

Research Paper

RESUMETRUST: A FULL-STACK TALENT PLATFORM WITH COMPOSITE TRUST SCORE FOR VERIFIED HIRING

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ABSTRACT

The rapid growth of digital recruitment has led to an overwhelming volume of semi-structured resume data, creating challenges in accurately evaluating candidate credibility and increasing the risk of resume fraud. This project, “ResumeTrust: A Full-Stack Talent Platform with Composite Trust Score for Verified Hiring,” presents an innovative solution to

transform traditional resumes into verified, data-driven professional profiles.

The proposed system introduces a **Three-Pillar Verification Architecture** consisting of automated resume parsing using Natural Language Processing (NLP), MCQ-based skill assessment for competency validation, and regex-based certification verification to ensure authenticity. These components work together to generate a **composite Trust Score (0–100)**, which quantifies candidate credibility by integrating education, verified certifications, and validated skills.

The platform is developed as a full-stack web application using Flask, MongoDB

Atlas, and modern frontend technologies, providing separate dashboards for students and recruiters. It also incorporates advanced visual analytics such as career trajectory charts and skill radar graphs, enabling recruiters to make informed, objective hiring decisions. Performance evaluation demonstrates efficient processing, with resume parsing completed in under two seconds.

Keywords

Resume Fraud, Talent Verification, Trust Score, Natural Language Processing (NLP), Resume Parsing, Skill Assessment, MCQ-Based Evaluation, Credential Validation, Full-Stack Web Application, Flask, MongoDB Atlas, Visual Analytics, Recruitment System, Data-Driven Hiring, Candidate Profiling

I. INTRODUCTION

In the modern digital recruitment ecosystem, organizations face a growing challenge in evaluating the authenticity and accuracy of candidate information presented in resumes. With the increasing volume of applications and the widespread use of online job platforms, resumes have become highly standardized yet largely self-reported documents. This creates a significant **information asymmetry** between candidates and recruiters, where

candidates possess full knowledge of their actual skills and qualifications, while employers must rely on unverified claims.

One of the major consequences of this asymmetry is the rising incidence of **resume fraud and misrepresentation**, including exaggerated skills, falsified certifications, and inaccurate work experience. Studies have shown that a large percentage of employers encounter discrepancies during background verification, leading to financial losses, increased hiring time, and potential risks in critical industries. Traditional verification methods are often manual, time-consuming, costly, and inconsistent, making them impractical for large-scale recruitment processes.

To address these challenges, this project proposes **ResumeTrust**, a full-stack talent verification platform designed to transform static resumes into dynamic, verified, and trustworthy profiles. The system integrates automated resume parsing, skill validation through structured assessments, and certification authentication to ensure data credibility. By combining these verification mechanisms, the platform generates a **composite Trust Score**, which provides a standardized and objective measure of candidate reliability.

Furthermore, ResumeTrust enhances recruitment decision-making through advanced visual analytics, enabling recruiters to analyze candidate performance, career progression, and skill distribution effectively. The platform supports both students and recruiters with dedicated dashboards, creating a transparent and data-driven hiring environment.

II. LITERATURE REVIEW

The development of intelligent recruitment systems has gained significant attention in recent years, particularly with the rise of data-driven hiring and automation technologies. Several research works have contributed to the fields of resume analysis, skill verification, fraud detection, and visual analytics, forming the foundation for the proposed ResumeTrust system.

Chen Zhang et al. (2017) introduced *ResumeVis*, a visual analytics system designed to extract and represent semantic information from semi-structured resume data. Their work emphasized the importance of **career trajectory visualization** and **interpersonal relationship graphs**, demonstrating how visual tools can reveal hidden patterns in candidate data and improve decision-making in recruitment.

Liu et al. (2018) proposed a keyword-based resume screening approach using Natural Language Processing (NLP) techniques. Their methodology focused on **Named Entity Recognition (NER)** and keyword extraction to match resumes with job requirements. While effective for automation, the approach relied heavily on keyword matching, which lacks deep semantic understanding.

To overcome the limitations of keyword-based systems, **Chen and Zhang (2020)** explored semantic matching using **BERT (Bidirectional Encoder Representations from Transformers)**. Their research demonstrated that deep learning-based embeddings significantly improve the accuracy of candidate-job matching by capturing contextual meaning rather than relying solely on keywords.

In the domain of fraud detection, **Gupta et al. (2021)** applied supervised machine learning techniques to identify anomalies and inconsistencies in resume data. Their findings highlighted the potential of machine learning models in detecting fraudulent patterns, though they primarily focused on detection rather than prevention or verification.

Singh and Reddy (2022) emphasized the importance of **skill verification through online assessments**, arguing that practical

testing provides a more reliable indicator of candidate competency compared to self-reported skills. Their work supports the integration of MCQ-based or interactive assessment systems in recruitment platforms.

