Personality Prediction System based on CV and Quiz Analysis

Khushboo Joshi[1], Khushi Saini[2], Ayush Tyagi[3], Harshit Sharma[4], Mr. Hemant Kumar Bharadwaj[5]

[1,2,3,4]*Student, R D Engineering College, Ghaziabad, Uttar Pradesh, India*
[5]*Assistant professor, R D Engineering College, Ghaziabad, Uttar Pradesh, India*

Abstract: **Recruiting the right candidate is a challenge due to the high volume of job applications and the limitations of traditional resume screening. This study introduces an automated personality prediction system that leverages Support Vector Machine (SVM) for classification and Natural Language Processing (NLP) for text analysis.**
This system extracts key resume features, such as skills and language patterns, to infer personality traits and enhance hiring accuracy. A quiz-based assessment further refines personality evaluation. Comparative analysis highlights SVM's effectiveness in personality classification. This approach helps HR professionals make data-driven hiring decisions, reduces bias, and improves efficiency.

Keywords: **Personality Prediction, Machine Learning, Recruitment, SVM, NLP, Resume Analysis, Personality Assessment.**

I. INTRODUCTION

Recruitment has evolved into a complex and competitive process in the modern era of rapid technological advancements. Organizations receive a vast number of job applications, making it challenging to manually screen and identify the most suitable candidates. Traditional hiring methods, which involve multiple rounds of interviews, aptitude tests, and group discussions, are often time-consuming, inefficient, and susceptible to bias. Moreover, relying solely on resumes for candidate evaluation overlooks a crucial aspect—personality traits, which play a significant role in workplace success. To overcome these hurdles, intelligent systems leveraging machine learning and natural language processing (NLP) are proving to be effective in making the recruitment process more efficient and seamless.

Personality is a key determinant of an individual's professional performance and influences factors like teamwork, leadership, adaptability, and communication. Various psychological models, such as the Big Five Personality Traits, provide structured frameworks for assessing personality based on characteristics such as openness, conscientiousness, extraversion, agreeableness and neuroticism. By integrating personality prediction within the hiring framework, organizations can improve candidate evaluation beyond just technical skills, resulting in well-rounded and insightful hiring choices.

This study presents an automated personality prediction system that leverages resume analysis and quiz-based assessment to evaluate candidates. The system utilizes advanced machine learning methods, with a focus on the Support Vector Machine (SVM) classifier, to derive valuable insights from resumes and categorize candidates according to their personality attributes. Additionally, a structured quiz-based assessment further refines personality evaluation, ensuring a comprehensive approach. Unlike traditional methods, this approach significantly reduces manual effort, enhances objectivity, and improves the reliability of selecting the right candidate. The proposed system benefits both the candidates and recruiters. Candidates understand their personality traits better and areas for improvement, whereas organizations can make data-driven hiring decisions, reduce biases and optimize workforce planning.

Furthermore, integrating NLP techniques and structured data extraction from resumes ensures a high level of precision in personality classification. Future enhancements may include integrating social media data and refining classification models to further improve the predictive capabilities of the system. By automating personality prediction through CV analysis and structured assessments, this research aims to revolutionize the recruitment landscape, providing an efficient, objective, and data-driven approach to talent acquisition.

II. LITERATURE SURVEY

The hiring process has grown increasingly challenging due to the growing number of applicants, the diverse skill sets required, and the subjectivity of human decision-making. Traditional hiring methods, which rely on manual resume screening and interviews, are not just tedious; they also tend to be biased. HR professionals often struggle to filter out the most suitable candidates from a vast pool, resulting in inefficiencies and potential mismatches in hiring.

To overcome these challenges, Applicant Tracking Systems (ATS) have been widely adopted in modern recruitment. These systems automate resume screening by parsing and analyzing resumes based on keywords, skills, and experience. ATS solutions leverage Natural Language Processing (NLP) and Machine Learning (ML) to rank candidates and streamline the selection process. Although ATS has significantly improved the efficiency of shortlisting candidates, it has several limitations.

