

AI-Based Personality Prediction and Career Recommendation from Social Media Posts

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Abstract—This paper presents a novel AI-driven framework for personality prediction and career recommendation using insights derived from social media posts. By leveraging Natural Language Processing (NLP) and machine learning techniques, our system analyzes users' linguistic patterns, sentiment, and behavioral traits to predict their personality based on established psychological models such as the Big Five. Furthermore, we employ a recommendation algorithm to suggest optimal career paths by mapping personality traits to suitable professions using industry-specific datasets. We evaluate our model on real-world social media datasets, comparing its predictive accuracy with traditional psychometric assessments. The findings indicate that AI-based personality assessment can offer a scalable and automated alternative to conventional career counseling, enhancing career decision-making through data-driven insights. Additionally, this technology can be applied to targeted advertising by tailoring content based on personality profiles and to personalized learning by recommending educational resources aligned with an individual's cognitive style and career aspirations.

Keywords—Personality Prediction, Career Recommendation, Social Media Analysis, Natural Language Processing, Machine Learning, Big Five Model

I. INTRODUCTION

Personality plays a crucial role in shaping an individual's career path, influencing work preferences, communication styles, and decision-making abilities. Traditionally, personality assessment has relied on self-report questionnaires, which are often time-consuming, subjective, and susceptible to bias. However, with the exponential rise in social media usage, vast amounts of user-generated content now offer an alternative means of understanding personality traits through behavioral analysis.

Artificial Intelligence (AI), particularly Natural Language Processing (NLP) and machine learning, has enabled automated personality prediction by analyzing social media posts. By leveraging linguistic patterns, sentiment analysis, and behavioral cues, AI can infer personality traits based on established psychological models such as the Big Five Personality Model. Furthermore, career recommendation systems can utilize these personality insights to suggest suitable career paths, improving decision-making for students, job seekers, and professionals.

In this research, we propose an AI-based framework that analyzes social media posts to predict personality traits and recommend careers accordingly. Our approach integrates NLP techniques, machine learning models, and a career-

matching algorithm trained on real-world occupational datasets. We evaluate the performance of our system against traditional psychometric assessments and explore its potential applications in career counseling, targeted advertising, and personalized learning. Through this study, we aim to demonstrate how AI-driven personality analysis can enhance career guidance and provide data-driven recommendations for individuals seeking career advancement.

II. LITERATURE SURVEY

The application of machine learning and natural language processing (NLP) in personality prediction has gained significant attention in recent years. Various models have been developed to analyze user-generated content and infer personality traits based on linguistic and behavioral patterns [1][3]. Jothi Prakash et al. [1] introduced a multi-task learning framework integrating NLP tasks such as emotion and irony detection to improve personality prediction accuracy. Their model, which combines RoBERTa, Graph Convolutional Networks (GCNs), and hierarchical attention mechanisms, significantly outperforms traditional approaches in analyzing social media text.

Similarly, Karanatsiou et al. [3] proposed a model aimed at predicting the Big Five personality traits by utilizing various social media features, such as language use, behavioral patterns, and emotional cues. Their approach demonstrated the effectiveness of incorporating multiple user-specific data sources for more precise personality profiling. Additionally, Bo Han et al. [2] tackled the challenge of noisy social media data by introducing a lexical normalization technique to manage out-of-vocabulary (OOV) words, enhancing text preprocessing for personality prediction tasks. Their findings underscore the importance of managing social media text noise to improve prediction accuracy.

Several studies have explored data mining techniques for personality classification, emphasizing the efficiency of different algorithms in categorizing individuals based on personality assessments [4]. The integration of deep learning and NLP for text-based personality prediction has also been examined, showing that psycholinguistic features play a crucial role in determining personality traits [5][6]. Research on sentiment analysis and lexical analysis in social media further supports the idea that user interactions and language style can serve as indicators of personality dimensions [7].

Career recommendation systems have been studied in conjunction with personality prediction, where AI-driven models map personality traits to suitable job roles. Recent advancements in machine learning-based career counseling suggest that AI can provide personalized career guidance by analyzing behavioral traits extracted from digital footprints [8]. Moreover, hybrid approaches that combine personality assessment with resume analysis have been proposed to enhance recruitment processes and job matching accuracy [9][10].

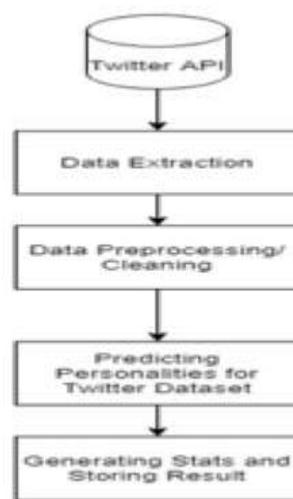
III. METHODOLOGY

A. Data Extraction from Social Media

The first step involves collecting textual data from major social media platforms, including Twitter, Threads, and Reddit. These platforms are chosen due to their extensive user engagement and diverse linguistic expressions, which provide a rich dataset for personality analysis. The extraction process includes:

- Twitter API: Used to collect tweets based on keywords, hashtags, and user handles.
- Reddit API: Gathering posts and comments from various subreddits related to career discussions, psychology, and personality.

