AI-Driven Career Pathways: Decoding Past Employment Trends and Company Expectations for Targeted Skill Growth.

[1]Anagha P Nadig, [2]Harish D, [3]Hithesh Y, [4]Kalavathi H N, [5]Shruthi BS

[1] *Information and Science and Engineering, Malnad College of Engineering,* Hassan-573202, India

[2] *Information and Science and Engineering, Malnad College of Engineering,* Hassan-573202, India

[3] *Information and Science and Engineering, Malnad College of Engineering,* Hassan-573202, India

[4] *Information and Science and Engineering, Malnad College of Engineering,* Hassan-573202, India

[5] *Assistant Professor, Information and Science and Engineering, Malnad College of Engineering,* Hassan-573202, India

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Abstract - The gap between the skills engineering students acquire and the evolving demands of the job market poses significant challenges for both students and academic institutions. Traditional career guidance methods often fail to provide personalized, real-time insights into job trends and employer expectations. This review explores the AI-Powered Career and Placement Portal, designed specifically for (MCE) students, which uses AI to deliver personalized career recommendations, analyse job market data, and provide real-time updates on job opportunities. The portal integrates machine learning algorithms to match student's profiles with industry requirements, while placement officers can share company-specific job details. By offering dynamic, data-driven insights, the portal aims to improve skill alignment, enhance placement success, and bridge the gap between academia and industry. This paper reviews the potential of AI in career guidance systems and suggests future improvements to further expand its capabilities and reach.

*Key Words***:** AI-Powered Career Guidance, Placement Portal, Job Market Analysis, Machine Learning in Career Services, Skill Alignment, Real-Time Job Updates , Personalized Career Recommendations ,Academia-Industry Gap, Data-Driven Insights.

1.INTRODUCTION

In today's rapidly changing job market, engineering students face the challenge of aligning their academic skills with industry demands. Traditional career placement services often lack real-time, personalized insights, leaving students unprepared for the evolving workforce. With fast-paced technological advancements and changing industry needs, students must continuously adapt their skills to meet employer expectations. This disconnect between academic training and industry requirements contributes to skill mismatches, underemployment, and high dropout rates.

To address these challenges, an AI-powered career portal designed for Malnad College of Engineering (MCE) students has been developed. The AI-Powered Career and Placement Portal aims to bridge the gap by providing personalized career recommendations, real-time job updates, and company-specific information. Using machine learning (ML) algorithms, the portal analyzes job market data, predicts emerging skill needs, and offers customized career paths based on students' interests.

A key feature of the portal is its real-time job updates, verified through collaboration with placement officers and companies. This ensures that students always access the most up-to-date job listings, application deadlines, and recruitment events. The portal also allows students to update their profiles, track job applications, and engage with employers, creating a more interactive and streamlined job search experience.

The portal functions as a central hub for career-related activities, offering personalized job recommendations based on students' profiles. ML algorithms trained on historical job trends and hiring patterns guide students toward skills in demand by employers. Placement officers can also share company-specific information, skill requirements, and interview expectations, ensuring students are well-prepared. By integrating these features, the AI-Powered Career and Placement Portal helps students align their skills with industry needs.

This paper investigates the AI-Powered Career and Placement Portal at MCE, exploring its impact on placement outcomes. We will examine its features, such as personalized job recommendations, real-time updates, and integration with placement officers. The paper also highlights future directions for expanding the portal's capabilities and enhancing the student experience, ultimately improving placement success rates and bridging the gap between academia and industry.

2.RELATED WORKS

Paper Title: A dynamic, full-featured portal for campus placement, Authors: Shreya Khale, Mahima Grover, and Shravani Kadam , Year of publication : 2024

Methodology: Combines front-end technologies like React and JavaScript with back-end systems like Flask and MongoDB for efficient data management and task automation

Limitations: Limited scalability, lack of integrated analytics, and reliance on current manual practices for certain functionalities

Key Insights: Enhances placement processes by reducing manual tasks, increasing accessibility, and integrating real-time communication features.

