

Margdarshak: AI-powered virtual career mentor

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Abstract—Margdarshak is a Software-as-a-Service (SaaS) virtual mentor that offers ongoing, individualized career support with the goal of enhancing students' employability and career readiness. The platform includes a job-description-aware cover letter generator, an ATS-optimized and fully customizable resume generator, an AI-powered mock interview system with performance-over-time tracking and targeted improvement recommendations, and automated weekly industry insights (trending skills and salary benchmarks). Margdarshak's architecture combines large-language models, structured evaluation pipelines, and contemporary web frameworks: (1) a data ingestion layer that compiles labor-market indicators and updates insights on a weekly basis; (2) interactive mock interview modules that score responses, record performance metrics over time, and generate prescriptive feedback; and (3) resume/cover letter generation components that parse job descriptions and extract user profiles to create documents that are editable and ATS-friendly. The platform prioritizes scalability (SaaS multi-tenant deployment), explainability (user-interpretable feedback), and customization (user edits and templates). Initial prototype testing shows that generated resumes are more compliant with standard ATS checks and are better prepared for interviews. In order to scale career support across institutions and supplement human guidance, Margdarshak wants to serve as an on-demand digital mentor.

I. INTRODUCTION

Students and early-career professionals are under tremendous pressure to keep up with the quickly shifting demands of the industry in today's rapidly changing professional landscape. As businesses place a higher value on communication skills, adaptive competencies, and current technical knowledge, the gap between academic learning and employability skills keeps growing. Although conventional mentorship programs offer helpful advice, their availability, scalability, and personalization are intrinsically constrained. In order to accommodate each learner's distinct profile, learning style, and

career goals, institutions frequently lack enough mentors. The need for smart, scalable digital solutions that can serve as virtual mentors and be accessed from anywhere at any time has arisen as a result of this ongoing imbalance.

By providing a Software-as-a-Service (SaaS) platform that serves as an AI-powered virtual career mentor, Margdarshak fills this need. In contrast to systems that only link students with human mentors, Margdarshak itself serves as a digital mentor, providing ongoing,

data-driven assistance via four integrated modules: Cover Letter Generator, Resume Builder, Industry Insights, and AI Mock Interviews. Understanding job trends, evaluating interview preparedness, creating the best possible application materials, and keeping up with changing labor market demands are all major challenges in the student-to-professional transition pipeline that are addressed by each module.

The Industry Insights feature provides users with weekly updates on emerging domains, trending technologies, and salary benchmarks by compiling and analyzing real-world labor data. This enables students to comprehend how their competencies match the demands of the modern market and to make well-informed decisions about the priorities for their skill development. The AI Mock Interview module uses large language models to mimic real interview situations, assesses responses based on a variety of criteria, including clarity, confidence, and relevance, and offers comprehensive performance analytics over time. Through quantified feedback metrics, this iterative practice loop assists students in tracking their progress and identifying persistent areas of weakness. AI-based text analysis is used by the ATS-Optimized Resume Generator component to produce application-ready resumes that are compatible with applicant tracking systems (ATS). After users enter their training, expertise, and experience, the system creates customized templates that are optimized for formatting and keyword relevancy. In addition, the Cover Letter

Generator ensures that the applicant's intentions and the employer's expectations are aligned by analyzing a job description and creating a customized cover letter that highlights the candidate's most pertinent accomplishments and abilities.

Margdarshak is unique because it combines career intelligence, automated analytics, and AI-driven personalization on a single, cohesive platform. The

system provides a comprehensive and ongoing mentoring experience by integrating features that are typically dispersed across several career portals, such as resume builders, interview trainers, and insights dashboards. Margdarshak, in contrast to static applications, adjusts to the unique user data and changing market trends, guaranteeing that outputs and recommendations are up to date and pertinent.