Additionally, **Zhang et al. (2017)** proposed graph-based techniques for resume visualization and semantic extraction. Their approach modeled resumes as interconnected entities, enabling better understanding of relationships between skills, experiences, and organizations. This research highlights the importance of structured data representation and visualization in modern recruitment systems.

While existing works address individual components such as parsing, matching, or fraud detection in isolation, no unified platform integrates all three pillars with a transparent, quantifiable trust metric. ResumeTrust addresses this gap.

III. METHODOLOGY

1. System Architecture Design

The system adopts a **three-layer architecture** consisting of:

- **Presentation Layer:** Developed using HTML, CSS, Bootstrap, and

Chart.js for interactive user interfaces.

- **Application Layer:** Built with Python and Flask to handle business logic and processing.
- **Data Layer:** Uses MongoDB Atlas for storing user data, resumes, quiz results, and job applications.

This layered design ensures modularity, maintainability, and scalability of the platform.

2. Resume Parsing and Data Extraction

The first step involves extracting structured information from uploaded resumes (PDF/DOCX):

- PyPDF2 and python-docx are used to read document content.
- Regular Expressions (Regex) and NLP techniques extract key entities such as:
 - Name, Email, Phone Number
 - Education details
 - Skills and Certifications
- Extracted data is stored in the database for further processing.

This step converts unstructured resume data into machine-readable structured information.

3. Skill Verification using MCQ

Assessment

To validate candidate skills:

- The system generates **domain-specific MCQ quizzes** based on extracted skills.
- Each quiz includes a fixed number of questions with a **time constraint**.
- A **minimum score of 70%** is required to pass.
- Candidates are given limited attempts to ensure fairness.

This method provides an objective evaluation of technical competencies beyond self-reported claims.

4. Certificate Validation Module

Certification authenticity is verified using:

- **Regex-based pattern matching** for different certification providers (AWS, Google Cloud, Microsoft, Coursera, NPTEL).
- Each certification ID is checked against predefined formats.
- Valid certificates are marked as verified and stored in the system.

This approach ensures fast and automated credential validation without external dependencies.

5. Trust Score Computation

A core component of the system is the calculation of a **composite Trust Score (0–100)** based on verified data:

- Education Score = 40 points
- Certification Score = up to 40 points
- Skill Score = up to 20 points

The final Trust Score is computed using:

$$T = E + \min(C \times 20, 40) + \min(S \times 10, 20)$$

This score provides a standardized and quantitative measure of candidate credibility.

6. Job Application and Recruitment Workflow

The system supports two user roles:

- **Students:** Upload resumes, take quizzes, validate certificates, and apply for jobs.
- **Recruiters:** Post job requirements, filter candidates, and evaluate profiles based on Trust Scores.

Applications are ranked automatically, enabling efficient and data-driven hiring decisions.

7. Data Visualization and Analytics

To enhance decision-making:

- **Radar charts** display candidate skill strengths.
- **Line charts** show Trust Score progression over time.
- Analytical dashboards provide insights into candidate performance and trends.

These visual tools simplify complex data interpretation for recruiters.

8. System Testing and Performance Evaluation

The system is validated through:

- Unit Testing
- Integration Testing
- Functional and System Testing

Results indicate high efficiency, with resume parsing completed in under two seconds and accurate Trust Score computation.

IV. SYSTEM ARCHITECTURE

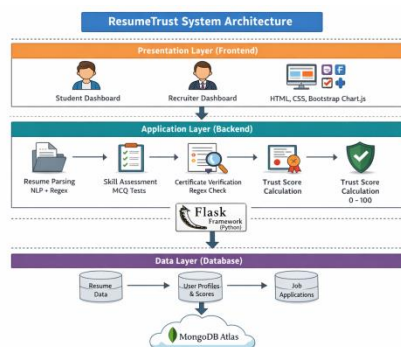


Fig 4.1 - System Architecture

ResumeTrust is built on a **three-layer architectural pattern** separating concerns across the Presentation Layer, Application Layer, and Data Layer.

The **Presentation Layer** is developed using HTML5, Bootstrap 5.3, Jinja2, and Chart.js 4.4, rendering dedicated dashboards for Students and Recruiters with interactive skill radar charts and Trust Score visualizations.

The **Application Layer**, implemented in Python 3.10 and Flask 3.0, houses all core business logic — the Resume Parsing Subsystem (PyPDF2, python-docx), MCQ Skill Quiz Engine, Certificate Validation Engine, and Trust Score Computation Engine.

The **Data Layer** uses MongoDB Atlas as the cloud-hosted NoSQL database, persisting all system data across five collections: users, candidate_profiles, quiz_attempts, jobs, and applications.

Together, these three layers form a seamless pipeline that transforms an unverified resume into a quantifiably trustworthy talent profile in real time.

V. RESULTS & DISCUSSION

The implementation of the ResumeTrust platform demonstrates strong performance and efficiency across all major components of the system. The resume parsing module is capable of extracting structured information from PDF and DOCX files within a time frame of less than two seconds, meeting the system's performance requirements. Additionally, the Trust Score computation is performed in real time, ensuring that users receive immediate updates after completing verification steps such as skill assessments or certificate validation.