● Limited Personality Analysis – ATS generally focuses on skills and experience but fails to assess a candidate's personality, soft skills, or behavioral traits, which are crucial for job performance.
● Keyword Dependency – Many ATS solutions rely heavily on keyword matching, often overlooking well-qualified candidates who use different terminologies in their resumes.
● Lack of Contextual Understanding – While ATS can scan resumes for relevant terms, it lacks a deep understanding of a candidate's potential beyond textual data.
● Bias in Screening – Since ATS follows predefined criteria, there is a possibility of reinforcing biases present in historical hiring data.

Owing to these shortcomings, there is a growing need for advanced recruitment systems that not only analyze qualifications but also assess personality traits to achieve a more precise match for job roles. Personality prediction using ML techniques, particularly NLP and classification algorithms such as Support Vector Machine (SVM), opens up a promising approach for enhancing recruitment accuracy. By integrating psychometric analysis with resume screening, recruiters can develop a better understanding of candidates' behavioral tendencies, work ethics, and communication skills.

This research aims to bridge the gap between ATS-based resume filtering and personality prediction, ensuring a more holistic and data-driven approach to recruitment.

III. RESEARCH METHODOLOGY

This system leverages Support Vector Machine (SVM) to assess individuals based on the Big Five Personality Traits. It analyzes inputs from CVs and user responses to determine personality traits and provides meaningful insights. The methodology follows several stages:

1. Data Collection
To build an accurate personality prediction system, data is gathered from multiple sources:
CV Uploads: Users provide their CVs that serve as primary input data. The CV contains information such as skills, education, work experience, and achievements, which can indicate personality traits.
Questionnaire Responses: User responses are gathered through a structured set of predefined questions.

2. Data Preprocessing
Before being used for personality prediction, the data is cleaned and prepared to ensure accuracy.
• Relevant content is extracted through Natural Language Processing (NLP) techniques.
• Key sections such as skills, experience, education, and achievements are identified.
• Irrelevant content (e.g., formatting elements, stop words, and redundant phrases) is removed.

3. Feature Selection
For CVs:
TF-IDF (Term Frequency-Inverse Document Frequency) or convert text into numerical values. The presence of certain words or phrases related to personality traits (e.g., "team player" for extraversion, "detail-oriented" for conscientiousness) is considered
For Questionnaire Responses:
User answers are mapped to Big Five trait indicators. Semantic similarity techniques are applied if necessary to compare responses with predefined personality trait markers. On useful information rather than generic text.

4. Model Selection and Training:

A Support Vector Machine (SVM) classifier, recognized for its high efficiency in text classification, is trained.

Training Process:
A labelled dataset is used, where individuals are already classified into Big Five Personality Traits. The model learns how different words, phrases, and response styles correlate with Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism.

Why SVM?
• Effective text-based classification.
• Works well with high-dimensional data (such as text features from CVs).
• Robust to overfitting, especially for small-to-medium-sized datasets.

5. Personality Prediction
Once trained, the SVM model predicts personality traits of new users based on them
CVs and Questionnaire Responses.
 Prediction Process:
• The pre-processed CV and responses are fed into the trained model.
• A score is assigned to each of the Big Five traits, indicating the user's personality profile.
• The output is presented as a percentage for each trait (for example,
•Openness: 80%
•Conscientiousness: 65%
•Extraversion: 50%
•Agreeableness: 70%
•Neuroticism: 40%
This approach ensures accurate and interpretable personality assessment.

6. Results & Visualization
The personality prediction results are presented in a clear and user-friendly manner.
• Graphical Representation: Bar charts, radar charts, or percentile-based graphs for each trait.

