

# AUTOMATIC PERSONALITY RECOGNITION SYSTEM

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**Abstract:** In today's era the advancement in artificial intelligence(AI),the automatic analysis of video interviews to apprehend individual personality traits has become a progressive area of research. Progress in computer vision and pattern recognition based on deep learning(DL) have guided to the foundation of convolutional neural network models that can effectively recognize human nonverbal cues and impute their personality traits with the usage of a camera. In this paper, an end-to-end AI interviewing system was developed using video of the interview fetched and CNN model to perform automatic personality recognition (APR) based on the features extracted from videos and the personality from the facial expressions and self reported questions. The AI interview agent can replace existing self-reported personality assessment methods that job seekers may control to achieve socially desirable effects.

**Keywords:** Big five, convolutional neural network (CNN), personality computing, TensorFlow, Deep learning.

## I. INTRODUCTION

Personality is the most important trait for the selection in a particular job. In the traditional way of job interviews, the person gives information about himself in the resume in which he can lie and hence his personality can be wrongly interpreted by the interview taker. So, in order to predict the personality of the person, inputs cannot be taken as the traditional way. In our system, we take the inputs as the video interview and based on the audio and the video fetched during the video interview, we can predict the personality by using CNN model in order to predict the facial expressions throughout the video. These expression can also be recorded with the supervised learning model but it takes a lot of manual work and similar it is for the personality that is predicted using the OCEAN model for the audio that is fetched. Thus Deep learning model are proven to be highly useful in order to predict the personality based on the video fetched.

## II. OBJECTIVES

1. Understanding the pattern involved in the prediction of the personality of a person.
2. The Automatic Personality Recognition used in Asynchronous Video Interviews system aims to develop a software to predict the personality of a person based on the audio and video fetched during the Video Interviews.
3. Design an algorithm that can combine the personality features that are extracted by the audio and video in order to provide with the overall personality of the system.
4. Attain accuracy in predicting the personality traits from the audios and the videos recorded.

## III. RESEARCH METHODOLOGY

We have researched about the personality prediction and found that each and every person have different ways of expressing them and thus all those ways participate in the personality of the person. The personality can be predicted by using mainly two ways i.e. (1) Personality from the audio recorded for the particular answer and (2) Personality from the video by the expressions a person makes while answering in the asynchronous video interviews.

Using audio to predict the personality can be done using the Big Five traits or the OCEAN model. The OCEAN model basically stands for openness, conscientiousness, extraversion, agreeableness, and neuroticism. All of these refers to the quality of the person based on the text written or expressed by them. These five can be defined as: Openness(the degree to which an individual is imaginative and creative.), Conscientiousness(the degree to which an individual is organized, thorough, and thoughtful.), Extraversion(the extent to which an individual is talkative, energetic, and assertive.), Agreeableness(the degree to which an individual is sympathetic, kind, and affectionate.), Neuroticism(reflects the tension, moodiness, and anxiety an individual may feel.) Thus, the audio can be fetched from the video of the person



using the extraction. Thus, the fetched audio that is the answer of individual which shows his/her perspective regarding the question can be pass to the audio-to-text conversion. The text that is now generated can be passed to the five traits model to predict each quality that is reflected from the person

Using video to analyse the personality can be done using the Convolution Neural Network. When the individual answers the question, his/her expression changes in respect to the question. And the result of the expression change can be used as a perspective to analyse the emotion of the person. A CNN model to detect the facial expression from the images stating whether the person is happy, sad, angry, surprise or neutral can be made. The video that is fetched during the interview can be extracted into large number of frames. These frames will contain all the expression of the person throughout the video interview and these frames can be looped through the trained model to predict the expression of the person. Thus, considering both the prediction from the audio and the video an algorithm can be designed such that it will recognize and rate the personality of the individual.

