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AI-Powered Internship Recommendation Engine for PM Internship Skill Program

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Rockfall Prediction, Open Pit Mining, Artificial Intelligence, Machine Learning, IoT Sensors, Early Warning System, Risk Assessment, Real-Time Monitoring.

ABSTRACT

The PM Internship Skill Program is a significant national initiative aimed at aligning higher education outcomes with evolving labor market demands. Despite this effort, over 40% of Indian graduates experience underemployment, working in roles misaligned with their skills and career aspirations. This persistent skills mismatch leads to substantial productivity losses and limits meaningful career entry opportunities for young professionals. Traditional internship placement systems, largely dependent on manual coordination and heuristic-based matching, achieve only 60–65% placement relevance. These methods lack scalability, real-time labor market intelligence, and structured feedback mechanisms, resulting in inefficient matches and limited skill development.

The problem is further intensified by a 2–3 year lag between emerging industry skill requirements and academic curriculum updates, particularly in rapidly evolving domains such as artificial intelligence, data science, cybersecurity, and digital transformation. Manual processes are unable to effectively match thousands of diverse student profiles with dynamic internship opportunities across sectors and locations.

Addressing these systemic challenges requires intelligent, scalable, and data-driven solutions capable of improving internship relevance, enhancing employability, and strengthening India's global competitiveness through efficient talent deployment.

1. INTRODUCTION

1.1. Objectives

• To develop an intelligent recommendation system that matches students with suitable internships based on skills, academic background, interests, and experience level.

• To implement a hybrid machine learning model combining content-based and collaborative filtering

techniques to improve placement accuracy and personalization.

• To automate resume parsing and skill extraction using Natural Language Processing (NLP) for accurate identification of technical and soft skills.

• To introduce real-time feedback and adaptive learning mechanisms that help students identify skill gaps and improve continuously during the internship lifecycle.

• To analyze labor market trends through industry profiling and emerging skill detection to ensure alignment between academic training and industry demands.

• To reduce skill mismatch and underemployment by improving internship relevance and employability outcomes.

• To design a scalable and secure platform that can be extended across institutions, industries, and regions.

2. METHODOLOGY

• Data Collection: Gathering student profiles (Resumes) and Internship posts.

• Data Preprocessing: Cleaning the text and removing unnecessary words.

• Skill Extraction: Using AI to identify key PM skills like "Market Research","Roadmapping"

or "SQL"

• Matching Algorithm: Using Content-Based Filtering (matching student skills to job keywords) or Collaborative Filtering (seeing what similar students liked).

• Result: Sorting the internships from "Best Match" to "Lowest Match"

3. SYSTEM DESIGN

The system is organized into layered components:

1. Presentation Layer (Frontend)

• Developed using React.js

• Provides student dashboard

• Displays recommended internships

• Allows profile updates and feedback submission

2. Application Layer (Backend)

• Developed using Node.js and Express.js

• Handles REST APIs

• Manages authentication and authorization

• Executes business logic and recommendation requests

3. Data & ML Layer

• SQLite database stores:

o Student profiles

o Internship listings

o Recommendation scores

o Feedback data

4. KEY FEATURES

• Automatically matches student skills with internship requirements.

• Weighted relevance scoring ensures most suitable internships appear first.

• Can handle thousands of students and internship postings simultaneously.

• Extracts technical and soft skills from unstructured resume text.

• Combines content-based and collaborative filtering for higher accuracy.

5. RESULTS

• Accuracy: Achieved the highest overall prediction accuracy for internship relevance.

• Precision & Recall: Showed improved ability to correctly identify relevant internships while reducing false positives and false negatives.

• F1-Score: Balanced, indicating reliable classification performance.

• Confusion Matrix Analysis: Reduced misclassifications compared to other models Ensured better detection of both relevant and irrelevant internships

6. CONCLUSION

The AI-Powered Recommendation Engine makes the PM Internship Program smarter and faster. And also reduces the stress of job hunting for students and the stress of hiring for Companies. In the future, we can add a "Resume Scorer" or a "Chatbot" to help students pare for interviews. Our AI engine is not just a tool it is a bridge between a student's dreams and a al-world opportunity.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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