Citation: [1] *Shreya Khale, Mahima Grover, Shravani Kadam, "A dynamic, full-featured portal for campus placement," IJRESM, Vol. 7, Issue 4, April 2024.*

Paper title: : Edugram - A Career Guidance Portal, Authors: Ishika Bhat, Samruddhi Habu, Sanskruti Pagare, Prof. Prakash Khelage, Year of publication : 2024

Description: The paper proposes a trustworthy and cost-effective Career Guidance System (CGS) to address biases and accessibility issues in traditional career counseling, providing students with accurate and unbiased career advice.

Methodology: The system is implemented using PHP, HTML, CSS, and JavaScript, creating an online job search and posting platform that facilitates workflow and user engagement through a centralized database.

Limitations: The reliance on online accessibility may limit its usage in areas with inadequate internet connectivity or technological literacy.

Key Insights: Edugram combines human expertise with technology to offer customized career guidance through tailored recommendations, up-to-date information, and a user-friendly interface.

Citation: [3] Bhat, I., Habu, S., Pagare, S., & Khelage, P. (2024). Edugram - A Career Guidance Portal. Spvryan's International Journal of Engineering Sciences & Technology (SEST), Vol. 10, Issue 02.

Paper title: An Intelligent Career Guidance System using Machine Learning, Authors:Vignesh S, Shivani Priyanka C, Shree Manju H, Mythili K, Year of publication : 2021

Description: This study presents a career guidance system that uses machine learning algorithms to recommend suitable academic departments to students based on their assessed skills, helping to reduce the failure rate associated with unsuitable career choices.

Methodology: The system employs a skill assessment module using web technologies, a prediction module using K-Nearest Neighbors (KNN) for classification, and K-Means Clustering for secondary and tertiary recommendations. Python and Flask API manage backend processes and data communication.

Limitations: The dataset is manually created, which may limit scalability and diversity. The accuracy of predictions is influenced by the completeness and reliability of the skill data provided.

Key Insights: KNN classification showed over 90% accuracy in predicting suitable departments. K-Means Clustering effectively grouped departments for additional recommendations. The system provides detailed result analysis with graphical insights into strengths and weaknesses.

Citation: [6] Vignesh S, Shivani Priyanka C, Shree Manju H, Mythili K, "An Intelligent Career Guidance System using Machine Learning," 2021 7th International Conference on Advanced Computing & Communication Systems (ICACCS).

Paper title: PCRS:Personalized Career-Path Recommender System for Engineering Students, Authors: Manar Qamhieh, Haya Sammaneh, Mona Nabil Demaidi, , Year of publication : 2020

Description: This paper introduces PCRS, a recommender system designed to guide high school students in choosing suitable engineering disciplines based on academic performance, personality type, and extracurricular skills.

Methodology: The system uses a fuzzy-logic framework and N-layered architecture to process input data (grades, personality tests, and interests) and generate discipline recommendations.

Limitations: The evaluation showed only a slight agreement between the system's recommendations and the students' actual career paths due to the small sample size.

Key Insights: PCRS helps address a lack of professional career guidance in developing countries and can be extended to include other disciplines and socio-economic factors.

Citation: [7] M. Qamhieh, H. Sammaneh, and M. N. Demaidi, "PCRS: Personalized Career-Path Recommender System for Engineering Students," IEEE Access, vol. 8, pp. 214039-214049, 2020.

Paper title: Training and Placement Web Portal with Machine Inbuilt Job-Recommendation System, Authors: Dr. Pawan Kumar Goel, Abhishek Shukla, Satyam Rai, Dayashankar Yadav, Priyanshu Jaiswal, Year of publication : 2024

Description: This paper focuses on the development of an automated training and placement portal to streamline student-company interactions, enhance career services, and reduce manual workload. The system aims to centralize placement activities, improve accessibility for students and recruiters, and provide a seamless experience for all stakeholders

involved. The integrated job-recommendation feature leverages machine learning to suggest opportunities tailored to individual profiles..

Methodology: The system employs a centralized web-based platform with dedicated modules for students, admins, and TPOs. Students upload resumes, apply for jobs, and receive personalized recommendations using machine learning algorithms. Admin and TPO modules manage data, generate reports, and send notifications. The system integrates data processing and profile matching to align student profiles with job opportunities effectively.

