iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** VI **Month of publication:** June 2026

DOI: https://doi.org/10.22214/ijraset.2026.83651

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue VI June 2026- Available at www.ijraset.com

Intelligent System for Resume Evaluation and Campus Placement Selection

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Abstract: ***Shortlisting students during campus placements is a time-consuming task for Training and Placement Officers, especially when many resumes need to be reviewed. Manual screening may lead to delays and inconsistencies. To reduce this effort, a web-based resume screening system is developed. The system allows resumes in PDF or Word format to be uploaded and lets officers set basic requirements such as skills and academic marks. It reads the resume content and matches it with the given criteria using simple keyword checking. Based on this, the system gives a basic score and selects suitable candidates. The final shortlisted list is saved in an Excel file, and email notifications are sent to students. This system helps in organizing the placement process and reduces manual workload.***

Index Terms: Artificial Intelligence (AI), Natural Language Processing(NLP), Resume Screening, Student Shortlisting, Placement Automation, Candidate Evaluation, Keyword Matching, Recruitment System, Web application, Email Automation.

I. INTRODUCTION

In recent years, campus placements have become more competitive as many students apply for a limited number of job opportunities. One of the main challenges faced by Training and Placement Officers (TPOs) is manually checking and shortlisting student resumes. This process takes a lot of time and may sometimes lead to delays and errors. When there are a large number of resumes, it becomes difficult to handle them efficiently and fairly. Traditional placement methods mainly depend on manual checking or simple filters like academic marks. However, these methods do not properly consider important factors such as technical skills and project knowledge. With different job roles like web development, data science, and cloud computing, it becomes difficult to match students with the correct requirements using manual methods.

To solve these problems, a simple automated resume screening system is proposed. The system allows resumes to be uploaded in PDF or Word format and lets officers set basic requirements such as skills and marks. It reads the resume content and matches it with the given criteria using keyword checking. Based on this, candidates are given a basic score and suitable students are selected. The shortlisted list is saved in an Excel file for easy use, and email notifications are sent to students. This system helps reduce manual effort, improves organization, and makes the placement process faster and easier to manage.

A. Objectives of the System

The primary objective of this work is to develop an intelligent and automated placement analysis system that assists Training and Placement Officers in efficient resume screening and candidate shortlisting using AI and NLP techniques.

1) To develop a web-based system for automated resume screening and shortlisting.
2) To extract and analyze skills from resume using NLP techniques like keyword matching.
3) To evaluate candidates across multiple technical domains such as Frontend, Backend, Cloud, etc.
4) To compute a suitability score based on academic and technical parameters.
5) To generate shortlisted student reports in Excel format.
6) To send automated email notification using SMTP.
7) To improve speed, accuracy, and fairness in the placement process.

II. LITERATURE SURVEY

Campus placement systems have evolved significantly with the integration of data analytics, machine learning, and automation techniques to improve the efficiency. Initially, placement activities were fully manual, relying on resume screening and academic scores, which was time-consuming and less efficient. Later on, institutions started adopting digital systems to mange student data and streamline recruitment processes [1].

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After that, machine learning techniques were introduced for campus placement prediction using academic and skill-based data. These models improved the accuracy of identifying eligible candidates compared to traditional methods. Gradually, predictive systems became more reliable by analyzing historical placement patterns and student performance [2].

Later on, data analytics approaches were used to combine multiple factors such as academics, skills, and aptitude scores for better decision-making. These methods helped in improving fairness and transparency in candidate selection.

Over time, data-driven placement systems became more structured and efficient [3].

After that, Natural Language Processing (NLP) techniques were introduced to automate resume screening by extracting skills and information from unstructured resumes. This reduced manual effort and improved consistency in evaluation. Gradually, NLP systems evolved to better understand resume content and improve extraction accuracy[4].

Machine learning classification models were later used to categorize students based on eligibility and performance data. These models helped in automating candidate filtering and improving selection speed. Over time, these models became more refined with better accuracy and reduced bias [5].

After that, Artificial intelligence based recruitment systems were developed to handle large volumes of resumes and rank candidates automatically. These systems integrated multiple technologies for better decision making. Gradually, AI-based systems evolved into more intelligent and adaptive recruitment platform [6].

Later on, keyword extraction techniques in NLP were used to identify technical skills, tools, and domain expertise from resumes. This helped in converting unstructured data into structured formats. Over time, these techniques improved in accuracy and contextual understanding [7].

