

# Talent Sphere

*A Virtual Career Fair Networking Portal with AI-Assisted Recruitment and Real-Time Queue-Based Video Interaction*

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## ABSTRACT

The traditional in-person career fair connects students with employers but is limited by geography, time, cost, and low interaction efficiency. Existing online platforms only replicate static job portals, offering little real-time engagement or process visibility. **Talent Sphere** is a virtual career fair platform that recreates and enhances this experience online, connecting candidates and recruiters through interactive, queue-based video interviews instead of static submissions. The system supports three roles—candidates, recruiters, and administrators—each with dedicated dashboards and tailored workflows. A client-side mock backend simulates database persistence, real-time queue updates, notifications, and network latency, enabling a fully self-contained, deployable demonstration of complex recruitment workflows.

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## KEYWORDS

*Virtual Career Fair, Recruitment Portal, React, TypeScript, Vite, Tailwind CSS, Google Gemini AI, PDF.js, Role-Based Access Control, Event-Driven Architecture, Pub-Sub Pattern, WebRTC, Queue-Based Video Interview, Single Page Application, AI Resume Analysis, Mock Backend.*

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## SYNOPSIS

Talent Sphere centres its engagement model on direct, synchronous human interaction rather than asynchronous form filling, delivering a fundamentally more dynamic and equitable recruitment experience across three role-specific interfaces. Candidates upload PDF resumes that are parsed client-side using PDF.js and enriched by Google Gemini AI for automated skill identification and profile structuring, before exploring virtual company booths, joining interview queues, and receiving real-time push notifications as their queue position advances. Recruiters access a comprehensive dashboard to monitor queue status, admit candidates into mock video interview sessions, and record structured post-interaction evaluations for post-fair review. Administrators govern platform integrity by validating recruiter registrations through a secret key verification mechanism, moderating user-generated conduct reports, and monitoring overall activity to maintain a safe and professional virtual fair environment. The event-driven, publish-subscribe architecture implemented entirely on the client side enables real-time state propagation across all role interfaces without requiring any deployed server infrastructure.

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## TECHNOLOGIES

**Frontend Framework:** React with TypeScript — declarative, component-based single-page application architecture with static type safety for maintainable, large-scale UI development.

**Build Tooling:** Vite — next-generation frontend build tool delivering near-instantaneous development server cold starts and optimised, tree-shaken production bundling.

**Styling:** Tailwind CSS — utility-first CSS framework enabling rapid, consistent, and fully responsive interface styling across all three role-specific dashboard layouts.

**AI Integration:** Google Gemini AI — processes extracted resume text to perform automated skill identification, candidate profile enrichment, and structured capability mapping without manual data entry.

**PDF Processing:** PDF.js — client-side PDF parsing library that extracts raw text content from candidate-uploaded curriculum vitae files entirely within the browser environment.

**Mock Backend:** Client-side event-driven pub-sub system — simulates database persistence, queue state transitions, notification dispatch, and artificial network latency without any server deployment.

**Architecture Pattern:** Role-Based Access Control (RBAC) with modular component separation — enforces distinct capability boundaries across candidate, recruiter, and administrator tiers throughout all platform layers.

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## PROCEDURE

### Step 1: User Registration and Authentication

New users select their role—candidate, recruiter, or administrator—and complete the role-specific registration form. Recruiter accounts remain pending until an administrator verifies legitimacy via a secret key, ensuring only authorised organisations access recruiter tools. Upon login, users are directed to their role-specific dashboards, providing tailored tools and information.

## **Step 2: Candidate Profile Creation and AI Analysis**

Candidates upload their CVs in PDF format, which are parsed on the client side using PDF.js. The extracted text is analysed by Google Gemini AI to automatically identify skills, competencies, and qualifications, enriching the candidate profile without manual data entry.

## **Step 3: Virtual Career Fair and Queue Management**

Candidates explore interactive company booths displaying organisational profiles, roles, and recruiter details. They join interview queues with a single click, while the platform updates queue positions and recruiter dashboards in real time using a client-side event system.

## **Step 4: Interview Sessions and Feedback Collection**

Recruiters admit candidates from the queue to mock video interview sessions simulating real-time one-on-one interactions. After interviews, recruiters complete evaluation forms, and candidates submit feedback, creating a continuous quality improvement loop for post-fair assessment.

## **Step 5: Administrative Oversight and Governance**

Administrators manage pending recruiter registrations, approve or reject accounts based on verification, and moderate conduct reports to ensure professional integrity. They maintain platform safety and fairness across all active virtual career fair sessions.

## **WHY IT IS BEST**

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**Live Interaction Over Static Submissions:** Queue-based video interview sessions replace opaque application pipelines with real-time, human-centred conversations, replicating the immediacy and engagement of physical career fair booth interactions in a fully online environment.

**AI-Powered Resume Intelligence:** Google Gemini AI automatically extracts and structures candidate skills from uploaded PDF resumes, eliminating manual profile entry and delivering a richer, more accurate representation of candidate capabilities to recruiters.

**Zero Server Infrastructure Required:** The client-side pub-sub mock backend enables complete demonstration of real-time queue management, role-based access control, and notification delivery without requiring any deployed server, database, or cloud infrastructure.

**Three-Role Purpose-Built Experience:** Dedicated dashboards and workflows for candidates, recruiters, and administrators ensure every user type operates within an interface precisely tailored to their responsibilities, eliminating role confusion and interface bloat.

**Geographically Unrestricted Access:** The fully online platform removes the geographical, logistical, and financial barriers of physical career fairs, enabling candidates and recruiters from any location to participate in a structured, high-quality recruitment event.

**Production-Ready Extensible Architecture:** The modular, component-based design and event-driven architecture provide a clean and well-structured foundation for integrating WebRTC video, cloud databases, and secure authentication in a future production deployment.

## **CONCLUSION**

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Talent Sphere demonstrates that the interactive, human-centred engagement of a physical career fair can be authentically replicated and enhanced online, overcoming the limitations of traditional events and static recruitment portals. By focusing on synchronous, queue-based video interactions instead of asynchronous form submissions, the platform delivers a more transparent and equitable experience for candidates, recruiters, and administrators. Its client-side architecture incorporates a pub-sub mock backend, Google Gemini AI resume analysis, PDF.js processing, role-based access control, and real-time notifications, forming a cohesive, self-contained prototype. The development roadmap includes WebRTC-powered live video sessions, migration to cloud-hosted databases for true persistence and concurrency, secure OAuth 2.0 or JWT authentication, and advanced recruitment analytics. Additional enhancements like calendar-based interview scheduling, automated reminders, and customizable virtual booths will further improve user experience. Together, these upgrades position Talent Sphere as a scalable, production-ready, next-generation virtual recruitment platform.

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