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AI based Interviewing for Personality Detection and Assessment

D.Shashidhar, K.Ajay Karthik *, D.Karthik**
Nuli Namassivaya
Electronics and Communication dept,
MVSR Engineering College

***Abstract*:** Because of the pandemic, several sectors are experiencing substantial hurdles during the recruitment process. Since it's hard to evaluate individuals online, the IT industry is also having trouble with hiring procedures. As a result the automated interview analysis has risen for identification of particular personality traits , which has been a topic of current research. Advances in CV and pattern recognition have led to the development of CNN models based on Deep Learning approaches. This technology has a wide range of applications in domains like human-computer interaction, personality computing, and psychological testing. With a webcam, these models can precisely identify nonverbal signs and attribute personality attributes to people. Companies may utilize interview traits using Artificial Intelligence to either supplement or supersede the self-reported personality test that is currently in use instruments—which applicants for positions routinely fabricate to obtain socially acceptable results. An AI-based interviewing method was established through the use of AVI and the implementation using individuality prediction algorithms trained on the initial assessment v2 data set. By extracting pertinent information from the AVI and utilizing facial expressions to generate authentic personality ratings, the goal was to accomplish automated personality recognition (APR). The model is trained using the VGG-16 behavioral model system in order to improve the model's accuracy in personality prediction.

Keywords: Convolution Neural Network(CNN);Visual Geometry Group(VGG); Artificial Intelligence(AI);.

I. INTRODUCTION

During the pandemic, employers are traveling around and haphazardly conducting interview processes, and no organization retains any documentation of the interviewer's responses, including their tone or content. The system that uses AI helps us to simplify lives in several ways [1].An organization's human resources division invites potential employees for recruitment based solely on their CV in the conventional method of interviewing candidates for a particular position. To determine whether a candidate is qualified for the post, this HR department directly assesses candidates' talents through their resumes. Interviewers have an essential role in the hiring process since they evaluate applicants and select the most qualified one for the position. A 2 candidate's personality is evaluated during an interview alongside their abilities and knowledge since they need to have the right commitment to work and an upbeat mindset for the position [18].

The main objectives of the project are to develop an algorithm that can assess resumes and identify emotions from a person's face and speech. The goal of the paper was to develop an end-to-end AI-powered interviewing system that could categorize resumes from candidates and pinpoint important personality features through asynchronous video interviews [6]. However, work done before this time frame is linked to many labor-intensive machine-learning techniques that could affect efficiency of the system. When it comes to tasks like image processing, Convolution Neural Networks have demonstrated remarkable performance.[19] CNN's method generates an interviewer that is based on artificial intelligence that is automated and able to categorize applicants. The proposed approach uses video analysis to classify an individual's performance during an interview. identifying a variety of facial expression traits, parsing and analyzing resumes, tone evaluation, voice emotion recognition, and displaying the results on the user's system [2].

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II. RESEARCH ELLABORATIONS

In the existing model, The number of systems that use machine learning algorithms to predict personality traits has significantly increased during the last few years. These setups are developed to assess different facets of human behavior, including speech, body language, and facial expressions, in order to gauge the degree of a certain personality trait. The major characteristics Types model, that is frequently employed in trait research, is one such framework. IBM Watson Personality Insights is one of the most well-known systems for forecasting personality qualities. It analyzes text data, including emails and postings on social media, using natural language processing to identify personality traits[13]. This work presents the ChaLearn LAP initial impressions v2, the benchmark dataset for multimodal personality trait research. The purpose of this dataset is to test and train models for forecasting characteristics of personality using auditory and sight-based information. The dataset consists of self-reported personality traits as well as a substantial amount of videos showing people performing specific activities and expressing their identities in front of the camera. The personality traits under research were part of the standard model used in the study of personalities, the Five Factor Model, also known as the Big Five. It stimulates agreeableness, conscientiousness, neuroticism, openness, and extraversion—the five facets of the human personality. Each of these five attributes is given a number between 0 and 1, each clip receives ground reality labels as a result.[14] All things considered, the personality prediction algorithms currently in use have the power to completely change the understanding of human behavior and offer insightful information for a wide range of disciplines, including marketing, psychology, and human resources. These systems do have some drawbacks, though, and further study is required to increase their precision and dependability[20].The employment of such technologies raises additional ethical issues, such as the possibility of bias, privacy infringement. In spite of these obstacles, it is anticipated that personality prediction will keep expanding and developing as new tools and methods become available.