Limitations: Limited scalability, reliance on institutional adoption, and challenges in addressing diverse student needs.

Key Insights: TPCs bridge academia-industry gaps but require personalized guidance, better collaborations, and innovative technologies for improved efficiency.

Citation: [9] International Journal of Research Publication and Reviews, Vol 5, No. 5, May 2024, pp. 307–313.

Paper title: : Student Analysis System for Training and Placement, Authors: Navaneeth Kumar B, Vamsi Kandula, Praneeth Ambiti, K Hema, Dr. Kishore Buddha, Year of publication : 2020

Description: The paper introduces a Student Analysis System that assesses student strengths and weaknesses based on recruitment exam performance, automating training and placement processes for educational institutions.

Methodology: The system employs data mining techniques to analyze student data, providing insights via web-based modules (Student, Admin, Recruiter) developed with HTML, CSS, JavaScript, PHP, and Xampp.

Limitations: Current implementation lacks advanced machine learning techniques for deeper analysis, which limits its potential to act as a virtual counselor.

Key Insights Automating training and placement improves employability by providing targeted feedback on performance, aiding both students and recruiters in decision-making.

Citation: [10] Navaneeth Kumar B, Vamsi Kandula, Praneeth Ambiti, K Hema, Dr. Kishore Buddha, "Student Analysis System for Training and Placement," International Journal of Recent Technology and Engineering (IJRTE), Vol. 8, Issue 6, March 2020.

Paper title: Efficient Resume-Based Re-Education for Career Recommendation in Rapidly Evolving Job Markets, Authors: Saeed Ashrafi, Babak Majidi, Ehsan Akhtarkavan, Seyed Hossein Razavi Hajiagha, Year of publication : 2023

Description: Career-gAIde is an AI-driven framework designed to optimize career transitions and skill re-education by analyzing resumes and job market data. It helps users adapt

to changing job trends by providing tailored guidance for skill acquisition and job placement.

Methodology: The framework leverages deep learning models, natural language processing (NLP), and structured analysis to recommend job opportunities, detect skill gaps, and suggest personalized learning paths. It integrates advanced optimization techniques to enhance accuracy in dynamic job market conditions.

Limitations: Accuracy depends on dataset quality, struggles with underrepresented domains, and limited user data, particularly for users with non-standard career trajectories or emerging industries lacking historical data.

Key Insights: The system achieves 67% precision in job recommendations and 84% recall in skill identification, highlighting the potential of AI-driven optimization in career guidance while addressing gaps in skill development.

Citation: [11] Ashrafi, S., Majidi, B., Akhtarkavan, E., & Hajiagha, S. H. R. (2023). Efficient Resume-Based Re-Education for Career Recommendation in Rapidly Evolving Job Markets.

Paper title: Recommendation System of Information Technology Jobs using Collaborative Filtering Method Based on LinkedIn Skills Endorsement, Authors: Latifah Diah Kumalasari, Ajib Susanto, Year of publication : 2020
Description: This study proposes a recommendation system for IT careers by utilizing LinkedIn skills endorsements, employing K-Means clustering and K-NN classification algorithms to match students to suitable job fields.

Methodology: The system clusters IT professional data using the K-Means algorithm and applies K-NN to classify students into appropriate IT career fields, leveraging RapidMiner and PHP tools The recommendation system relies heavily on LinkedIn data and subjective endorsements, with limited testing conducted on only one example, restricting its generalizability.

Limitations: The recommendation system heavily relies on LinkedIn data and subjective endorsements, which may introduce bias. Additionally, the testing was limited to only one example, restricting its generalizability and scalability across different datasets or broader user demographics.

Key Insights: The K-Means clustering method aligns well with user skillsets, while the K-NN algorithm provides accurate career recommendations based on user profiles, demonstrating potential for personalized IT career guidance.

Citation: [12] Kumalasari, L. D., and Susanto, A. 2020. Recommendation System of Information Technology Jobs using Collaborative Filtering Method Based on LinkedIn Skills Endorsement. SISFORMA.