After that, automated scoring system were introduced to evaluate candidate across multiple domains such as Frontend, Backend, Machine Learning and Cloud Computing. These systems provided objective ranking based on predefined criteria. Gradually, scoring system became more multi-dimensional and accurate [8].

Later on, SMTP-based email automation systems were integrated into placement platforms to notify shortlisted candidates efficiently. This improved communication speed between placement officers and students. Over time, notification system became more automated and reliable [9].

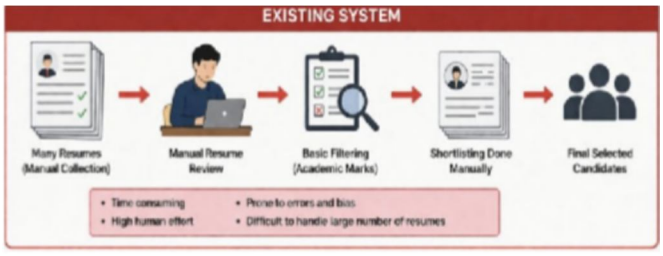
After that, researchers observed that existing systems skills lack full integration of resume analysis, scoring, and reporting in a single platform. Gradually, the need for intelligent and unified placement system increased. This led to the development of more advanced AI-based placement analysis systems [10].

III. SYSTEM ANALYSIS

A. Existing System

The existing campus placement process is mostly manual and depends on basic criteria such as academic marks and simple resume checking. Training and Placement Officers need to review each resume one by one, which takes a lot of time and effort. When the number of students is high, it becomes difficult to manage and process all resumes efficiently.

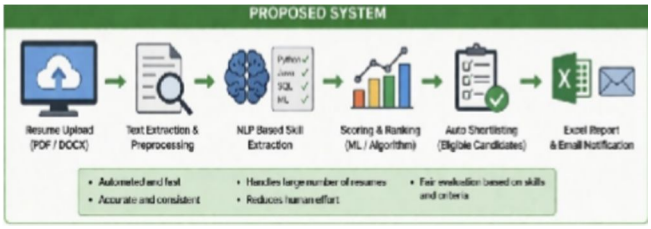
Manual shortlisting may also lead to errors, inconsistency, and bias in decision-making. There is no proper system to evaluate technical skills in detail, so important information in resumes may be missed. Due to the lack of automation, the placement process becomes slow and less efficient.



B. Proposed System

To overcome these problems, a simple automated resume screening system is proposed. The system uses keyword matching to evaluate resumes. Training and Placement Officers can upload resumes and set basic requirements such as skills and academic marks. The system reads the resume content, identifies matching skills, and evaluates candidates based on simple criteria. It then assigns a score and selects suitable candidates automatically.

The system also generates an Excel report of shortlisted students and sends email notifications. This helps reduce manual work and improves the organization of the placement process.



IV. METHODOLOGY

The system works in a simple step-by-step process. First, student resumes are uploaded in PDF or Word format. The system extracts text from these resumes.

Next, the data is cleaned by removing unnecessary symbols. The system then uses keyword matching to find important skills and information from resumes. Based on this, each candidate is given a basic score.

Students who meet the required criteria such as minimum marks and required skills are shortlisted. The final result is stored in an Excel file, and email notifications are sent to selected students.

A. System Overview

The proposed Intelligent System for Resume Evaluation and Campus Placement Selection is designed as a web-based modular system to ensure scalability, efficiency, and ease of maintenance.

The system performs multiple operations such as:

- Resume collection
- Resume parsing and analysis
- Skill extraction using NLP
- Candidate evaluation and scoring
- Shortlisting and report generation

This modular approach allows individual components to be updated without affecting the overall system performance.

B. AI and NLP Integration

The system integrates Artificial Intelligence (AI) and Natural Language Processing (NLP) techniques to automate resume analysis and candidate evaluation.

Some key features include:

- Keyword-based skill extraction from resumes.
- Resume parsing for structured data generation.
- Domain-wise evaluation (Frontend, Backend, ML, etc).
- Scoring mechanism based on predefined criteria.
- REST API communication between frontend and backend.

The system uses NLP techniques to identify relevant skills and match them with company requirements, improving accuracy in shortlisting.

