



Route2hire: An AI-Assisted Integrated Career Development and Job Search Platform

Darshan Dawandkar¹, Devashri Murumkar², Diya Mate³, Anjali Sarsar⁴, Prof. Khushi yesur , Dr. Sushama V. Telrandhe⁶

^{1,2,3,4}UG Students, Department of Computer Science and Engineering,
Gurunanak Institute of Engineering and Technology, Nagpur, India

⁵Assistant Professor, Department of Computer Science and Engineering,
Gurunanak Institute of Engineering and Technology, Nagpur, India

⁶Associate Professor, Department of Computer Science and Engineering,
Gurunanak Institute of Engineering and Technology, Nagpur, India

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Abstract - Route2Hire is an integrated career development and job-search platform designed to reduce the fragmentation that job seekers face when moving from job discovery to interview preparation and career development. Conventional job portals primarily concentrate on vacancies and applications, while useful activities such as referral discovery, interview experience sharing, salary research, resume preparation, skill development, and practice are often distributed across multiple platforms. Route2Hire brings these activities together in a single web application. The system provides curated technology job listings, employee referral opportunities, interview experiences and questions, salary information, resume building and review facilities, role-based career roadmaps, a Data Structures and Algorithms (DSA) problem tracker, community discussions, polls, and an AI-assisted career question interface.

Insights, Career Roadmap, DSA Tracker, Artificial Intelligence, Web Application.

Key Words: Route2Hire, Job Portal, Career Platform, Resume Analysis, Skill Extraction, Interview Experience, Job Referrals, Salary Information, Learning Roadmap, DSA Practice, Community Platform, Gemini AI.

1. INTRODUCTION

The modern job-search process involves much more than finding a vacancy and submitting an application. Candidates need to understand job requirements, prepare a relevant resume, develop technical skills, practice interview questions, compare compensation, learn from other candidates, and identify opportunities through professional networks. When these activities are distributed across unrelated websites and applications, users must repeatedly search, register, maintain information, and switch between services. This fragmentation can make career preparation difficult, particularly for students and early-career professionals.

Route2Hire is proposed as an integrated platform that brings the major stages of the career journey into one environment. Its job module focuses on curated QA, SDET, Test Automation, Software Testing, and broader technology

The platform is implemented as a modern full-stack web application using React and Vite on the frontend, Node.js and Express on the backend, MongoDB for persistent application data, and Firebase-supported authentication. Google Gemini is used for career-oriented conversational assistance and for extracting technical skills from job descriptions to support resume preparation. The system also maintains structured progress data for roadmaps and DSA practice. By combining job discovery, preparation, community interaction, and career planning, Route2Hire provides an end-to-end digital environment for improving employability and making the job-search process more organized.

Index Terms - Job Search, Career Development, Resume Builder, Interview Preparation, Employee Referrals, Salary



opportunities. In addition to job discovery, the platform provides employee referral listings, interview experiences, interview questions, salary structures, resume templates, resume reviews, and community content. These services are connected through a common user account and profile-oriented experience.

The platform also addresses the preparation side of employability. Role-based roadmaps contain skill nodes, prerequisites, learning steps, resources, estimated effort, and progress tracking. The DSA problem tracker records completed problems and assigns points based on difficulty. A leaderboard encourages consistent practice by ranking users according to points, completion count, completion time, and a deterministic user identifier. These mechanisms convert passive career information into measurable preparation activities.

An additional AI layer is incorporated into the platform. The career assistant can respond to questions about job opportunities and career advice, while the resume builder can analyze a supplied job description and extract technical skills into categories such as programming languages, frameworks and libraries, databases, tools and platforms, cloud services, and other technical skills. This feature helps users connect the language of a vacancy with the content of their resume.

The objective of Route2Hire is therefore not merely to create another job listing website, but to establish an integrated career support system. The research contribution lies in combining job discovery, social career information, preparation resources, structured learning progress, and AI-assisted support within one platform architecture.