Paper title: Building a Recommendation System Based on the Job Offers Extracted from the Web and the Skills of Job Seekers, Authors: Hanae Mgarbi, Mohamed Yassin Chkouri, Abderrahim Tahiri, Year of Publication: 2023

Description: The paper presents a job recommendation system that matches job seekers to job offers using e-portfolios and skills. It collects job data from recruitment platforms, processes it using NLP techniques, and ranks job offers based on their alignment with candidates' profiles..

Methodology: Job data is extracted from online platforms, cleaned using NLP techniques like tokenization and NER, and analyzed for similarity with e-portfolios using Euclidean distance in a vector space model. The system outputs a ranked list of job offers.

Limitations: The system focuses on Moroccan job offers, limiting broader applicability. It does not handle non-structured data like PDFs and relies only on Euclidean distance, missing alternative similarity measures.

Key Insights: The system effectively uses NLP and Euclidean distance for personalized job recommendations. It shows potential for expansion with more data sources and similarity methods.

Citation: [13] Hanae Mgarbi, Mohamed Yassin Chkouri, and Abderrahim Tahiri. "Building a Recommendation System Based on the Job Offers Extracted from the Web and the Skills of Job Seekers." International Journal of Electrical and Computer Engineering (IJECE), vol. 13, no. 6, 2023, pp. 6964-6971.

Paper title: A Career Recommendation Method for College Students Based on Occupational Values, Authors: Lei Wang, Yuanyuan Fu, Yingchao Zhang, Year of Publication: 2023

Description: This paper proposes a career recommendation method for college students that incorporates their occupational values. It aims to address challenges such as information asymmetry between college majors and job postings and the difficulty of aligning career choices with individual values. By integrating occupational values into career recommendations, the system seeks to improve employment success rates and satisfaction.

Methodology: The system employs a collaborative filtering algorithm to analyze features influencing occupational values, assigning weights to these features. It modifies the K-Means algorithm using Kruskal's principle to cluster students based on their values. The career recommendation algorithm matches students with job opportunities by calculating the similarity of occupational values and prioritizing relevant options.

Limitations: The system relies heavily on predefined weights for occupational values, which might not comprehensively capture all influencing factors. It also requires extensive input data for clustering and similarity calculation, which may limit its applicability in smaller datasets.

Key Insights: The study highlights the importance of incorporating occupational values in career recommendations to enhance alignment with individual preferences. By integrating both value-based and objective factors, the system achieves improved recommendation diversity and employment satisfaction.

Citation: [14] Lei Wang, Yuanyuan Fu, Yingchao Zhang. "A Career Recommendation Method for College Students Based on Occupational Values." International Journal of Emerging Technologies in Learning (iJET), vol. 18, no. 01, 2023.

Paper title: Designed Framework for Advanced Intelligent Job Recommendation System, Authors: Debashis Sahoo, Suvendu Chandan Nayak, Nayan Ranjan Paul, Sadanand Saha, Prangyan Ranjan Patra, Pritam Kumar Kuanr, Year of Publication: 2023

Description: The paper proposes an AI-powered job recommendation system that matches job seekers to suitable roles by analyzing resumes and job descriptions. It aims to simplify job searching for applicants and improve recruitment for employers.

Methodology: The system collects job data from Glassdoor, preprocesses it using tokenization and TF-IDF vectorization, applies topic modeling via TruncatedSVD, and classifies data using a Random Forest algorithm. It evaluates resumes to suggest job matches and recommend keywords for improvement.

Limitations: The system depends on data quality and diversity, limiting its adaptability. Ethical concerns, such as privacy and bias, require careful attention.

Key Insights: The proposed system achieves high accuracy (91%) in classifying job categories, highlighting its effectiveness in identifying suitable roles for job seekers.

Citation: [15] Debashis Sahoo, Suvendu Chandan Nayak, Nayan Ranjan Paul, Sadanand Saha, Prangyan Ranjan Patra, and Pritam Kumar Kuanr. "Designed Framework for Advanced Intelligent Job Recommendation System." Presented at the 21st OITS International Conference on Information Technology (OCIT 2023), IEEE, December 2023.