IV. SYSTEM DESIGN

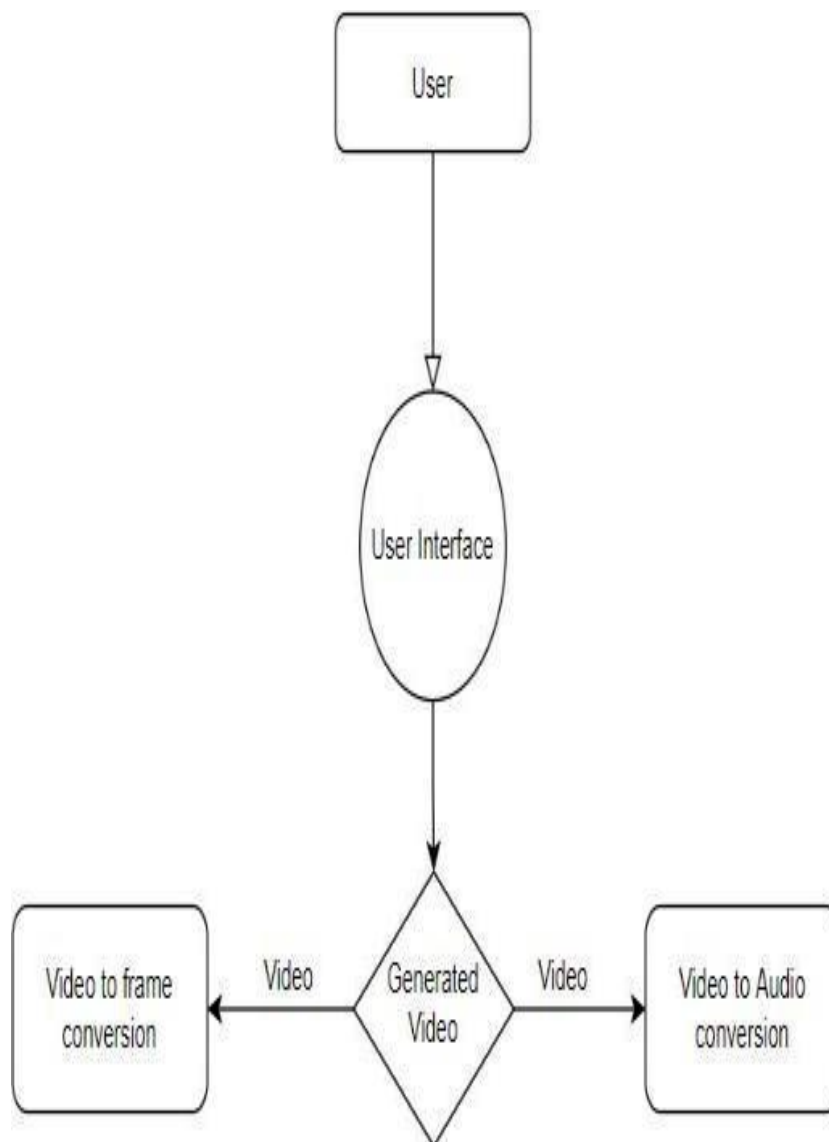


Fig. 1 Basic design for audio and video fetching

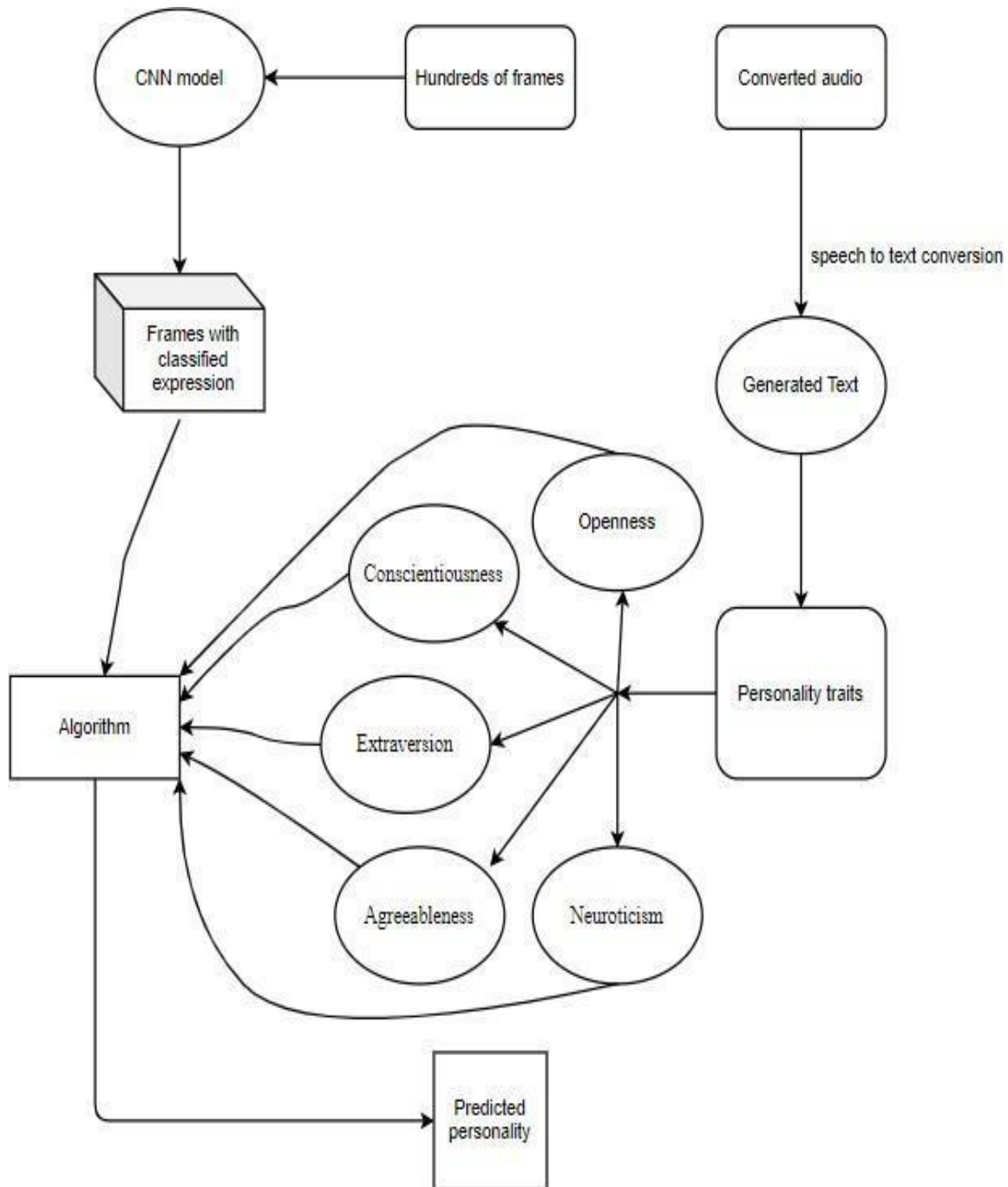


Fig 2. Design for the process of flow throughout the system

## V. PROPOSED ALGORITHM AND IMPLEMENTATION

1. We have used a module called moviepy in order to get audio from the video.
2. The extracted audio is passed to the Python speech to text converter in order to convert the audio into the text.
3. The prediction using the OCEAN model is based on training different dataset like the one that contain the words with it's classification as the kind of word it is either it is expressing anger or happiness or introvert, etc. The next data set is the one that contain essay and after that is the one that contain the various post and the type of that post. Thus all these dataset are trained using the algorithm like SVM, DECISION TREE, LINEAR REGRESSION and NAÏVE BAYES.



4. The video that is fetched is converted in numerous frames using the opencv library and then it is stored and then looping through each frame/photo, it is passed to the trained model to classify the facial expression. The recorded expression on the particular frame is stored in the variable and gradually each variable containing each expression is stored and its value is increased gradually.