1.1 IDENTIFY, RESEARCH AND COLLECT IDEA

The idea for Route2Hire originates from the common difficulty of managing the complete job-search lifecycle. A candidate may discover a job on one platform, look for interview questions on another, search social media for referrals, compare salaries elsewhere, prepare a resume separately, and use another application for DSA practice or learning. This separation creates repeated effort and reduces continuity in the candidate's preparation.

1. Identify the problem

The primary problem is the fragmentation of career resources. Generic job portals are effective at listing vacancies but do not always provide an integrated environment for interview experiences, referrals, resume improvement, salary information, skill roadmaps, and measurable preparation. Students may also lack a structured way to understand what to learn for a particular career role and to track progress over time.

2. Online Research and Information Collection

Research on job recommender systems shows that modern employment platforms increasingly use content-based, collaborative, hybrid, knowledge-based, and other recommendation approaches. Recent literature also identifies the need to extend job systems beyond candidate-job matching toward broader human-resource and career-support

processes. Route2Hire follows this broader direction by treating job search as one part of a complete career-support workflow.

3. Study of Conferences, Workshops and Technical Discussions

The project concept was further shaped by practical observations of how students prepare for technology roles. Interview experiences, salary discussions, referral opportunities, resume feedback, DSA practice, and learning roadmaps are frequently shared in separate communities. Integrating these resources can reduce information switching and provide a more consistent user experience.

4. Understanding Technical Terms and Concepts

The implementation requires understanding of full-stack web development, REST APIs, authentication, database management, responsive user interfaces, structured content management, progress tracking, recommendation-oriented career support, and generative AI. The project uses React, Vite, Tailwind CSS, Node.js, Express, MongoDB, Firebase authentication, Redux, Axios, Chart.js/Recharts, and Google Gemini APIs.

1.2 RESEARCH IDEA IDENTIFIED

The research idea identified is to develop an integrated career-development platform that connects opportunity discovery with preparation and professional knowledge sharing. Instead of optimizing a single activity such as job search, the system organizes several complementary activities around a common candidate profile. The proposed platform allows a user to discover jobs and referrals, study interview material, examine salary information, build and improve resumes, follow a role-based roadmap, practice DSA, interact with a community, and receive AI-assisted career guidance.

The research gap is the limited integration of these functions in a single, role-oriented platform. Existing research frequently studies job recommendation, resume-job matching, reciprocal recruitment, or skill/course recommendation as separate problems. Route2Hire's approach is to combine opportunity discovery and career preparation as interconnected services, while leaving sophisticated personalized recommendation and large-scale evaluation as future research directions.

2. SYSTEM ARCHITECTURE

The system architecture of Route2Hire describes how the user interface, application server, database, authentication service, and AI services communicate. The user interacts with the React-based client to access jobs, referrals, interviews, salary information, resumes, roadmaps, DSA practice, blogs, polls, and community features. Authenticated requests are processed by the Node.js and Express backend, which exposes REST-style routes for the major modules.



USER / CANDIDATE	FRONTEND React + Vite + Tailwind	BACKEND Node.js + Express	MongoDB Application Data
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GEMINI AI (Career Assistant + JD Skill Extraction) ↔ Firebase Authentication

Fig -1: System architecture of the Route2Hire integrated career platform.

The backend stores structured application data in MongoDB. Separate models and routes manage users, jobs, referrals, interviews, interview questions, salaries, resumes, resume comments, roadmaps, user progress, DSA problems, polls, blogs, testimonials, and feature requests. Firebase is used for authentication support, while protected backend routes verify user access before performing operations on private resources.

The AI layer is connected to the user-facing career assistant and the resume-building workflow. The career assistant sends

career-related questions to a Gemini model and presents the generated response in the interface. In the resume workflow, a pasted job description is analyzed to identify technical skills and group them into meaningful categories. This creates a direct connection between a target job description and resume preparation.