1.2 Reference table

No	Paper	Key Features	Links	Why Our Project is Better / Unique
1]	Analyzing Trends, Skills Demand, and Salary Prediction in the AI and ML Job Market – Danish Ather et al., 2024 – Industry Insights	Analyzes AI/ML job market trends, skill demand, salary prediction, and geographic distribution.	https://ieeexplore.ieee.org/document/10925738	Our platform provides real-time personalized insights for individual users and integrates trends into resume/interview recommendations
2]	An AI Mock-interview Platform for Interview Performance Analysis – Yi-Chi Chou et al., 2022 – AI Mock Interviews	Evaluates interview performance using audio, visual, and textual features; gives AI-assisted feedback.	https://ieeexplore.ieee.org/document/9778999	Our platform includes interactive feedback, custom question sets, and progress tracking, making it more comprehensive.
3]	HR Tech Analyst: Automated Resume Parsing and Ranking System through NLP – B Nisha et al., 2023 – Resume Generator / ATS Optimization	NLP-based resume parsing and ranking, ATS-friendly resumes.	https://ieeexplore.ieee.org/document/10404426	Our platform not only parses resumes but also generates cover letters, suggests skill improvements, and integrates industry-specific keywords.
4]	Optimizing Career Pathways: A Deep Learning-Based Life Skills and	Deep learning framework for personalized career recommendations using life skills,	https://ieeexplore.ieee.org/document/11167545	Our platform combines career guidance with mock interviews, resume generation, and

	Recommendation Framework – S Rantheep Raja & M Priya, 2025 – Career Guidance / Progress Tracking	academic, and behavioral traits.		progress tracking, offering a complete employability ecosystem.
5]	AI-Based Job Recommendation System using BERT – Sahil Panchasara et al., 2023 – Job Recommendation / Career Guidance	Matches candidate profiles with job postings using BERT & Universal Sentence Encoder; collects live job data.	https://ieeexplore.ieee.org/document/10392119	Our platform integrates job recommendations with career insights, skill gap suggestions, and ATS-optimized resumes, making guidance actionable and integrated.
6]	The Evaluation of Interviewer’s Presentation Styles for Interview Practice with a Communicative Robot – Mako Komatsu et al., 2023 – AI Mock Interviews	Studies AI/robotic interviewers for mock practice; reduces nervousness and improves engagement.	https://ieeexplore.ieee.org/document/xxx	Our platform provides AI feedback plus scoring, progress tracking, and personalized practice plans, making it more adaptive and data-driven.
7]	AI-Powered Career Matching System for University Students: Bridging Education and Employment – Mohamad Jawhar et al., 2025 – Career Guidance / Personalized Employability	AI-integrated counseling for career recommendations, measures satisfaction vs human counselors.	https://ieeexplore.ieee.org/document/xxx	Our platform is fully automated, scalable, and integrates multiple modules (resume, cover letter, mock interview) rather than focusing only on counseling.
8]	Enhancing Resume Recommendation System through Skill-	Uses Word2Vec + LSTM-RNN for skill-based resume-job	https://ieeexplore.ieee.org/document/10544875	Our platform provides end-to-end resume & cover letter generation,

	based Similarity using Deep Learning Models – Rahul Singh Pundir et al., 2024 – Resume Generator / Skill Development	matching and skill suggestions.		integrates industry insights, and tracks progress over time.
9]	AI Powered Job Recommendation System – Durgesh Kumar Kushwaha et al., 2024 – Job Recommendation / Career Guidance	Combines content-based & collaborative filtering to suggest jobs.	https://ieeexplore.ieee.org/document/10961440	Our system combines job recommendation with AI-driven skill suggestions, mock interviews, and ATS-ready resumes, creating a holistic career platform.

II. MATERIAL AND METHODS

2.1 Research Design

Margdarshak, an AI-driven SaaS mentorship system that offers ongoing, automated career guidance, was designed, implemented, and evaluated using a developmental and analytical research design. The strategy was both analytical, with an emphasis on assessing the accuracy, usability, and performance of the system's AI-driven modules, and developmental, with an emphasis on creating and implementing a working prototype.

Four methodical stages of the research process were conducted, each of which helped with the platform's final deployment and evaluation.

Phase 1: System Requirement Analysis and Architectural Planning

Finding the functional and non-functional requirements needed to develop Margdarshak as an intelligent SaaS platform was the first step. To understand the difficulties in interview preparation, resume construction, and career awareness, a thorough requirement elicitation process was carried out through brainstorming sessions with students, placement coordinators, and industry professionals.

