

# AI-Based Resume Screening System

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## Abstract

The rapid growth of job applications in modern recruitment processes has made manual resume screening a time-consuming and error-prone task for recruiters. Traditional screening methods often suffer from human bias, inconsistency, and inefficiency, especially when handling large volumes of resumes.

To overcome these challenges, an AI-based Resume Screening System is proposed to automate and optimize the recruitment process using artificial intelligence and machine learning techniques. The proposed system utilizes Natural Language Processing (NLP) to extract relevant information such as skills, education, experience, and certifications from resumes in various formats.

Machine learning algorithms analyze and compare candidate profiles with job requirements to rank resumes based on relevance and suitability. By incorporating techniques such as text classification, keyword matching, semantic analysis, and similarity scoring, the system ensures accurate and unbiased candidate evaluation.

This AI-driven approach significantly reduces screening time, improves shortlisting accuracy, and assists recruiters in making data-driven decisions. The system enhances recruitment efficiency while maintaining fairness and scalability, making it suitable for organizations of all sizes.

## 1. Introduction

Recruitment is a critical function in every organization, as hiring the right candidate directly impacts productivity and growth. With the increasing popularity of online job portals and digital resumes, organizations receive thousands of applications for a single job opening. Manually reviewing these resumes is not only inefficient but also prone to human errors and unconscious bias. As a result, many qualified candidates may be overlooked during the initial screening process.

Artificial Intelligence (AI) has emerged as a powerful tool in automating complex decision-making tasks across various domains, including human resource management. An AI Resume Screening System leverages machine learning and natural language processing to automatically analyze resumes and identify the most suitable candidates based on predefined job criteria. Unlike traditional keyword-based systems, AI-powered screening can understand contextual meaning, skill relevance, and experience levels more effectively.

The proposed system accepts resumes in digital formats such as PDF or DOCX, processes them using NLP techniques, and extracts structured information. Such automation reduces recruiter workload, ensures consistency, and minimizes bias in candidate shortlist.

## 2. Proposed Methodology

The Smart Health Camp Management System is designed to simplify and digitalize the way health camps are organized and monitored. The proposed methodology focuses on reducing manual work, improving communication, and maintaining patient medical records in a secure and structured manner.

At the beginning, patients and doctors register into the system using their basic details and login credentials. Secure authentication ensures that only authorized users can access

the system. The administrator then schedules health camps by specifying the location, date, and time. Once a camp is scheduled, the system identifies patients living near the camp location and automatically sends notifications to inform them about the upcoming camp.

During the health camp, doctors examine patients and enter health conditions, observations, and remarks directly into the system. These details are stored digitally and maintained as part of the patient’s medical history. When patients visit future camps, doctors can easily review previous health records, which helps in providing better diagnosis and treatment. Patients can also log in at any time to view their health history, while the administrator monitors overall system activities.

## 3. System Architecture Overview :

The AI Resume Screening System automatically analyzes resumes and ranks candidates based on job requirements using Natural Language Processing (NLP) and Machine Learning (ML) techniques.

### Presentation Layer :

Parameter	Existing System	Proposed System
Resume Screening method	Manual or role-based Screening	Automated Screening using AI or ML
Processing speed	Very slow And time consuming	Very fast And realtime processing
Accuracy	Low accuracy	High accuracy
Bias Handling	Human bias may affect decisions	Reduced bias through Data driven decisions
Scalability	Difficult to handle large volumes of resumes	Handles bulk Resume efficiently
Human efforts	Requires high human involvement	Minimal human Intervention
Decision Making	Subjective decisions	Objective scoring and ranking system

The Presentation Layer represents the user interface of the AI-based Resume Screening System through which HR managers or administrators interact with the system. This layer is developed using web technologies such as HTML, CSS, JavaScript, and Bootstrap to provide a user-friendly and responsive interface. It allows users to register, log in securely, upload candidate resumes in PDF or DOCX format, and enter job descriptions for screening. The interface also displays ranked results, shortlisted candidates, and detailed matching scores. This layer communicates with the backend through RESTful APIs and

ensures smooth interaction between the user and the system without exposing internal processing logic.