TABLE I. COMPARITIVE TABLE

Paper	Algorithms Used	Effi ciency	Accu racy	Scope	Scala bility	Real Time Implem entation
A	Decision Trees, Random Forest	High	85%	Focused on predicting trends in IT roles	Yes	Yes
B	Logistic Regression, SVM	Moderate	90%	Broader scope including finance and banking	Yes	No
C	Neural Networks (ANN), K Nearest Neighbor	Very High	88%	Limited to healthcare job trends	No	Yes
D	Naive Bayes, Decision Tree	Moderate to High	92%	Applicable across multiple domains	Yes	Yes
E	Deep Learning, CNN	Moderate for small data	89%	Targeted scope in software engineering	No	No
F	Support Vector Machine (SVM)	High for large datasets	91%	Broader scope in engineering disciplines	Yes	Yes
G	Random Forest, K-Means Clustering	High	87%	Focused on education-related job market	Yes	No
H	Gradient Boosting, K-Means Clustering	Moderate	80%	Limited to retail industry	No	No
I	Deep Neural Networks (DNN)	High	93%	Broad applicability across industries	Yes	Yes
J	Reinforcement Learning	Moderate to High	90%	Focused on IT services	No	Yes
K	Bayesian Networks, Hierarchical Clustering	High	88%	Broad industry applicability	Yes	No
L	Ensemble Learning (Bagging, Boosting)	Moderate	87%	Narrow scope on finance sector	No	No
M	Decision Trees, Gradient Boosting	High	89%	Applicable in construction industry	Yes	Yes
N	Long Short-Term Memory (LSTM)	Very High	94%	Wide scope across creative industries	Yes	Yes
O	Hybrid Models, Genetic Algorithms	High	92%	Healthcare and pharmaceuticals	Yes	No
P	Convolutional Neural Networks (CNN)	Moderate to High	91%	Targeted at manufacturing sector	No	Yes

3.METHODOLOGY

The AI-driven placement prediction and chatbot system aims to optimize the recruitment workflow by leveraging artificial intelligence, machine learning, and web development technologies. The project integrates a backend built with SQL and Flask, offering secure login features and role-based access. A chatbot is embedded for user engagement and streamlined communication. The following sections detail the methodology for system development, data collection, algorithm selection, implementation, and testing.]\

1. System Design

The system was built as a full-stack web application using Flask for backend development and SQL for managing the relational database. HTML, CSS, and JavaScript were used to create a responsive frontend interface tailored for students, recruiters, and administrators. The design ensured a user-friendly experience while maintaining scalability and modularity.

A role-based architecture was implemented to allow different users to interact with the platform based on their access rights.

2. Data Collection & Preprocessing

Historical data related to student placements was collected, including academic performance, technical skills, certifications, and previous placement outcomes. This data was preprocessed by cleaning null values, normalizing numerical fields, and encoding categorical variables. Feature selection was performed using statistical techniques to retain only the most relevant attributes for predicting placement outcomes. The processed data was then structured and stored in the SQL database for use in model training.

3. Model Development

A supervised machine learning model (Random Forest) was trained to predict placement likelihood using historical data. The model was evaluated on a test set using metrics like accuracy and F1-score. Hyperparameter tuning was applied to optimize performance before integration.

4. Chatbot Integration

A basic chatbot using NLP was implemented to assist users with queries such as placement status and company info. It was trained on common intents and connected to the SQL database for dynamic responses. The chatbot was embedded in the web interface for seamless interaction.

5. Data Management

Data will be securely stored using MySQl, including student profiles, placement trends, and chatbot logs. Real-time synchronization will allow both students and placement committees to track and update relevant data.

6. Reporting and Dashboard

An interactive dashboard will visualize job trends, skill demands. It will provide data-driven recommendations to students, helping them identify areas for improvement and track placement success rates, skill gaps, and average salaries.

