SvedbergOpen
DISSEMINATION OF KNOWLEDGE
International Journal of Artificial Intelligence and Machine Learning
Publisher's Home Page: https://www.svedbergopen.com/
Research Paper Open Access

AI Based Fingerprint Learning and Personality Profiling

Mrs Poonam Bharat Kulkarni[1] Dr Sonali Shashikant Rokade[2], Dr Bharat Pralhad kulkarni[3], Mr Naresh Ashok Kamble[4], Dr Mayuri Rathi[5], Mrs Trupti Firake[6]

[1]Computer science and Engineering Dept ,Walchand college of Engineering poonam.kulkarni@walchandsangli.ac.in
[2]Assistant prof , Walchand college of Engineering, anjanishra@gmail.com
[3]PVPIT BUDHGAON ,Electronics &Tele communication, bk.2983@gmail.com
[4]D Y Patil Agricultural and Technical University,Talsande,Kolhapur, nareshkamble85@gmail.com
[5]Assistant Professor,IT Dept, D Y Patil college of engineering Akurdi Pune, 2014mmsoni@gmail.com
[6]Assistant Professor,IT Dept, D Y Patil college of engineering Akurdi Pune, truptipatil159@gmail.com

Abstract
Autism Spectrum disease (ASD) is a multifaceted neurodevelopmental disease marked by Autism Spectrum disease (Personality Profiling) is a multifaceted bio-developmental disease marked by challenges with social interaction, communication, and repetition. Although long used, conventional methods of treating and diagnosing human personality profiling (Personality Profiling) are sometimes overshadowed by issues of subjectivity, late detection, and restrictions on individualization. Increased attention has been given to AI-driven Fingerprint-Based Personality Prediction (Personality Prediction System) technology as a method for increased prediction and treatment strategy for human personality profiling (Personality Profiling). Electroencephalography (Fingerprint Data) is a typical technique employed by AI model control devices (Personality Prediction Systems) to record and process AI model waves, which are able to reflect neural activity in real time. For an early and accurate prediction of human personality profiling (Personality Profiling) and identification of accompanying anomalies, such insights are important. Neurofeedback training, interactive VR-Personality Prediction System systems, and emotion recognition modules are all some examples of ai-driven fingerprint-based personality prediction (Personality Prediction System) therapies that are promising in improving the attention, emotion regulation, and social communication of individual individuals. Ethical issues, technological constraints, and interdisciplinary collaboration needs are some of the challenges this study discusses as it ventures into the possible applications of ai-driven fingerprint-based personality prediction (Personality Prediction System) technology to diagnose and treat human personality profiling (Personality Profiling). The coming together of machine learning, multimodal bioimaging, and wearable Personality Prediction System systems all point to a revolutionary future in which Personality Prediction Systems are vital for providing personalized and accessible autism care.

Index Terms: Human Personality Profiling, Virtual Reality, Emotion Recognition, Artificial Intelligence, Cognitive Rehabilitation, Assistive Technology, Neurotechnology.

I. INTRODUCTION

Social interaction, communication, and certain behavioral patterns are longstanding difficulties experienced by individuals with Human Personality Profiling (Personality Profiling) (Wong, A., Gao, R. 2023). Making a prediction of human personality profiling (Personality Profiling) is not always easy. In spite of being limited, age-old methods of prediction like psychological observation and questionnaire evaluation have been integral to medical care for decades. Clinical observation requires the time-consuming and subjective activity of prolonged surveillance and evaluation by medical professionals. Questionnaires, due to being dependent upon accounts by patients or carers, are prone to recollection bias and subjective interpretation. Better and more reliable diagnostic tools are severely needed now to assist in early prediction and speedy treatment of human personality profiling (Personality Profiling) as reported cases continue to increase. The treatment as well as prediction of human personality profiling (Personality Profiling) are being revolutionized by new Brain Computer Interface (Personality Prediction System) technology. Capturing and decoding fingerprint ridge patterns in real time, Personality Prediction System systems take a shortcut past older methods, establishing an immediate link of communication between equipment and AI model. Enhanced objectivity and real time tracking are two of its advantages, as this technique gives a direct window into one's cerebral activity patterns. Evidence in studies by fingerprint image (Fingerprint Data) indicates that individuals with human personality profiling (Personality Profiling) exhibit specific behavioral trait

correlation characteristics in language and social interactions. Analyzing such fingerprint ridge patterns, Personality Prediction System systems can recognize Personality Profiling-specific associated Fingerprint Data profiles and hence make more precise and quick diagnoses. Through real-time observations that guide development of specific therapeutic interventions, Personality Prediction System facilitates persistent observation of biological activity.