V. RESULT AND ANALYSIS

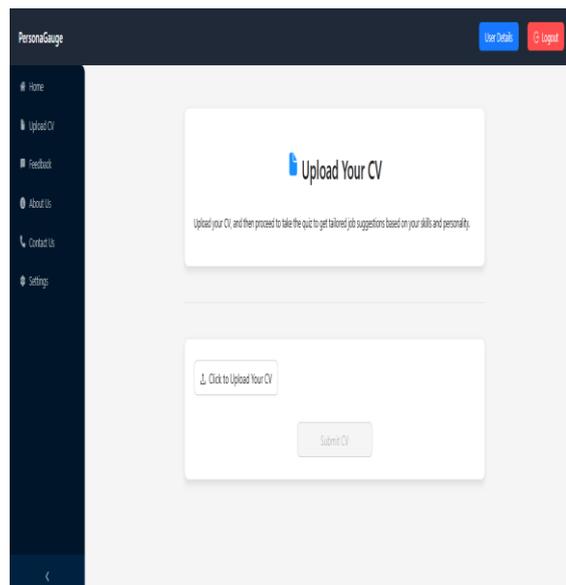Fig. Flowchart
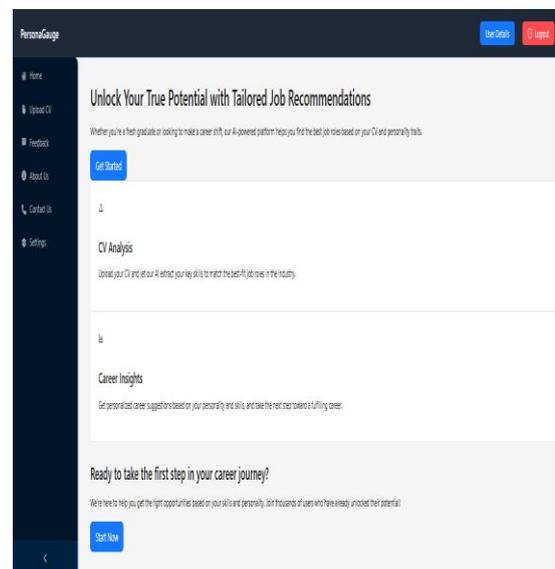
Fig. Front page overview

Fig. CV Submission Interface
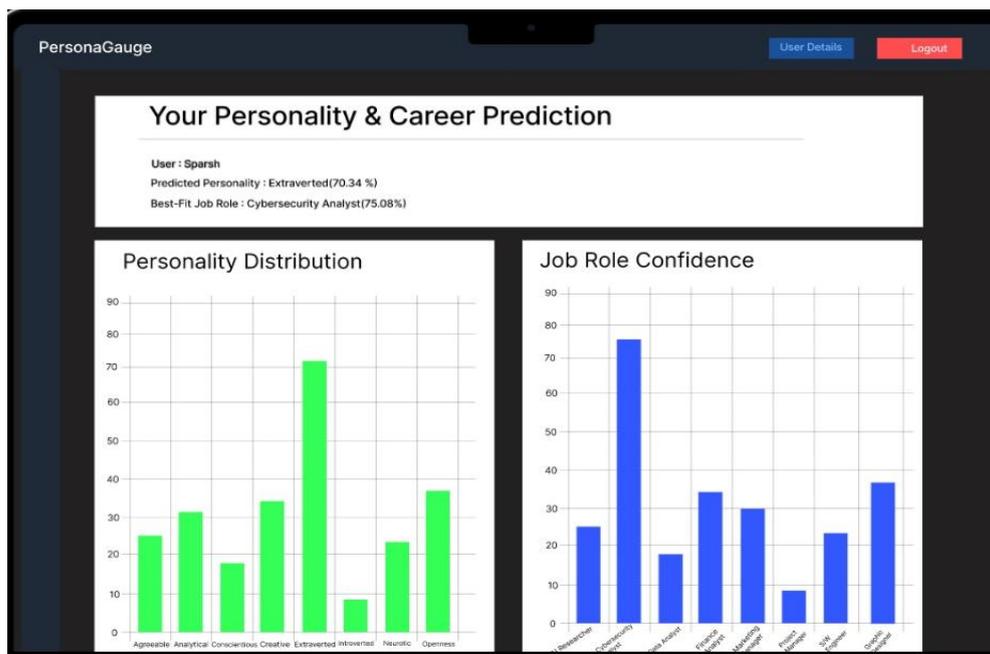
Fig. Personality quiz overview

Fig. Dataset

Fig. Result and visualization

VI. POSITIVE IMPACT

- Enhanced Hiring Process

Recruiters often struggle to shortlist candidates based solely on qualifications and experience. A personality prediction system enables data-driven hiring, ensuring that candidates' personalities align with their job roles, workplace culture, and company values.

- Bias-Free Recruitment

Traditional hiring methods are prone to biases, both conscious and unconscious. Automating personality analysis through CVs minimizes human biases, leading to a more objective selection process based on skills, qualifications, and personality traits than demographic factors.

- Improved Job-Candidate Fit

A mismatch between an employee's personality and job roles can lead to dissatisfaction and high turnover rates. The system helps in identifying individuals whose personalities align with their job responsibilities, ensuring higher job satisfaction and long-term commitment.