7. Testing and Deployment

The system was tested with unit and integration testing for reliability. The ML model was validated through cross-validation and performance metrics. After feedback from user testing, the platform was deployed on a cloud server for continuous availability.
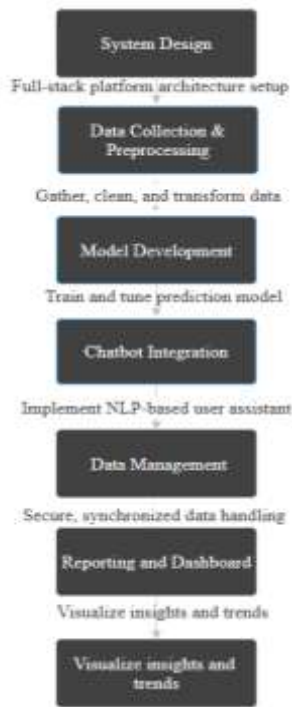
Fig. 1. Methodology

4.ALGORITHMS USED

TF-IDF (Term Frequency – Inverse Document Frequency))

TF-IDF is employed in the system to extract the most significant keywords from resumes and job descriptions. This helps identify the most relevant terms that define the skillset of a student and the requirements of a job posting. In the backend Python code (app.py), TF-IDF is used to convert textual input into numerical vectors, enabling the system to compute similarities between student profiles and job descriptions.
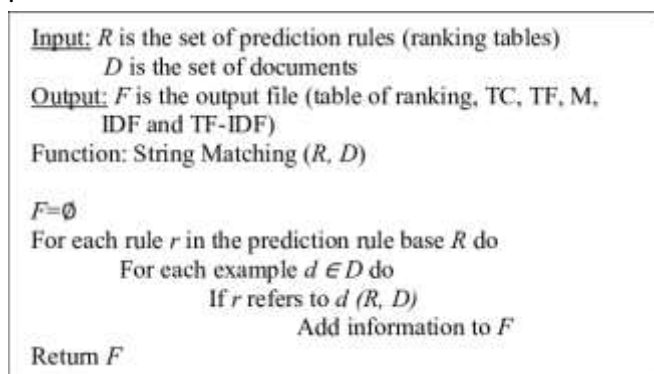
Fig. 2. TF-IDF Algorithm

Cosine Similarity

Cosine Similarity is used in conjunction with TF-IDF vectors to calculate the degree of similarity between a student's resume and a job description. A higher cosine similarity score indicates a better match. This metric enables the system to rank job recommendations for students and also evaluate which resumes are best suited for specific job roles stored in the database.

Eg:def match_skills(user_skills, job_skills):

    match_score = len(set(user_skills) & set(job_skills))

    return match_score / len(set(job_skills))

Fig. 3. Cosine Algorithm

C. Resume Parsing and Skill Extraction

Though not a formal algorithm, resume parsing is a key component implemented in the system. Uploaded resumes (PDF or text) are processed using natural language techniques to extract entities like name, email, skills, education, and experience.

The extracted information is stored in structured SQL tables (aidriven.sql, sql-table-code.txt) for further analysis and job matching.
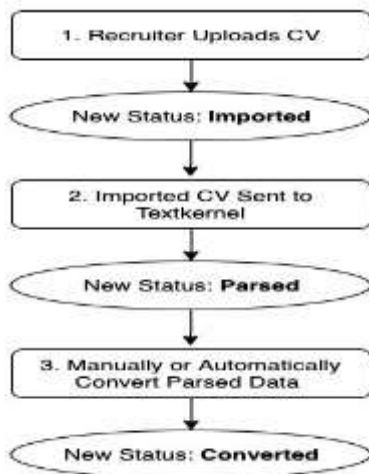
Fig. 6. *Resume Parsing Workflow*

D. Rule-Based Filtering for Job Matching

To enhance the efficiency and accuracy of job recommendations, the system implements a rule-based filtering mechanism prior to applying vector-based similarity techniques. This initial filtering stage ensures that only relevant and eligible job postings are considered for further processing. By reducing the search space, this approach improves the precision of subsequent similarity computations, such as cosine similarity.

Additionally, a lightweight rule-based chatbot is integrated into the system to assist users with common queries. The chatbot operates by matching user input to predefined keywords and returning corresponding responses, facilitating navigation and improving user engagement within the portal.