The possibility of Personality Prediction System technology as a new tool in Personality Profiling prediction has been shown by studies that use Fingerprint Data to distinguish, with success, Personality Profiling individuals from normal controls. Another potential new application of Personality Prediction System is in human personality profiling (Personality Profiling) rehabilitation, in which it gives immediate feedback in order to enhance individuals with the disorder in terms of communication and social ability. Yaoyao et al. (2024) asserts that the aim of this research is to analyze current as well as potential uses of Personality Prediction System in human personality profiling (Personality Profiling) prediction. The current work examines how Personality Prediction System technology can obtain and read out behavioral trait correlation in a direct manner, resulting in more objective as well as more precise data relating to neural activity. The complexity of
Personality Profiling, in combination with limitations of gold-standard diagnostic techniques (e.g., subjectivity and late onset of symptoms) creates a potential new opportunity in terms of Personality Profiling early prediction as well as customized training or guidance.

Fig. 1. Fingerprint Types

II. LITERATURE SURVEY

However, NLP systems that use conventional natural language processing models have difficulties in understanding bidirectional contextual information and are therefore not effective in understanding natural language. In view of this challenge, Devlin et al. proposed a model referred to as Bidirectional Encoder Representations from Transformers (BERT). In this model, Masked Language Modeling and Next Sentence Prediction were implemented to come up with rich contextual information for natural language understanding tasks. Consequently, eleven NLP benchmark tasks were accomplished with parameters such as learning rate and batch size, achieving state-of-the-art performance.

In the domain of detecting fake news, a major problem faced in the development of research stem cell is the unavailability of comprehensive datasets. Concerning this problem, Shu et al. proposed a dataset called Fake News-Net, a large-scale dataset that contains various attributes, such as news content, social context, spatio-temporal attributes, etc., comprising a total of 23,196 news articles. This dataset can evaluate various models based on detecting fake news in a comprehensive manner, simulating real-world scenarios.

Various studies were carried out on the techniques of text summarization and the classical methods with regards to their lack of coherence and extractability of information. Allahyari et al. proposed a detailed survey of summarization approaches that are either extractive or abstractive. the experiments demonstrated that the abstractive summarization approaches are computationally expensive, yet they generate a coherent and semantically rich summary.

Similarly, research has proven that news recommendation methods fail to accurately assess complex user behaviors in a dynamic news environment. Wu et al. carried out a study on various neural news recommendation methods using a survey to prove their effectiveness in using deep learning algorithms to perform multi-task learning and also using an attention model to assess user behaviors based on click-through rates and dwell times to prove their superiority to traditional collaborative filtering using a 15-20% margin.

Lastly, the speed with which misinformation is able to disseminate makes it impractical for facts to be manually checked. Zhou et al. conducted a survey of various techniques for fake news identification as well as mitigation, including those using machine learning, deep learning, knowledge, and ensembles. Their findings indicated that models that rely on linguistic features, source credibility, and propagation patterns produce high levels of performance, where an accuracy level over 90% is achieved through Ensemble-based models under a controlled experimental environment.

TABLE 1: COMPARATIVE RESEARCH

Year	Paper Title	Drawback
2017	An Efficient Fingerprint Enhancement and Matching Technique	Performance degrades with partial or smudged fingerprints
2018	Fingerprint Identification Using Gabor Filters and Neural Networks	High computational complexity and longer processing time
2029	Secure Fingerprint Authentication System Using Machine Learning	Requires large training datasets and suffers from overfitting issues
2021	Deep Learning-Based Fingerprint Recognition System	High memory and processing requirements; limited performance on low-resolution sensors

III. PROPOSED SYSTEM

The current paper presents a machine learning-based DMIT framework that focuses on the accurate assessment of human intellect through the evaluation of fingerprint patterns using the Dermatoglyphics Multiple Intelligence Test technique in an efficient manner. A data-based approach has been taken in the proposed framework to make the test more accurate.
The process starts from data acquisition in which finger image scanning is carried out using a high-resolution digital fingerprint scanner to accurately record ridge details and minutiae from fingerprints. Pre-processing of these acquired images is required to remove noise from the image and enhance image contrast to sharpen ridges on fingerprints.