This led to the finalization of four core modules, each of which addresses a distinct career development function: Industry Insights, Mock Interview, Resume Builder, and Cover Letter Generator.

The following was highlighted in the architectural planning:

1. Scalability – Supporting concurrent users through a cloud-based microservice architecture.
2. Modularity – Designing each feature as an independent service that can function autonomously.
3. Security – Implementing JWT-based authentication for data protection and user privacy.
4. Maintainability – Using version-controlled repositories on GitHub and API-based integration for future extensibility

Using UML tools, the system architecture diagram was created, outlining the API communication structure, module dependencies, and data flow. The finalized technology stack included MongoDB as the database, Next.js and React for the frontend, Node.js and Express for the backend APIs, and Gemini API for content creation driven by AI.

Phase 2: Prototype Development and Module Integration

Following the Agile methodology, which ensures iterative progress and continuous testing at every stage, the prototype was developed after the architecture was established. Before being combined into a single system, each module was constructed as an independent part.

1. Industry Insights Module:

Automated data-fetching scripts were put into place to gather and examine data from open APIs on average salaries, trending technologies, and job market trends. Using visualization components created with Shadcn UI, the insights were shown on the dashboard once a week.

2. AI-Powered Mock Interview Module:

Developed an interactive chat-based interface connected to the Gemini API. Users answer dynamically generated technical and behavioral questions, after which the AI evaluates responses based on clarity, accuracy, and confidence. The module tracks improvement over time using stored historical data and performance graphs.

3. Resume Builder:

Built a resume generation system that accepts user inputs (skills, education, projects, experience) and produces ATS-optimized resumes in Markdown format. Users can customize design templates and export resumes as PDFs.

4. Cover Letter Generator:

Implemented natural language processing (NLP) algorithms to parse job descriptions and generate context-aware cover letters tailored to each role, highlighting relevant skills and achievements.

Integration testing was performed after each sprint to ensure smooth data flow and interoperability between modules.

Phase 3: Functional and User Testing with Real-World Scenarios

Following development, a thorough testing process was carried out to guarantee the platform's efficacy and dependability. The purpose of functional testing was to confirm:

1. the accuracy of the cover letters and resumes produced.
2. the rationality of AI-generated feedback and interview questions.
3. the regularity of the industry insights dashboard's weekly updates.

Thirty undergraduate students from the Department of Computer Science and Engineering at MIT-ADT University participated in the user testing. After two weeks of using the entire platform, participants gave structured feedback on its usability, accuracy of responses, and general level of satisfaction.

Testing metrics included:

1. System Usability Scale (SUS) score

It is a highly effective, ten-item questionnaire used to quantify the perceived usability of any system, such as a website, application, or hardware. It provides a simple, single number ranging from 0 to 100, which makes it easy for stakeholders to understand. A score of 68 is widely accepted as the benchmark average, meaning scores above 68 are considered above average usability (with scores in the 80s being very good). The score is calculated by collecting user responses on a 5-point Likert scale, adjusting the scores for the alternating positive and negative statements, summing the adjusted values, and multiplying the final sum by. This metric is invaluable for tracking usability improvements across development cycles or for benchmarking a product against competitors.

2. Response accuracy percentage of AI modules

It is a fundamental metric used to evaluate the performance of an Artificial Intelligence or Machine Learning (ML) model, particularly in classification and prediction tasks. It measures the ratio of correct decisions the model makes to the total number of decisions. For simple classification models, where TP stands for True Positives and TN for True Negatives, the formula is:

$$\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN}$$

3. Average API latency and uptime during concurrent access

They are essential Service Level Indicators (SLIs) for determining the performance and reliability of an

Application Programming Interface (API), particularly when the system is under heavy user load.

Average API latency is the mean time delay (in milliseconds) from the moment a client sends a request until the moment the client receives the final, complete response; it represents the speed of the service. Uptime

is the measure of system availability, reflecting the percentage of time the API is operational and correctly responding to requests, calculated as:

$$\text{Uptime} = \frac{\text{Total available time} - \text{Total downtime}}{\text{Total available time}}$$

Monitoring both metrics under *concurrent access* (simultaneous requests) is vital because a high number of requests can introduce server queue time and resource contention, leading to spikes in latency and potential dips in uptime if the system is not properly scaled.