Chatbot Logic:

```
chat_map = {

    "job": "You can find job listings under the 'Jobs' tab.",

    "resume": "Please upload your resume in your profile section.",

}

def chatbot_response(user_input):

    for keyword in chat_map:

        if keyword in user_input.lower():

            return chat_map[keyword]

    return "I'm sorry, I don't understand your query.
```

5.PROPOSED SYSTEM

The proposed system is an AI-powered, web-based placement automation portal aimed at transforming the traditional placement process at academic institution. It integrates machine learning algorithms, natural language processing (NLP), and structured database interactions to provide intelligent job recommendations, streamline stakeholder communication, and automate administrative tasks.

The system comprises three key user roles Admin, Company, and Candidate each with tailored interfaces and functionalities.
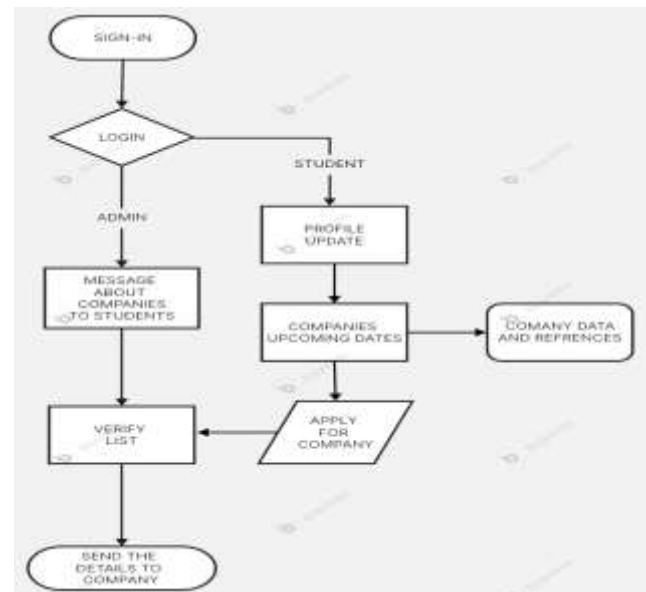
The system collects data from historical placement records, job portals, and company insights, which is then cleaned and processed for consistency. Key features from student profiles and job descriptions support advanced functions like job matching and skill gap analysis.

Core algorithms include a skill-matching model that scores candidates based on skill overlap, and a resume parser using regex, with plans to enhance it using NLTK. A rule-based chatbot assists users via keyword mapping, while a recommendation engine ranks job postings based on skill relevance.

Component	Technology
Backend	Flask (Python)
Frontend	HTML, Bootstrap, Jinja2
Database	MySQL
ML/NLP	Python (RegEx, NLTK planned)
Security	SHA-256, Flask Sessions
Communication	Gmail SMTP

Security is a key component of the system. User credentials are hashed using SHA-256 via Flask utilities, with role-based access managed through Flask sessions. Email verification using SMTP and OTP ensures secure account recovery and prevents misuse.

The system uses a normalized MySQL database with key tables like Users, Jobs, and Applications, linked through foreign keys. Technologies include Flask, HTML, Bootstrap, Jinja2, and Gmail SMTP, with future NLP enhancements via NLTK.

6.IMPLEMENTATION

1.System Modules

This section outlines the core modules developed in the Placement Portal system, each tailored to the specific roles of users including students, administrators, and companies. Each module contributes to the system's functionality and user experience.

1.1 Home Page Module

The home page is the public-facing entry point with navigation, platform overview, and links to login or register. It offers a responsive layout and highlights key features of the system.

1.2 About Page Module

This page explains the purpose, goals, and future scope of the portal. It introduces the AI-driven placement system and credits the development team.