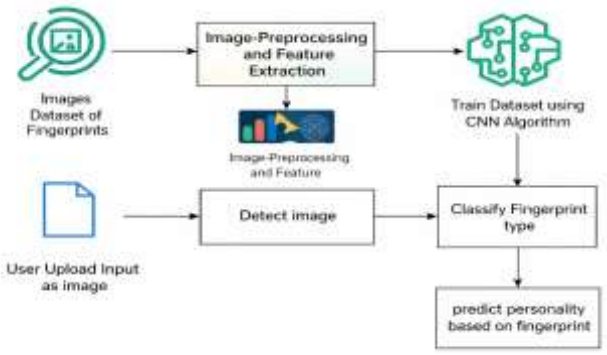
Once preprocessing is done, feature extraction takes place through the use of Convolutional Neural Networks (CNN). This model will learn and select fingerprint characteristics such as density, distribution of minutiae points, as well as core-delta points for intelligence pattern representation.

By employing cognitive analysis based upon machine learning algorithms, the proposed system forecasts intelligences and personality traits for individuals, which are then correlated and compared with existing cognitive models such as Gardner's Theory of Multiple Intelligence. The proposed system enables the learning process to ensure enhanced accuracy in system prediction.

Finally, the results of the predictions are represented using interactive visualization dashboards, with clear indications of the cognitive strengths and the intelligence characteristics. Based on the insights obtained, career suggestions are video stream and then transformed to the drone's coordinate frame.

IV. IMPLEMENTATION

Fig. 2. Model Working



The suggested intelligence prediction system based on the use of the DMIT technique is realized by the implementation of the system with specific characteristics so that the system's design becomes modular and flexible. The specific implementation of the suggested system occurs over certain well-defined phases of the intelligence prediction system.

A. Dataset:

There are 4000 RGB images in the data set of fingerprint images. Each of them has the images have been resized to a fixed size of 128, 128, 3. 40 images, or 1 percent, are used for testing; and 3960 images, or 99 percent, are used for training. There are many different such as arch, loops, and whorls, and other kinds. with the intention that the model will be able to recognize them as well predict learning styles and personality traits. Normalization and image enhancement are part of the preprocessing process, which makes the dataset uniform. The system's performance can be tracked using the following improves along with an increased dataset size using a complex technique of augmentation, however this small dataset size is the cause of challenges in reaching high accuracy.

B. Training and Validation

The CNN was trained with a 4000fingerprint image dataset resized into the standard shape of 128x128x3. The model due to preprocessing, the model is able to extract patterns efficiently. It is also a reliable ensuring the consistency within the inputs. Fingerprint patterns from the research done in dermatoglyphics were encoded by the classification of the dataset into the five types of arches, tented arch, left loop, right loop, and whorl. With the use of 3960 images from the entire dataset, the model was trained to recognize the minute patterns and characteristics of the Palm print classes. Cross-entropy losses of the model were decreased by adjusting the weights and however with an Adam optimizer. In the stages that would follow, many convolutional layers have been used in the understanding of data better and obtain more useful features.

Further, the best model is also attributed to the use of the fully connected layers end-to-end manner without the need features that are to be manually created, the "pooling layers" that are used for reducing the data, and the output of the network. A sample of the training data set that comprises the training loss and accuracy, was examined for 25 epochs to establish the learning curve of the model. Moreover, a sample of dataset was utilized in validation in order to permit the unseen examples found in the end of each epoch to gauge the model's capacity— for generalization. Thus, the most effective way of avoiding the overfitting that occurs when the hyperparameters, such as learning rate and batch size, are modified was the process of validation

V.EVALUATION METRICS

For the performance assessment of the proposed system titled "Talent-Print: AI-Based Fingerprint Learning and Personality Profiling," various classification and prediction performance measurements were used. These measurements evaluate the system's performance for the recognition of the fingerprint pattern and the prediction of the personality traits.