III. IMPLEMENTATIONS

In the proposed model, Individuals are known for their unique personalities, which are characterized by their unique ways of thinking, feeling, and acting. Personality evaluations are widely used to determine if a person is suitable for a given job or to what extent they fit into a certain cultural context. There are various options for personality evaluation models, but the five traits of personality. This paradigm provides a clear taxonomy for evaluating job applications for academics and practitioners. The FFM model is made up of Openness evaluates a person's inventiveness and creativity, whereas conscientiousness examines a person's ability to be organized, careful, and deliberate. A person's talkativeness, vitality, and assertiveness are determined by extraversion, agreeableness of sympathy, friendliness, and affection. In many cultural contexts, the major five personality characteristics are used to evaluate job candidates and forecast how well they would do on the job. The proposed approach aims to predict a person's personality attributes based on a single-user video clip. The suggested method is depends on the individual learning of personality traits by using several modalities-specific neural networks. This high-level information is extracted from the networks and integrated to provide an overall evaluation of the individual's psychological characteristics.

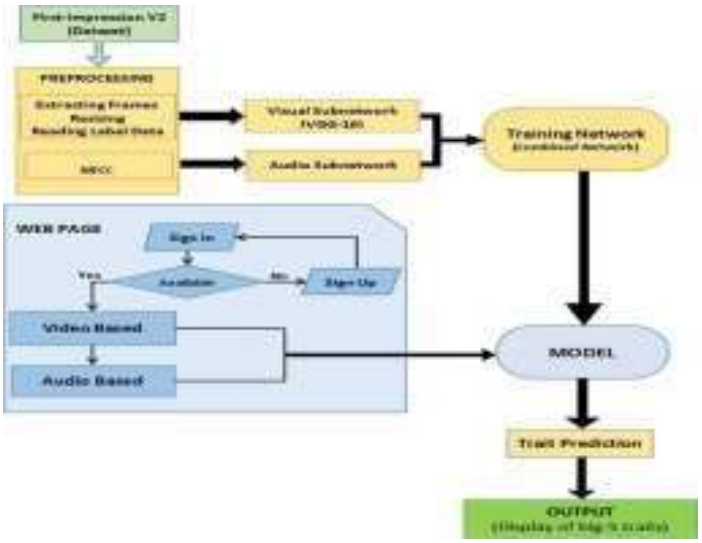

Fig 1

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A flowchart explaining this process is shown in Fig 1. The behavioral prediction model makes use of many subnetworks that have been taught to identify personality qualities with input data. To guarantee that the neural networks are trained independently of each modality-specific model, in question is capable of learning the relevant properties effectively and improving the final prediction output. The model is protected against training phase bias towards a certain feature by employing this technique. Based on earlier studies, this approach has been shown to improve personality prediction accuracy.

The approach consists of taking a single person's video clip as data and predicting the personality qualities that go along with it. The suggested method is based on using several neural networks, each tailored to a particular modality, to learn personality traits separately. Following their acquisition from the networks, these high-level features are combined to produce a final prediction regarding the individual's personality traits. Four distinct neural networks were trained one for ambient features, one for facial features, one for audio features, and one for transcription features—to extract high-level properties. Even though it would be difficult to combine all the networks, In the approach utilized, distinct personality prediction models were deliberately maintained for each of the four types of features (ambient, facial, audio, and transcription).

Benefits of the suggested system:

- Improved performance.
- The efficiency of time is improved

The trait prediction model makes use of many subnetworks that have been trained to recognize personality traits based on input data. Fig 1 shows a flowchart that explains this process. To ensure that the network can effectively pick up the relevant characteristics and improve the outcome of the final prediction, each modality-specific networks is trained independently. By using this method, the model is shielded from training phase bias toward a particular feature. This tactic, which is based on earlier studies, has been shown to increase personality prediction accuracy. Fig shows work flow and how the model is executed and process is shown in the form of block diagram.

IV. RESULTS OR FINDING

One kind of test for software methods that focuses on verifying the data stream throughthe software system is called data flow testing. Finding any flaws or mistakes in the data routes of the system is the goal. This method works especially well for assessing intricate systems that need a lot of data processing and modification. Missing data, improper data processing, uninitialized variables, and other problems can all be found via data flow testing.

User interface testing is a method of finding errors in software or anything that is being assessed using a GUI, Programs, websites, and other similar environments commonly use this testing technique.

The convolutional neural network (CNN) training results for personality detection in interviews are displayed in the graphs. The model's accuracy over time (measured in epochs) is displayed on the left-hand graph using the training data (blue line) and the validation data (orange line). The model's mean absolute error (MAE) on training data(blue line) and validation data (orange line) is displayed on the right-hand graph as a function of time (in epochs).