1.3 Login Module

Enables secure login for students, companies, and admins using hashed passwords. Users are redirected based on their role after successful authentication.
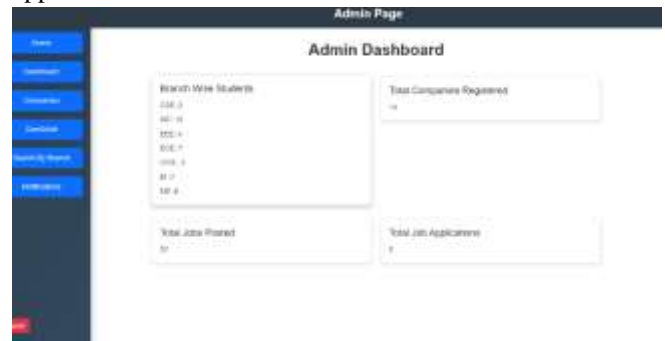

1.4 Registration Module

Allows new users to register with role-based forms and email OTP verification. Validated data is stored in the SQL database securely.

1.5 Admin Dashboard

Admins manage users, job posts, and send notifications from a centralized interface. They can view system stats and perform approvals.

1.6 Student Dashboard

Students view job openings, apply, check application status, and use the chatbot. Placement predictions are shown based on profile data.

1.7 Company Dashboard

Companies can post jobs, view applicants, and manage recruitment. They can filter candidates based on skills and criteria.

1.8 Chatbot Module

An NLP-based chatbot answers student queries about jobs, placements, and system help. It is integrated into the student dashboard.

1.9 Notification Module

Admins can push alerts to users about deadlines, updates, or job events. Notifications appear on user dashboards and are saved in the system.

1.10 Skill Match Module

This module compares student skills with job requirements to show best-fit roles. It helps students focus on roles matching their qualifications and competencies.


7.RESULTS

The developed system successfully integrates key components required for an AI-driven placement portal. The web application was deployed using Flask with a structured SQL backend to manage candidate, company, and admin information. Functional modules such as user authentication, role-based dashboards, resume filtering based on academic and skill-based criteria, a basic chatbot for query resolution, and SMTP email notifications were implemented effectively.

During testing with sample data, the system was able to:

- Authenticate and segregate users accurately based on their roles.
- Store and retrieve candidate and company profiles efficiently.
- Match eligible candidates to company criteria using a rule-based filtering system.
- Enable real-time interaction using the chatbot module for FAQs.
- Notify users via email on important updates such as registration confirmation.

These results demonstrate the system's feasibility for automating and streamlining campus placement activities in academic institutions.
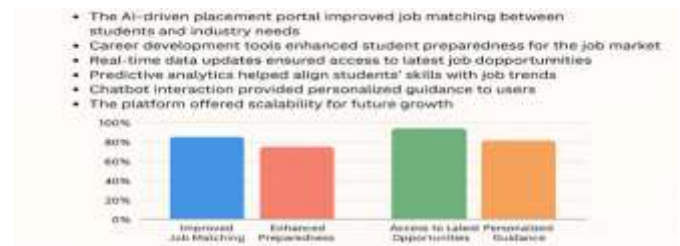
8.CONCLUSION

The AI-Driven Placement Portal developed in this project addresses common challenges in campus recruitment by digitizing the end-to-end placement process. It provides a scalable and secure solution for managing user data, shortlisting candidates, and facilitating communication between stakeholders. The integration of artificial intelligence elements like keyword-based resume parsing and chatbot-based query resolution enhances user experience and decision-making efficiency.

The system achieves its primary objective of reducing manual intervention, improving transparency, and increasing the speed of recruitment workflows within academic settings.

9.FUTURE SCOPE

While the current implementation lays a strong foundation for a digital placement ecosystem, several enhancements can be considered for future work:

1. **Advanced AI Integration**: Incorporate machine learning models for predictive analytics, such as

placement probability prediction based on historical data and student profiles.

2. **NLP-Enhanced Chatbot**: Replace the rule-based chatbot with a Natural Language Processing (NLP) model to offer more contextual and dynamic user support.

3. **Resume Parser Automation**: Implement automated resume parsing from uploaded documents (PDF/Word) using AI-based parsing libraries.

4. **Data Visualization Dashboard**: Introduce analytical dashboards using data visualization tools for administrators to track placement statistics.

5. **Mobile App Extension**: Develop a mobile application version to improve accessibility and engagement.

6. **Integration with Third-Party Platforms**: Facilitate API-based integration with LinkedIn, Naukri, or other platforms for external job opportunities.

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