The platform is designed around reusable components and modular backend routes. The frontend uses React components, Redux state management, Tailwind CSS, Ant Design/Flowbite elements, charts, rich-text editors, and responsive layouts. The backend uses Express middleware, JWT-based protected routes, Mongoose models, file handling, scheduled tasks, and external service integrations. This modular structure allows individual career services to be maintained without redesigning the complete system.

Table -1: Major Modules

Module	Function
Job Management	Stores, filters and displays curated technology job opportunities with company, location, experience and application details.
Referral Management	Publishes employee referral opportunities and supports referral comments and interaction.
Interview Module	Provides interview experiences, interview questions, details, filtering and community comments.
Salary Module	Maintains salary structures and salary-related discussions for technology roles.
Resume Module	Creates resumes, provides templates, supports reviews/comments and generates PDF resumes.
AI Career Support	Answers career/job questions and extracts technical skills from supplied job descriptions.
Career Roadmaps	Provides role-based skills, prerequisites, learning steps, resources and user progress.
DSA Tracker & Leaderboard	Tracks solved problems, difficulty-based points, rankings and weekly/all-time progress.
Community	Supports blogs, polls, comments, testimonials and feedback for knowledge sharing.

The Job Management Module acts as the entry point for opportunity discovery. The job data model includes job title, company, location, minimum experience, job description, application link, category, and timestamps. Indexes are maintained for frequently queried fields such as job title, company, category, experience, and time. The Referral Management Module complements job listings by enabling users to share and discuss referral opportunities.

The Interview and Salary Modules address information gaps that are not solved by vacancy listings alone. Interview experiences and questions allow candidates to learn from previous recruitment processes, while salary structures provide context for compensation expectations. Comments and filtering facilities make these resources easier to explore.

The Resume Module provides a structured resume builder, templates, reviews, comments, and PDF generation. The AI-assisted job-description analysis can extract technical skills from a target vacancy and convert them into categorized resume entries. This feature supports targeted resume preparation instead of requiring users to manually identify every technology mentioned in a job description.

The Roadmap Module represents a career role as a sequence of skill nodes. Each node can contain descriptions, prerequisites, sub-skills, learning steps, resources, estimated hours, and ordering information. User progress is stored separately, allowing completion states, milestones, current nodes, notes, and an overall progress percentage to be maintained.

3. CONCLUSIONS

Route2Hire is designed to make the career-development and job-search process more organized, connected, and actionable. Conventional approaches often require candidates to move between job portals, professional networks, interview-preparation websites, resume tools, salary websites, learning resources, and coding-practice platforms. Route2Hire integrates these activities into a common web application and provides a consistent user experience across the complete preparation-to-application journey.

The project combines curated technology jobs with employee referrals, interview experiences, interview questions, salary information, resume building, resume reviews, career roadmaps, DSA practice, community discussions, and AI-



assisted support. The technical implementation demonstrates how a modular full-stack architecture can support a large set of career-oriented services while keeping authentication, data storage, content management, and user progress logically separated.

One of the major strengths of the proposed system is the connection between information and action. A user can study an interview experience, inspect salary information, build a resume, analyze the skills mentioned in a job description, follow a roadmap, solve DSA problems, and then return to job opportunities without leaving the platform. The DSA leaderboard and roadmap progress features also introduce measurable preparation rather than only passive content consumption.

The AI features provide an additional layer of assistance. The career assistant can respond to job and career questions, while the resume workflow can extract technical skills from job descriptions. These functions demonstrate how generative AI can be embedded into an existing career platform without making the complete system dependent on AI.

Future development can extend Route2Hire toward personalized job recommendation using resume-job similarity, semantic embeddings, skill-gap detection, ranking algorithms, explainable recommendations, recruiter-side candidate matching, automated resume scoring, and empirical evaluation with real user data. Such extensions would allow the platform to move from an integrated career-support application toward a research-evaluated intelligent career recommendation system.

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