To ensure data diversity, posts from different regions, age groups, and professional backgrounds will be collected. Additionally, ethical considerations such as user privacy and data anonymization will be implemented.



B. Data Preprocessing and Cleaning

Raw social media text often contains noise in the form of slang, abbreviations, special characters, and irrelevant

content. To enhance model performance, the extracted data undergoes several preprocessing steps:

- Tokenization – Splitting text into meaningful units.
- Stopword Removal – Eliminating commonly used words that do not contribute to personality insights.
- Lemmatization – Converting words to their base forms to ensure consistency.
- Noise Removal – Filtering out emojis, special characters, and hyperlinks.
- Lexical Normalization – Handling misspellings and out-of-vocabulary words using a normalization technique to improve text clarity.

The cleaned dataset will serve as the input for the next phase of personality prediction.

C. Personality Prediction Using Deep Learning Models

- The personality analysis in this study is based on the OCEAN (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) model, a widely accepted framework in psychology. To extract personality traits from textual data, RoBERTa (Robustly Optimized BERT Pre Training Approach) is employed due to its superior contextual understanding and fine-tuning capabilities on large-scale social media datasets.
- RoBERTa is fine-tuned on labeled personality datasets and adapted to real-world social media text to enhance its predictive accuracy. By leveraging deep contextual representations, it effectively captures linguistic nuances and behavioral patterns indicative of personality traits.
- The final output of this phase assigns an OCEAN(Big Five Factor Model) personality score to each user, which is subsequently used for career recommendation.

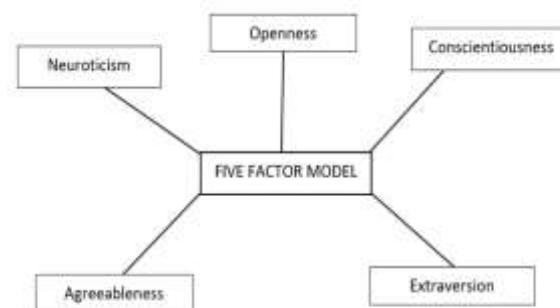


Fig. 1 Big Five Factor Model

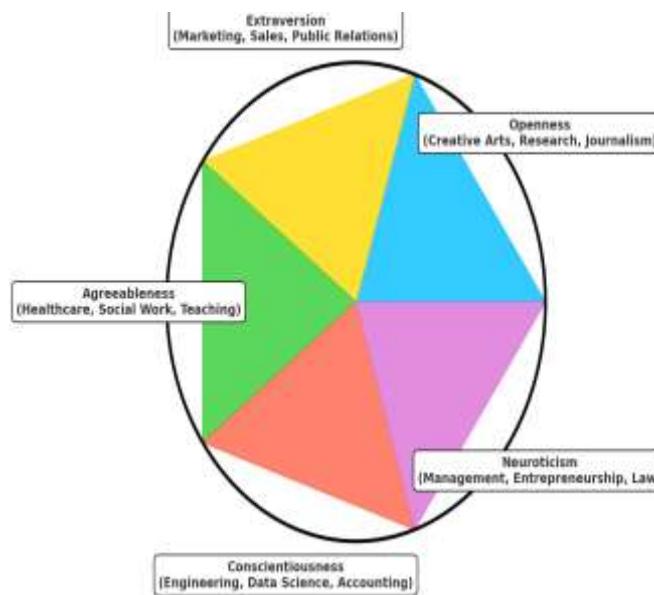
D. Career Mapping and Recommendation System

Once a user's personality traits are predicted, the system maps them to suitable career paths based on a predefined personality-career compatibility matrix. This mapping is designed using established psychological research and industry reports that associate personality traits with job roles.

Example mappings:

Extraversion → Marketing, Sales, Public Relations
Conscientiousness → Engineering, Data Science, Accounting
Openness → Creative Arts, Research, Journalism
Agreeableness → Healthcare, Social Work, Teaching
Neuroticism (Low) → Management, Entrepreneurship, Law

The recommendation system employs collaborative filtering and AI-driven matching to provide personalized career suggestions.



E. Web-Based User Interface

To make the system accessible, an interactive web application will be developed, allowing users to:

- Input their social media handles or text samples.
- Receive an AI-generated personality assessment based on OCEAN traits.
- Obtain a personalized career recommendation aligned with their personality.

The web interface will ensure user-friendly interaction, data security, and real-time processing.

IV. CONCLUSION AND FUTURE SCOPE

This research presents an AI-driven framework for personality prediction and career recommendation using social media data. By leveraging the OCEAN personality model alongside advanced deep learning techniques such as RoBERTa, the system effectively analyzes user-generated text to infer personality traits. The integration of a personality-career mapping algorithm enables personalized career recommendations, providing an innovative approach to career counseling. The proposed method enhances the accuracy and scalability of personality assessments, offering an automated and data-driven alternative to traditional career guidance techniques. Future work will focus on improving model generalization across diverse linguistic styles and expanding the personality-career mapping framework to accommodate dynamic labor market trends.

V. ACKNOWLEDGEMENTS

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