- Time and Cost Efficiency

Manual CV screening is time consuming and labor intensive. Automating personality assessment significantly reduces recruitment time and cost, allowing HR teams to focus on engaging with the most suitable candidates, rather than sifting through hundreds of resumes.

- Better Workforce Productivity

Employees who align well within an organization tend to be more engaged, motivated, and productive. The system helps organizations create a workforce that is not only technically proficient but also psychologically suited to the job, resulting in higher overall efficiency.

- Predicting Leadership Potential

The system can identify leadership traits in candidates and help organizations nurture future leaders. By analyzing personality attributes, such as decision-making ability, emotional intelligence, and resilience, companies can invest in leadership development at an early stage.

- Enhanced Team Dynamics

A well-balanced team with complementary personality traits fosters collaboration and innovation. This system ensures better team composition, reduces workplace conflicts, and enhances teamwork.

VII. NEGATIVE IMPACT

- Job Displacement

Automation of recruitment may reduce the need for human recruiters, leading to job loss.

- Bias in AI Algorithms

AI can inherit biases from the training data, resulting in unfair hiring decisions.

- Privacy Concerns

Collecting and analyzing personal data raises ethical issues regarding security and misuse.

- Over-Reliance on AI

Dependence on technology can reduce human decision-making skills and create vulnerability.

- Resistance to Change

Companies and job seekers may hesitate to trust AI-driven hiring and slow its adoption.

VIII. CONCLUSION

The Personality Prediction System through CV Analysis is a significant advancement in the hiring process, offering improved efficiency, fairness, and job candidate alignment. By leveraging AI and data-driven insights, organizations can streamline recruitment, reduce biases, and enhance workforce productivity.

However, challenges such as privacy concerns, job displacement, algorithmic biases, and overreliance on technology must be addressed to ensure ethical and responsible implementation. Transparency in AI-driven decisions, regular monitoring of fairness, and maintaining a balance between human judgment and automation are crucial for success.

The performance of the Personality Prediction System is directly influenced by the quality of the dataset. A comprehensive and well-prepared dataset ensures more accurate and reliable predictions, leading to better insights into an individual's personality.

Although this technology can revolutionize recruitment, it is best used as an aid to human

decision-making rather than a replacement for human decision-making. By merging AI capabilities with human intelligence, organizations can create a more inclusive, efficient, and ethical hiring process, ultimately fostering a skilled and diverse workforce.

IX. REFERENCES

[1]. Narwade R, Palkar S, Zade I, Sanghavi N. Personality Prediction with CV Analysis. Int Res J Eng Technol (IRJET). 2022 Apr;9(4):3220.

[2]. Robey A, Shukla K, Agarwal K, Joshi K, Joshi S. Personality Prediction System through CV Analysis. Int Res J Eng Technol (IRJET). 2019 Feb;6(2):1751.

[3]. Personality prediction through CV analysis using machine learning techniques. Proceedings of the IEEE International Conference on Advances in Electrical, Computing, and Telecommunication Engineering (ICAECT). 2023 Jan 5-6. DOI: 10.1109/ICAECT57570.2023.10117883.

[4]. Leveraging Machine Learning for Career Prediction and Resume Analysis in Career Assist. Proceedings of the 2023 10th IEEE Uttar Pradesh Section International Conference on Electrical, Electronics and Computer Engineering (UPCON). 2023 Dec 1-3; Gautam Buddha Nagar, India. DOI: 10.1109/UPCON59197.2023.10434306.

[5]. Prasoon A, Singh A, Gagan M, Verma J, Nivedita GY. Automatic Resume Quality Assessment. Int J Creat Res Thoughts (IJCRT). 2024 Jan;12(1):b89. Available from: https://www.ijcrt.org

[6]. Bagade S, Rout J, Yede P, Patil N. Personality Evaluation and CV Analysis using Machine Learning Algorithm. Res Pap. 2019 May;7(5). E-ISSN: 2347-2693.

[7]. Leena N, Sandhya N, Reddy RSA, Saheb SK. Personality Prediction Through CV Analysis. Int Res J Mod Eng Tech Sci. 2022 Jul;4(7). Impact Factor: 6.752.