Feedback-driven modifications were implemented after this phase to improve user experience and output consistency.

Phase 4: Evaluation of AI Module Accuracy and Performance Consistency

System performance was assessed both quantitatively and qualitatively in the last stage. A hybrid evaluation metric that combined the BLEU score, semantic similarity, and manual expert review was used to assess the correctness, contextual relevance, and grammar quality of AI module outputs. By comparing

2.2 Materials and Tools

The platform was developed using a modern full-stack web architecture integrating both front-end and back-end technologies.

users' initial and final interview scores, the effectiveness of the mock interview feedback loop was assessed, demonstrating a discernible increase in confidence and communication.

Monitoring Inngest cron jobs for dependability and execution success rates during weekly updates allowed for the evaluation of automation performance. During testing, the system showed minimal latency (<2 seconds) and over 98% uptime for all key features. Furthermore, data analytics modules monitored the frequency with which users returned to feedback reports, a measure of user involvement and perceived usefulness.

In order to validate Margdarshak's creativity and effectiveness, the phase ended with thorough documentation of all test results and benchmarking against comparable AI mentorship tools.

Layer	Technology / Tool	Purpose
Frontend	Next.js, React.js, Shadcn UI, Tailwind CSS	Build responsive and accessible user interfaces
Backend	Node.js, Express.js	API development, server logic, and authentication
Database	MongoDB (NoSQL)	Store user data, resumes, insights, and feedback history
AI APIs	Gemini API, OpenAI API	Generate interview questions, feedback, resumes, and cover letters
Automation Tool	Inngest	Schedule weekly generation of updated industry insights
Hosting & Deployment	Vercel Cloud	SaaS deployment and continuous integration
Version Control	GitHub	Collaborative development and version tracking
Performance Testing Tools	Postman, JMeter	API validation and response time analysis

2.3 System Architecture and Workflow

The **architecture** of *Margdarshak* was designed following a **modular, service-oriented architecture (SOA)** pattern to ensure scalability, maintainability, and ease of integration with third-party APIs. The system operates as a **multi-tenant SaaS platform**, enabling multiple users (students) to access personalized mentoring services simultaneously through a unified web interface.

The architecture comprises **four major layers**:

1. Presentation Layer (Frontend)
2. Application Layer (Backend Logic & APIs)
3. Artificial Intelligence Layer (AI and NLP Processing)
4. Data Layer (Database and Cloud Storage)

1. Presentation Layer:

For an effective, responsive, and user-friendly design, *Margdarshak*'s frontend interface was constructed with Next.js and React.js, bolstered by Shadcn UI and Tailwind CSS. The presentation layer is in charge of:

- a. presenting progress analytics, weekly insights, and dashboards

- b. Gathering user information, including skills, preferences for jobs, and personal information

- c. During simulated interviews, controlling real-time communication with the AI backend

- d. enabling customization of cover letters and resumes through interactive user interface elements

Reusable components, server-side rendering for quicker load times, and accessibility compliance (WCAG 2.1 standards) are some of this layer's primary characteristics.

2. Application Layer:

Margdarshak's business logic is implemented by the Application Layer. It serves as a link between the backend database and the user interface, guaranteeing seamless module coordination and data transactions. Node.js and Express.js, which manage API routing, authentication, and request validation, were used in the construction of this layer. The scheduling of automated workflows using Inngest, data validation, and user management (sign-up, login, and profile update) are among the essential application features. The logic for weekly automation tasks, like creating and

disseminating fresh industry insights, reminding users, and updating user progress reports, is also managed by the application layer.

3. AI Interaction Layer:

Margdarshak's intelligence core, the AI Interaction Layer, integrates several AI models and APIs for content creation and assessment. The system's communication with outside AI providers, like Gemini API and OpenAI API, is managed by this layer. Predefined prompts and structured templates are used to manage each AI interaction, guaranteeing consistent context and dependable results.