#### **Application Layer :**

The Application Layer acts as the core processing unit of the system where all business logic and AI operations are performed. It is implemented using Python frameworks such as Flask or Django. This layer handles resume parsing, text extraction, and Natural Language Processing (NLP) tasks including tokenization, stop-word removal, and lemmatization. It uses AI and Machine Learning techniques such as TF-IDF vectorization and cosine similarity to compare resumes with job descriptions. Advanced implementations may utilize transformer-based models like BERT for semantic matching. The application layer calculates similarity scores, ranks candidates based on relevance, and sends the results back to the presentation layer. It ensures efficient processing, decision-making, and system control.

#### **Data Layer :**

The Data Layer is responsible for storing and managing all system data securely and efficiently. It uses relational databases such as MySQL or PostgreSQL to store user credentials, job descriptions, resume metadata, candidate scores, and shortlisted results. Uploaded resume files are stored either in local server storage or cloud storage services. This layer ensures data integrity, consistency, and security through proper database management practices. It also supports retrieval of stored information for generating reports, viewing past screenings, and maintaining historical records. The data layer works closely with the application layer to

provide structured and reliable data for AI-based processing.

#### **4. Flow Chart :**

##### **1. Start**

The flowchart begins when the HR manager or administrator accesses the AI-based Resume Screening System. The system initializes and prepares the interface for user interaction.

##### **2. User Login / Registration**

In this step, the user logs into the system using valid credentials. If the user is new, they must complete the registration process.

##### **3. Upload Job Description**

After successful login, the HR uploads or enters the job description that includes required skills, qualifications, and experience. This job description becomes the reference for resume comparison.

##### **4. Upload Resumes**

The HR uploads multiple candidate resumes in PDF or DOCX format. The system validates file type and stores the resumes in the database or server storage.

##### **5. Resume Parsing**

The system extracts text content from uploaded resumes using parsing techniques. All relevant information such as skills, education, experience, and certifications is converted into machine-readable text format.

##### **6. Text Preprocessing**

In this step, the system performs Natural Language Processing (NLP) tasks such as tokenization, stop-word removal, lowercasing, and lemmatization. This ensures that the resume content and job description are cleaned and standardized for accurate comparison.

## 7. Feature Extraction

The processed text is transformed into numerical feature vectors using techniques such as TF-IDF or word embeddings.

## 8. Similarity Calculation

The system calculates similarity scores between each resume and the job description using cosine similarity or machine learning models. This step determines how closely each candidate matches the job requirements.

## 9. Ranking Candidates

Based on similarity scores, the system ranks candidates from highest to lowest match percentage. Candidates who meet the required threshold are shortlisted.

## 10. Display Results

The ranked list of candidates along with matching scores and skill analysis is displayed on the dashboard. The HR can review, download, or finalize shortlisted candidates.

## 11. End

The process ends after results are displayed. The system stores screening results in the database for future reference.

## 5. Output



The output of the code will display the results like this.

## 6. Future Enhancements

The AI-based Resume Screening System can be further enhanced by integrating advanced deep learning models such as transformer based semantic matching to improve accuracy in understanding candidate skills and job requirements.

Future versions can include automatic skill gap analysis, candidate personality assessment using behavioral analytics, and integration with job portals for real-time resume fetching. The system can also incorporate bias detection algorithms to ensure fair and unbiased candidate evaluation. Additionally, deploying the system on cloud platforms with scalable microservices architecture can improve performance and support large-scale recruitment processes. Implementing multilingual resume processing and voice-based resume analysis can further expand the system's usability and adaptability in global recruitment environments.

## 7. Conclusion

The AI-based Resume Screening System provides an efficient and intelligent solution for automating the recruitment process. By using Natural Language Processing and Machine Learning techniques, the system accurately analyzes resumes and matches them with job descriptions to rank candidates based on relevance.

This reduces manual effort, saves time, minimizes human bias, and improves the overall quality of hiring decisions.

The system ensures faster candidate shortlisting while maintaining accuracy and consistency. Therefore, the proposed AI-driven approach enhances modern recruitment processes and supports organizations in selecting the most suitable candidates effectively.

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