C. Resume Analysis Workflow

The system follows a structured workflow for resume processing and candidate evaluation:

- Training and Placement Officers uploads resumes (PDF/Word).
- System extracts text and relevant information from resumes.
- Skills and technical keywords are identified using NLP.
- Academic details and other parameters are evaluated.
- Scores are assigned based on predefined criteria.
- Suitability score is calculated.
- Candidates are shortlisted based on threshold.

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D. Skill Extraction and Feature Evaluation Engine

The module plays a key role in analysing resumes and extracting useful information.

Functions include:

- Text Extraction: Extracts content from PDF/Word resumes.
- Keyword Matching: Identifies technical skills like python, React, ML, etc.
- Domain Classification: Maps skills to categories such as Frontend, Backend, Cloud, etc.
- Score Assignment: Assigns marks based on skill relevance and presence.

This helps in converting unstructured resume data into structured evaluation metrics.

E. Candidate Evaluation and Shortlisting Engine

This is the core module responsible for decision-making. Functions include:

- Score Calculation: Combines resume marks, skill scores and other criteria.
- Suitability Evaluation: Generate overall suitability score.
- Shortlisting: Filters candidates based on threshold (e.g., >= 65)
- Ranking: Orders candidates based on performance.

F. Report Generation and Notification System

The system provides output in structured and usable formats:

- Generates Excel file containing shortlisted candidates.
- Includes details like Roll No, Name, Skills, Scores, Status.
- Sends automated emails using SMPT to shortlisted students.
- Ensure fast and efficient communication.

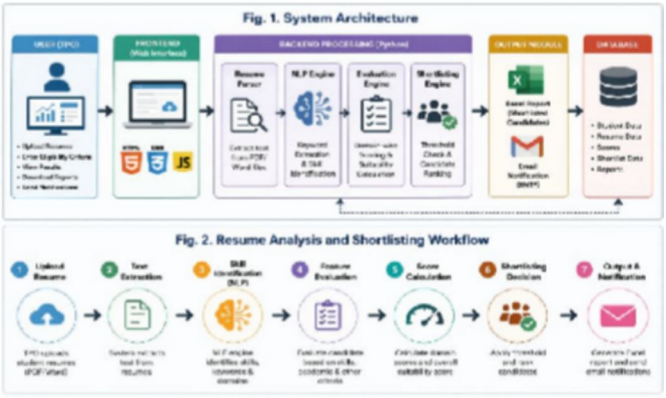

Fig. 1. System Architecture

V. IMPLEMENTATION

A. System Architecture

We have developed the AI-Powered Smart Analysis and student shortlisting system based on a client -server architecture with a web-based frontend and a python-based backend. the system is designed in a modular manner to ensure scalability, flexibility, and efficient processing of student data. Each module is responsible for a specific task, enabling easy maintenance and future enhancements. The key layers of the system include the user interaction layer, which provides an interface for training and placement officers to upload resumes and define eligibility criteria. The processing layer handles resume parsing, skill extraction, and candidate evaluation. The application logic layer implements scoring, shortlisting, and decision-making mechanisms. The database layer stores student information, scores, resume data, and shortlisted results.

B. Frontened Implementation

The frontend of the system is developed using HTML, CSS, and JavaScript to provide a simple and interactive user interface. The system includes a Home Page that introduces the application and provide navigation options. The resume upload module allows training and placement officers to upload student resumes in PDF or word format.

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C. Backend Implementation

The backend system is implemented using python and handles all core processing tasks. It provides API services that manage resume processing, skill extraction, scoring and shortlisting operations.

The backend includes modules such as:

- Resume Processing Module
- NLP Module
- Scoring Module
- Shortlisting Module

D. Feature Extraction Module

This module plays a crucial role in analyzing resume data and extracting meaningful information.

- Text Extraction: Extracts content from resumes in PDF/Word format.
- Skill Identification: Detects technical skills using keyword matching.
- Domain Classification: Maps skills into categories such as Frontend, Backend, ML, Cloud etc.
- Score Assignment: Assigns marks to each domain based on identified skills.

This module converts unstructured resume into structured information for further processing.