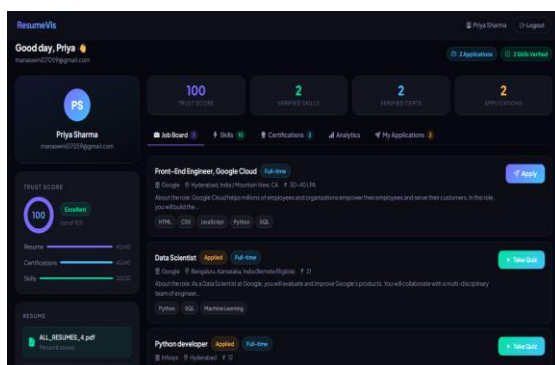


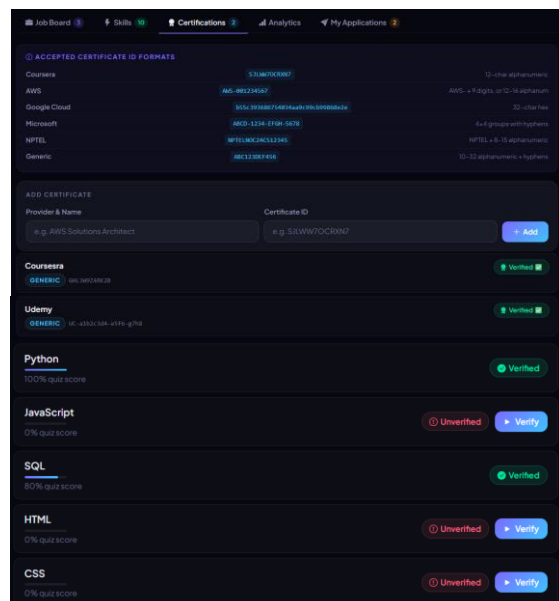
Fig 5.1: Student Dashboard

The MCQ-based quiz engine accurately evaluates candidate responses and determines pass or fail status based on a predefined threshold, confirming the system's ability to support real-time recruitment workflows.

From a functional perspective, all modules of the system operate with high accuracy and reliability. The resume parser

successfully identifies critical details such as skills, education, and contact information, while the certificate validation module effectively verifies credentials using predefined regular expression patterns.

Fig 5.2 : Certificate Validation



The skill verification component ensures that only candidates achieving a minimum score of 70% are considered competent in a given domain.

Fig 5.3 : MCQ Skill Quiz Interface

Furthermore, the Trust Score calculation follows the defined algorithm consistently, producing reliable and standardized results. Comprehensive testing, including unit, integration, and functional testing, confirmed that all features perform as expected without major errors.

The system significantly improves the recruitment process by reducing dependency on manual verification and subjective decision-making. Automated validation processes minimize the time required for background checks and eliminate delays commonly associated with traditional hiring methods. Recruiters benefit from a data-driven approach, as candidates are evaluated using a quantitative Trust Score that reflects verified qualifications and competencies. This not only enhances decision-making but also reduces the risk of hiring candidates with falsified credentials. Additionally, the ability to filter and rank applicants based on Trust Score and verified skills streamlines candidate selection and improves overall efficiency.

The integration of visual analytics further strengthens the system by providing intuitive insights into candidate performance. Features such as skill radar charts and career trajectory graphs allow recruiters to quickly interpret complex data and compare multiple candidates effectively. These visual tools enhance understanding and support better hiring decisions by presenting information in a clear and structured manner. Moreover, the platform demonstrates high reliability and usability, functioning smoothly across multiple browsers and devices while

maintaining a responsive and user-friendly interface.

VI. CONCLUSION

The ResumeTrust system successfully addresses the critical challenges of resume fraud, unverified candidate information, and inefficiencies in the recruitment process by introducing a comprehensive, trust-driven hiring platform. Through the integration of automated resume parsing, MCQ-based skill verification, and regex-based certificate validation, the system transforms traditional resumes into structured, verified, and reliable professional profiles. The introduction of a **composite Trust Score (0–100)** provides a standardized and objective metric that enables recruiters to evaluate candidates based on verified data rather than subjective judgment.

The project demonstrates the effective implementation of a full-stack web application using modern technologies such as Flask, MongoDB Atlas, and Bootstrap, ensuring scalability, performance, and user-friendly interaction. Performance results confirm that the system operates efficiently, with rapid data processing and accurate score computation. Additionally, the integration of visual analytics enhances decision-making by providing clear

insights into candidate skills and career progression.

Overall, ResumeTrust establishes a reliable and transparent recruitment framework that promotes merit-based hiring and reduces dependency on unverified information. Despite minor limitations, the system proves to be technically feasible, economically viable, and socially beneficial. It lays a strong foundation for future advancements in intelligent recruitment systems, contributing significantly to the evolution of data-driven and trustworthy hiring practices.

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