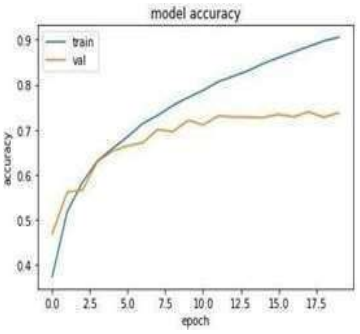

Fig. 2.Accuracy (precision vs epoch)

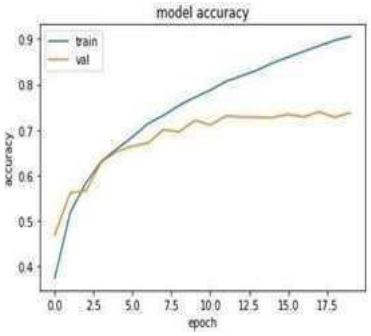

Fig. 3. Evaluation metrics

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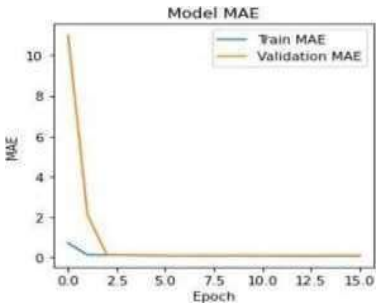

Fig. 4: Loss (MAE Vs Epoch)

Fig2 shows how successfully the model predicts the right personality trait for each interview is measured by its accuracy. The difference between the model's predictionsand the real personality traits is measured by the MAE.

The figures demonstrate how the model's performance on the training set of data rises with time, eventually leveling off at about 90 percent accuracy. Although it does not eventually reach the same level as the accuracy of the training data, the model's accuracy of the data used for validation grows over time. This implies that the model may not generalize effectively to new data and is overfit to the training set.

Table 1: Comparison Table Of Different MAE

Feature	Model 1-MAE	Bain 1 MAE	Validation 1 MAE
Graph Type	Line graph	Line graph	Line Graph
X-axis	Epoch	Epoch	Epoch
Y-axis	MAE	MAE	MAE
Minimum Value	-10	-4	-6
Maximum Value	-6	10	8
Overall Trend	Decreasing	Decreasing	Decreasing
Key Values	Epoch 75: MAE=2	Epoch 50: MAE=4	Epoch 100: MAE=4

Table 1 shows comparison between different Mean Absolute Error with minimum, maximum value including Model-1 MAE, Bain 1 MAE, Validation 1 MAE,Fig 2 shows how successfully the model predicts the right personality trait for each interview is measured by its accuracy. The difference between the model's predictions and the realpersonality traits is measured by the MAE.

V. CONCLUSIONS

The primary goal of this project is to develop personality computing by utilizing third-party datasets to predict personality using deep learning-based architectures. Validating automated personality detection using manually labeled characteristics obtained from remote cues was a hurdle in earlier personality computing experiments. However, recent research has leaned on Deep Learning architectures to recognize nonverbal clues and determine character attributes, using subjective judgments as independent variables. However, this study created an AVI model that can automatically determine the genuine personality of interview subjects by incorporating a semi-supervised CNN- based deep learning model. With a percentage ranging from 61 to 79, The accuracy of the high-performing APR approach employed in this investigation was higher than thatof earlier laboratory testing. of nonverbal communication. The results indicate that theAVI may be used to supplement or improve traditional techniques of self-identified assessment of characteristics, which may be influenced by social desirability when it comes to employment searches.

In summary, The creation of a precise Automated Personality identification system with the integration of a semi-supervised deep learning model and an audio-visual component holds promise for supplementing or replacing current self-reported personality tests inthe context of occupation searching. APR based on the CNN model beat earlier experimental tests, indicating the value of Deep Learning architectures in personality prediction.

Future Scope: Previous studies have demonstrated that deep neural networks that learn multimodal features such as image frames and audio—perform better at predicting the primary five characteristics than those that learn unimodal features. Future

research could integrate prosodic characteristics with visual techniques to understand how to determine the personality of an interviewee. Furthermore, the study's participants werea specific kind of professionals, which would limit how broadly the experimental results can be applied. Future research ought to involve a more diverse group of subjects

AUTHORS

**First Author* – *D. Shashidhar, B.E, MVSR Engineering college and*

**Second Author* – *K. Ajay Karthik, B.E, MVSR Engineering college and*

**Third Author* – *D.Karthik, B.E, MVSR Engineering college and*

Correspondence Author – *Er.Nuli Namassivaya, nnamassivaya@mvsrec.edu.in*

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