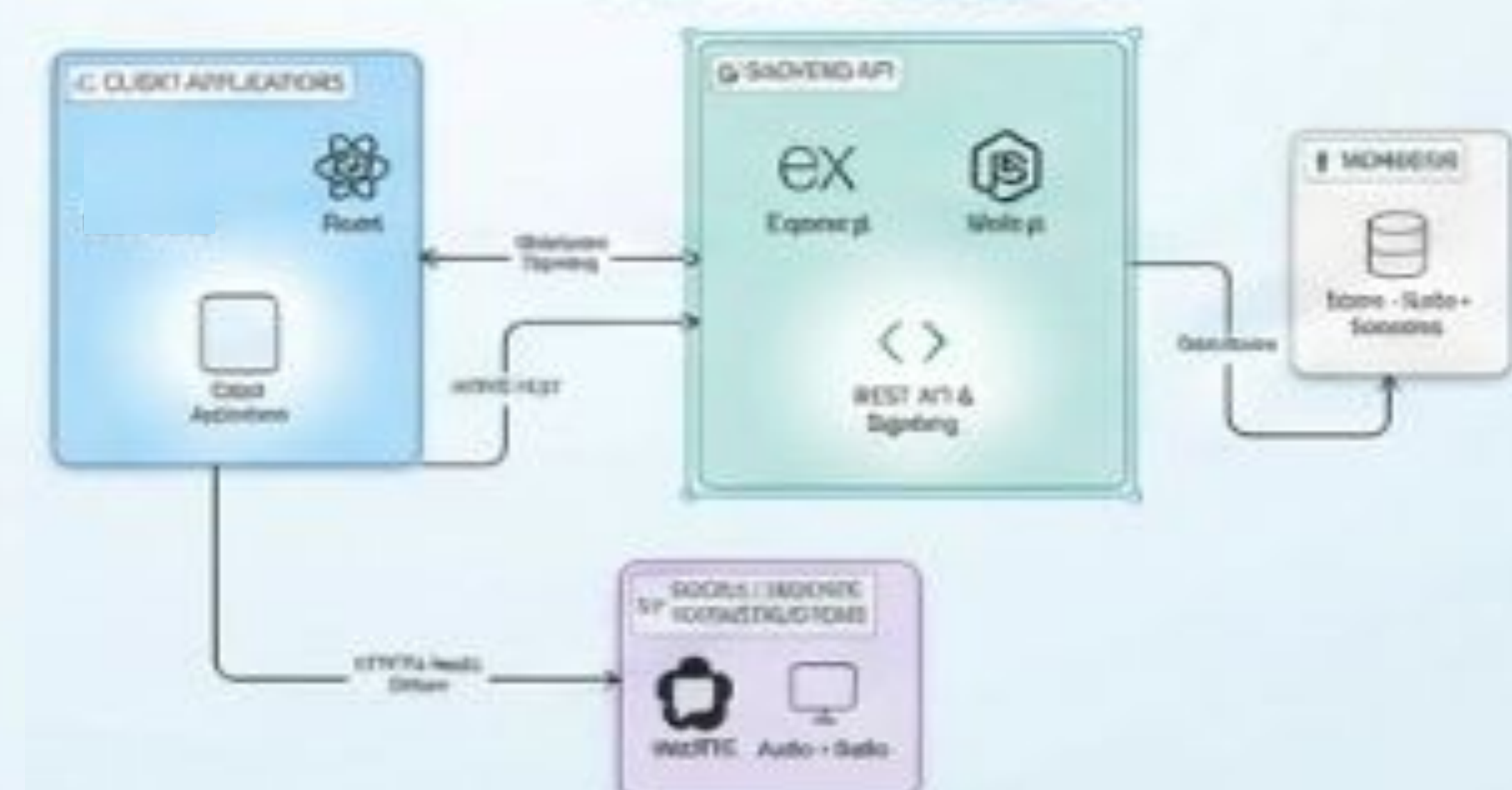
User

GUI:

Matching
Communication
Rate/Availability

Architecture:

Conclusions

- SkillBridge demonstrates how real-time communication technologies can enhance peer learning.
- By spearating signaling, business logic, and media streaming, the system achieves scalability, low latency, and a user-centered learning experience.
- The project highlights the challenges and solutions of integrating WebRTC into modern web and mobile applications.

Scan for Project Details