A. Evaluation Metrics

1. Classification Accuracy

Classification accuracy refers to the percentage of fingerprint patterns, such as arches, loops, and whorls, that the

suggested method correctly identifies. It assesses the overall accuracy of fingerprint pattern recognition.

2. Prediction Error

Prediction error is a measure of how much the systems prediction of personality and cognitive traits deviates from the validated "benchmark" scores. Clearly, lower prediction error is more desirable as it indicates a more accurate "alignment" of the systems' output to cognitive models.

3. Precision

Measured as the proportion of relevant personality features identified by the system. Recall: The proportion of valuable personality aspects carried out successfully.

4. F1-Score

Calculated by finding harmonic means. A balance of precision and recall. It broadly depicts the overall model performance and thus accentuates the effectiveness of the proposed system for classification.

A. Results Analysis

From the experimental outcome, the proposed framework for AI-based classification has high classification accuracy for finger pattern recognition and stable classification performance for personality prediction. From the training loss curve and the validation loss curve in Figure 3 and Figure 4 respectively, the convergence of the system can be considered stable without notable overfitting resulting during the training

A comparative analysis of the accuracy levels that various machine models use to classify information, as deep learning models excel in performance compared to other traditional models due to their capacity to learn feature representations.

VI. CLASSIFICATION

Non-invasive Personality Prediction Systems and invasive Personality Prediction Systems are both acknowledged by Zhang et al. (2024). The advantage of non-invasive Personality Prediction System is that it involves no invasion of the patient's body whatsoever, but the quality of the signal may be degraded because of using external imaging devices or electrodes on the scalp to measure behavioral trait correlation. There are surgical risks and ethical issues with invasive Personality Prediction System, that involves inserting electrodes into the cerebral cortex to access better quality data.

TABLE 2: COMPARISON BETWEEN NON-INVASIVE AND INVASIVE PERSONALITY PREDICTION SYSTEMS.

Aspect	Non-Embedded (Non-Invasive) BCI	Embedded (Intrusive) BCI
Advantage	**High safety:** No need to implant any equipment inside the body, hence avoids surgical risks.	**High signal quality:** Neural activity data with high resolution and accuracy can be obtained.
Disadvantage	**Weak signal quality:** Signal penetrating the scalp is weak, so accuracy may be lower.	**Surgical risk:** Requires surgical implantation, which involves risk of infection or other complications.
User Acceptance	**Easy to accept:** Suitable for a wide range of users regardless of health or age.	**Limited adaptability:** Not suitable for everyone (e.g., people with health conditions or age restrictions).
Accuracy	**Limited accuracy:** Deep or high-resolution neural data is hard to obtain.	**Precise control:** Enables fine motion control and complex information processing.
Convenience	**High convenience:** Easy to use, requires minimal preparation or recovery time.	**Usage restriction:** Requires regular calibration, maintenance, and adjustments.
Control Ability	**Limited control:** Cannot perform advanced tasks like prosthetic limb control.	**High stability:** More stable and less disturbed by external factors.

VII. LIMITATIONS

Despite promising results produced by the proposed Talent-Print system, a number of limitations have to be conceded.

1. Limited Scientific Validation

Long-term research from a large number of peer-reviewed scientific sources still has not established a strong correlation between fingerprint patterns and personality or trait intelligence. This reduces the interpretability and general acceptance of the results.

2. Dataset Dependence

The quality, size, and variability of the fingerprint dataset have a great implication for the accuracy and reliability of the system. Small, imbalanced, or low-quality data may lead to biased or inconsistent prediction.

3. Over-simplification of Cognitive Traits

Human intelligence and personality depend on many biological, psychological, and environmental factors; using only fingerprint features might oversimplify the complex nature of cognitive and behavioral traits.

4.Generalization

A model learned from information obtained from a particular demographic or population set might not work well on people of different age groups, ethnicity, or geographical locations.

5.High Computational Requirements

Deep learning in fingerprint analysis is considered to be computationally intensive and is likely to require high-end hardware and increased training time, which might limit its usability on a large scale in real-time applications.

6.Limited Model Interpret

The CNN-based models are a kind of black box. Hence, the reasons behind individual predictions by the CNN models are not easy to determine. 7.Scal For the system to scale to the global level, large and diverse datasets need to be established since the lack of these large and well-labeled data sources can make the system difficult to scale to the global level.