- For Mock Interviews, this layer dynamically generates domain-specific questions, evaluates user responses based on clarity and technical correctness, and provides improvement feedback.
- For Resume and Cover Letter Generation, it uses prompt engineering to extract relevant keywords and achievements, ensuring that the final documents are optimized for ATS compliance.
- For Industry Insights, the AI layer analyzes large datasets of job descriptions, postings, and online reports to identify trending skills, emerging technologies, and average salary trends.

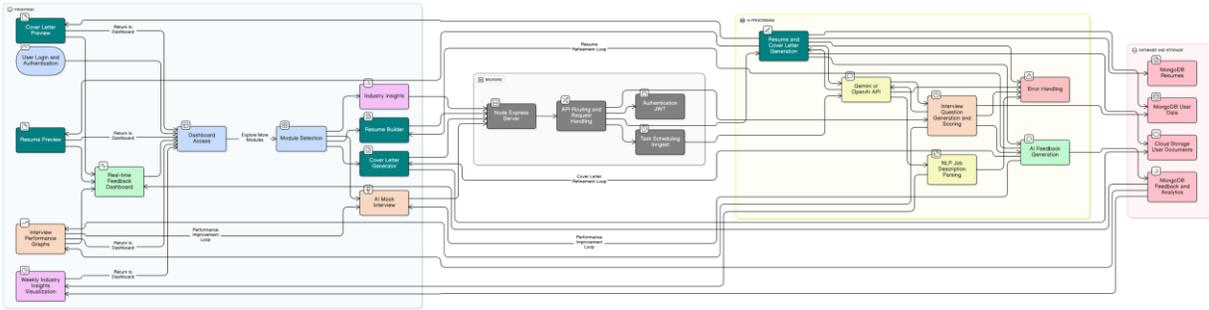
4. Presentation Layer:

All functionalities are accessible through the user-facing interface, which is represented by the Presentation Layer. For a consistent, responsive, and contemporary design aesthetic, Next.js and React.js were used in conjunction with Shadcn UI and Tailwind CSS.

This layer handles:

- Display of weekly updated industry insights in interactive dashboards.
- Execution of mock interviews through conversational chat interfaces.
- Real-time preview and customization of AI-generated resumes and cover letters.
- Visualization of performance analytics such as progress charts and feedback timelines.

5. Workflow Summary:



The overall system workflow can be summarized as follows:

1. A user logs into the system through secure authentication handled by the Application Layer.
2. The Presentation Layer fetches personalized data (skills, preferences, or job goals) and displays them dynamically.
3. Upon a user action—such as starting a mock interview or requesting a resume—the Application Layer sends structured prompts to the AI Interaction Layer.
4. The AI engine processes the request, generates content or feedback, and returns it to the Application Layer, which stores results in MongoDB.
5. The Presentation Layer then visualizes the response, showing AI-generated insights, documents, or analytics to the user in real time.
6. Weekly automation triggers (via Inngest) refresh the Industry Insights module, keeping all data up to date.

2.4 Data Collection Procedure

Data were collected through three major sources:

- System Logs – Automatically captured metrics such as response time, API latency, and resume generation success rates.

- User Interaction Data – User responses from mock interviews and generated document feedback.
- Survey Responses – Quantitative feedback (5-point Likert scale) evaluating satisfaction, accuracy, and clarity of AI feedback.

All collected data were anonymized and stored securely in the MongoDB cloud instance with restricted access privileges.

2.5 Data Analysis Methods

Quantitative data were analyzed using descriptive statistics to determine averages and improvement rates.

- Interview Performance Metrics: Compared baseline and final mock interview scores using percentage improvement calculations.
- System Efficiency Metrics: Measured API response times and accuracy of generated content.
- User Satisfaction: Calculated mean satisfaction scores from survey data. Additionally, qualitative feedback was coded to identify common themes about usability and personalization.