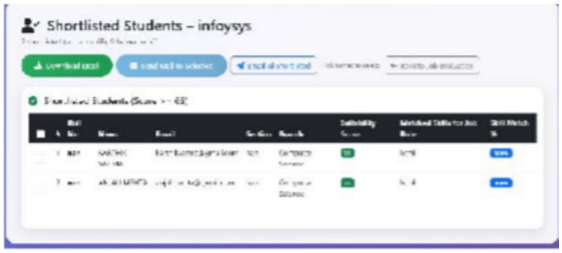
E. Data Processing Pipeline

The system follows a structured pipeline for processing student data.

- Dataset Workflow: Resumes are collected and uploaded by the user. The system extracts text and cleans the data by removing irrelevant content.
- Processing Workflow: The system evaluates candidates based on multiple parameters such as skills, academic performance, and domain knowledge.
- Evaluation Workflow: Candidates are ranked based on their suitability score. A threshold is applied to determine shortlisted candidates. The pipeline ensures accurate and efficient processing of large volumes of resumes.

F. Student Shortlisting Subsystem

The shortlisting subsystem is responsible for generating final results based on evaluation criteria



VI. MODULES AND ALGORITHMS

A. Modules

- Student Registration Module: This module is used to store basic details like name, roll number, branch, contact information. It helps in maintaining all student data in one place for further processing.
- Resume Upload Module: This module allows resumes in PDF or Word format. It checks the file and stores it for further analysis in the system.
- Resume Evaluation Module: This module analyzes resumes and extracts important skills using keyword matching. It identifies technical skills and prepares data for scoring.
- Student Record Management Module: This module manages all student data including scores and results. It helps in updating, storing, and viewing student records easily.
- Company Evaluation Module: This module allows entering company requirements like skills and marks. Based on this, the system checks which students are eligible.

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B. Algorithms

- Linear Search: Used to find student details by checking one by one from the list.
- Keyword Matching: Used to identify skills in resumes by matching words with predefined keywords.
- Quick Sort: Used to arrange students based on their scores in sorted order.
- Score-Based Ranking: Used **to calculate total score and rank students based on performance.**

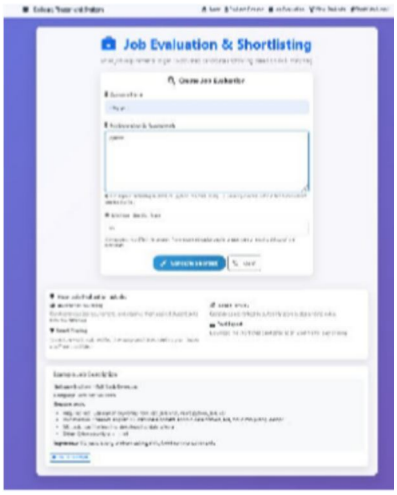
VII. RESULT

The proposed resume screening and student shortlisting system was tested using student resumes and basic eligibility criteria such as skills and academic marks. The system showed better performance compared to manual shortlisting in terms of speed and organization.

The system extracted skills from resumes and assigned simple scores to each candidate. Based on these scores, students were shortlisted according to the given requirements. The results show that the system:

- Improves accuracy in identifying suitable candidates
- Reduces the time required for resume screening
- Provides faster shortlisting compared to manual process

Overall, the system helps in making the placement process more efficient and easier to manage.



These results show that the system helps in evaluating candidates in a simple and consistent manner while reducing manual effort. The Excel report generated by the system contains student details, basic scores, and shortlist status, which helps Training and Placement Officers easily review and manage candidates.

The email notification feature successfully informs selected students, improving communication between officers and students. Compared to traditional methods that mainly depend on academic marks and manual checking, the proposed system considers both skills and basic academic performance.

Overall, this makes the shortlisting process more organized, faster, and more reliable.

VIII. FUTURE SCOPE

The proposed system can be improved in the future by using more advanced technologies. Instead of simple keyword matching, better Natural Language Processing (NLP) techniques can be used to understand resume content more effectively. Machine learning methods can also be added to improve candidate scoring and prediction.

The system can be extended by including additional factors such as aptitude test scores, interview performance, and other assessments. It can also be connected with job portals and company databases to make the placement process more automated.

In addition, the system can be hosted on cloud platforms for better access and scalability. A student dashboard can also be added so that students can view their status and eligibility easily.

Overall, these improvements can make the system more useful, efficient, and automated for handling campus placements.

IX. CONCLUSION

This paper presents a simple resume evaluation and student shortlisting system for campus placements. The system helps in automating the resume screening process and evaluating candidates based on their skills and basic academic criteria. It extracts important information from resumes and shortlists suitable students according to predefined requirements.