VIII. CONCLUSION

Among the numerous domains impacted by the biological illness known as Autism Spectrum illness (Personality Profiling) are social interaction, communication, and behavior. Conventional approaches to diagnosing and treating human personality profiling (Personality Profiling) have included things like psychological observation, behavioral assessments, and parent-reported questionnaires. These methods, while effective, can be time-consuming, subjective, and miss the biological dysfunctions at their source. AI-driven Fingerprint-Based Personality Prediction (Personality Prediction System) technology has recently arisen as a game-changing tool in this field, providing a more objective, real-time, and biologically grounded method of prediction and intervention. By directly reading AI model signals, most often from fingerprint images (Fingerprint Datas), AI model connectivity interfaces (Personality Prediction Systems) allow for the early and reliable prediction of human personality profiling (Personality Profiling).

Beyond its diagnostic applications, Personality Prediction Systems are revolutionizing the therapeutic landscape for individuals with Personality Profiling. There is promising evidence that some applications, such as AI feedback system training, focus enhancement, mood regulation, and assistive communication technologies, can aid individuals with autism and other co-occurring illnesses in enhancing their social and cognitive abilities. By incorporating Personality Prediction Systems with technologies such as virtual reality (VR), artificial intelligence (AI), and robotics, training or guidance is taking a more dynamic, interactive, and engaging turn. With these new developments, tailored treatment plans can be created to meet the unique biological and behavioral needs of individual individuals.

However, there are still several challenges that need to be overcome before Personality Prediction Systems may be widely used to treat Personality Profiling. Signal noise, device usability, cost, and ethical concerns around data privacy and security are among the many technological issues that require fixing. Collaborative efforts spanning bioscience, engineering, psychological medicine, psychology, and education are essential for ensuring that Personality Prediction System systems are usable, effective, and supported by psychological trials. Despite these challenges, the outlook for Personality Prediction System development is positive. Due to the exponential evolution of technology, Personality Prediction System could one day enable more precise Personality Profiling prediction and more tailored therapies than was before achievable. An improved understanding, prediction, and management of human personality profiling (Personality Profiling) might ultimately improve the quality of life for families and individuals affected by the illness.

REFERENCES

1. S. Darade, A. Jadhav, H. Patil, V. Gaikwad, S. Raikar, and D. Patil, "Multiple Intelligence Evaluation Using Dermatoglyphics for Identifying Learner Types and Personality in Children," IEEE, 2024.
2. IEEE, "Application of Deep Neural Networks in Dermatoglyphics for Academic Achievement," IEEE Transactions, 2023.
3. M. Singh and O. Majumdar, "Dermatoglyphics: Blueprints of Human Cognition on Fingerprints," IEEE Transactions on Pattern Analysis and Machine Intelligence, 2015.
4. N. Alam, M. Ahsan, J. Haider, and M. Kowalskie, "An Intelligent System for Automatic Fingerprint Identification Using Feature Fusion by Gabor Filter and Deep Learning," Science Direct, 2021.
5. Y. Liu, H. Zhang, and C. Li, "Feasibility of Identifying Children's Intel ligence through Dermatoglyphic Analysis," China Education Research, 1999.
6. K. Darji, S. Darji, S. Nisar, and A. Joshi, "Automatic Dermatoglyphics Multiple Intelligence Test Based on Fingerprint Analysis Using Convo lution Neural Network," Springer, 2021.
7. DSM-5, Diagnostic and Statistical Manual of Mental Disorders, vol. 5. Washington, DC: American Psychiatric Association, 2013.
8. Y. Fang, Z. Ye, and X. Chen, "The influence of science and technology on the development of modern surgery," J. Clin. Surg., vol. 32, no. 01, p. 15, 2024.
9. A. Finke, A. Lenhardt, and H. Ritter, "The Mind Game: a P300-based ai-driven fingerprint-based personality prediction game," Neural Netw., vol. 22, no. 9, pp. 1329–1333, 2009.
10. C. Frauenberger, "Rethinking autism and technology," Interactions, vol. 22, pp. 57–59, 2015, doi: 10.1145/2728604.