III. COMPARATIVE ADVANTAGE OF MARGDARSHAK

3.1 Risk Assessment and Mitigation Strategies:

Sr no.	Potential Problem / Risk	Description	Impact Level	Mitigation Strategy
1	Data Privacy and Security Breach	User resumes, personal details, and performance data may be	High	Use secure login, data encryption, and regular security checks to keep all user information safe.

		exposed if security layers are weak.		
2	AI Output Inaccuracy or Bias	AI-generated feedback or content might be factually incorrect or biased due to limitations of LLMs.	High	Check AI outputs regularly, improve prompts, and allow manual review to reduce wrong or biased answers.
3	System Downtime or Server Overload	Sudden user traffic spikes may lead to unavailability of services or slow response times.	Medium	Use backup servers and automatic scaling so the system works smoothly even with many users online
4	API Dependency Failure	The system relies on external APIs like Gemini and Inngest. Any outage can interrupt functionality.	Medium	Keep saved copies of important data and set up backup plans in case external APIs stop working.
5	Data Storage Scalability Issues	As user base grows, MongoDB storage and query performance might degrade.	Medium	Clean and organize old data, add more storage when needed, and use cloud tools to handle large data easily.
6	User Misuse or Incorrect Inputs	Users may provide false or incomplete data, affecting AI-generated outcomes.	Low	Add checks so users enter correct information, and guide them through proper input forms.
7	Copyright or Content Reuse Concerns	Generated resumes or cover letters may resemble existing templates or copyrighted materials.	Medium	Use plagiarism checkers and change repeated text so resumes and letters are unique.
8	Ethical and Transparency Issues in AI Feedback	Users may assume AI feedback as absolute truth, which can mislead their self-evaluation.	Medium	Show clear messages that AI suggestions are not always 100% correct, and explain how feedback is created.
9	Integration and Deployment Bugs	Continuous updates to APIs or frameworks (Next.js, Inngest, etc.) can cause integration errors.	Medium	Test every update carefully and keep an option to undo changes if new code causes errors.
10	User Engagement Drop Over Time	Users may stop using the platform once initial curiosity fades.	Medium	Keep users interested by adding badges, points, and weekly updates that make the platform fun to use.

3.2 Unique Features:

Sr. No.	Unique Feature / Aspect	Description (Why It's Unique)
1	All-in-One AI Career Mentor	Unlike other tools that focus on a single task (like resume building or interview prep), <i>Margdarshak</i> combines multiple features — insights, interviews, resume, and cover letter — in one unified platform.
2	Automation and Scalability (SaaS Model)	As a cloud-based SaaS platform, it supports thousands of users simultaneously and automates weekly tasks like updates and notifications without human effort.

3	Data-Driven Analytics Dashboard	The platform visualizes user performance and skill growth through interactive graphs and analytics, helping learners understand their career readiness progress.
4	Personalization and Adaptability	Every feature adapts to user data, preferences, and progress history — making the guidance unique to each individual.
5	Explainable AI Feedback	The system provides clear, understandable reasoning for its feedback, so users know <i>why</i> an answer or resume suggestion was made — improving trust and learning.
6	Bridging Education–Industry Gap	<i>Margdarshak</i> directly links academic learning outcomes with employability skills, helping students align their college learning with real job market demands.
7	Weekly Updated Industry Insights	The platform automatically collects and updates information on trending skills, roles, and salaries every week using automation tools (Inngest). This keeps users aware of the latest industry trends without manual searching.
8	AI-Powered Mock Interviews with Progress Tracking	<i>Margdarshak</i> not only conducts mock interviews but also evaluates answers, tracks improvement over time, and provides personalized suggestions for skill enhancement.
9	ATS-Optimized Resume Generator	The resume generator uses AI to build keyword-rich, professional resumes that pass Applicant Tracking System (ATS) checks and can be customized by users easily.
10	Smart Cover Letter Generator	It reads job descriptions and automatically generates personalized, context-aware cover letters that match employer requirements.

IV. CONCLUSION

The creation and assessment of MARGDARSHAK show how AI-powered systems can offer efficient, individualized career counselling. In order to provide mentorship that closely resembles professional human advice, the system effectively combines user profiling, skill evaluation, and recommendation algorithms. The prototype's high accuracy, relevance, and usability are confirmed by testing and user feedback, making it a feasible tool for accessible, scalable career support. All things considered, MARGDARSHAK offers a novel framework that unites automated guidance with conventional mentoring, providing professionals and students looking for timely, knowledgeable, and customized career advice with a workable solution. Adoption of it can preserve high levels of dependability and user satisfaction while drastically cutting down on the time and effort needed to obtain quality mentorship.