The system performs better than manual methods by making the process faster and more organized. The web interface allows Training and Placement Officers to upload resumes, set requirements, and view results easily. It also generates an Excel report and sends email notifications to shortlisted students.

Overall, the system reduces manual effort and improves the speed and accuracy of the placement process. It provides an efficient way to manage large numbers of student resumes. Future improvements can include more advanced techniques and better integration with external systems to improve performance further.

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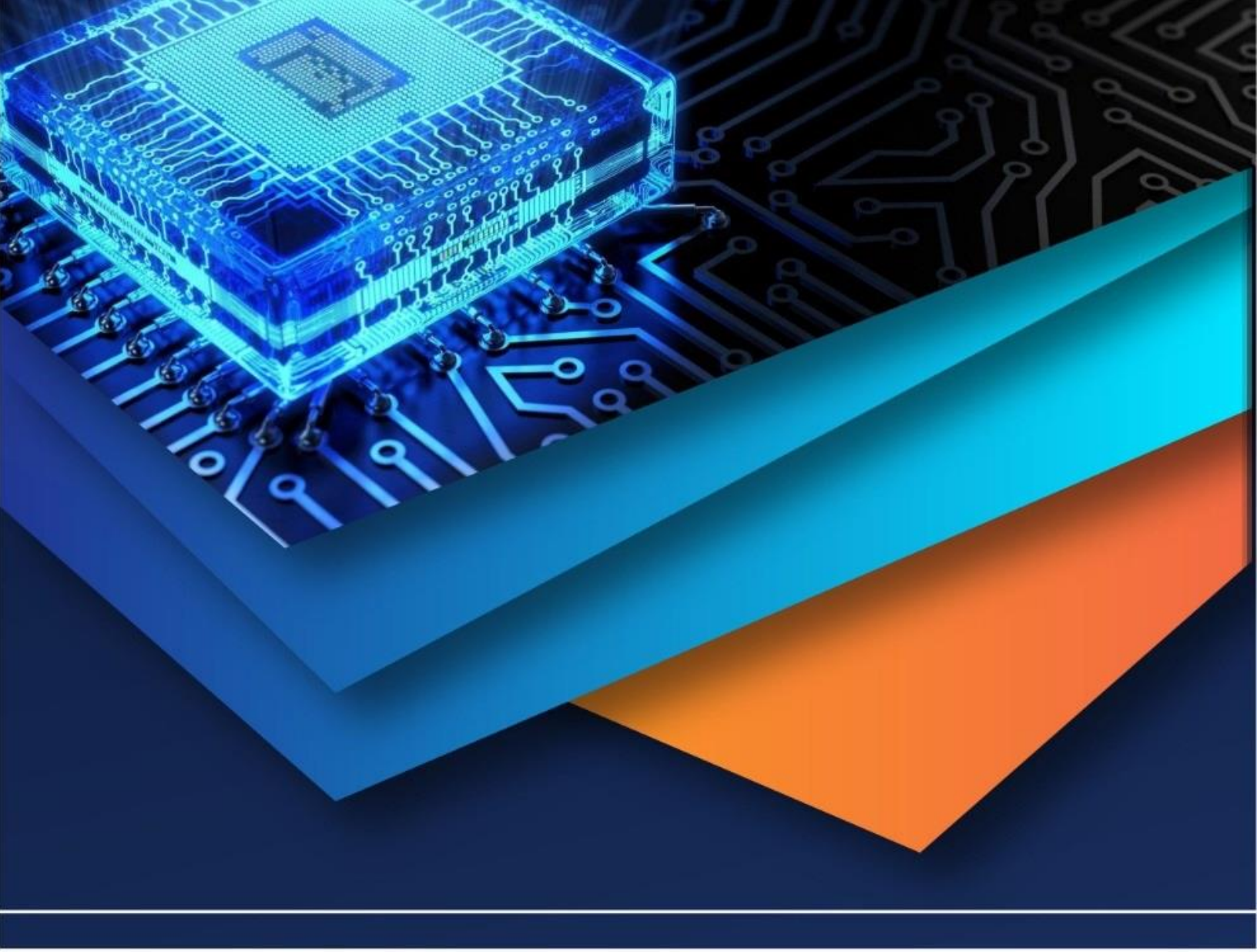

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