5. The CNN model that is used in order to catch the emotion or the facial expression of a frame is made up of 7 blocks. The first four blocks each contains these layers as Convolutional2D, Activation function, Batch Normalization, Convolutional2D, Activation function, Batch Normalization, Max Pooling layer and a dropout layer. Thus after the 4 blocks made up of the above layers, there is block 5 containing flatten layer, Dense layer, Activation function, Batch Normalization and Dropout layer. The block 6 is same as 5 but the flatten is not present. Then, the block 7 contains Dense and Activation function. Thus, this completes the deep learning model.
6. The result that we get from the video part and the result from the audio part is combined and an algorithm is designed in order to predict the overall personality of the user.
7. Thus, the personality is predicted using the asynchronous video interview.

## VI. RESULTS

1. The user personality is predicted on both the audio and the video terms.
2. The video to audio conversion is shown in the below Fig3.
3. The personality from the OCEAN model is in the form of 1 and 0 representing whether the traits from the model is present in the generated text or not.(Fig. 4)
4. The personality generated from the CNN model contains the result in the form number of the images that contains a particular expression from the expression Happy, Sad, Surprise, Angry and Neutral.(Fig. 5)
5. The fig. shows the predicted output that is given by the algorithm that is made from considering the output from the audio and video.(Fig. 6)

```
chunk: 0%|
MoviePy - Writing audio in my_result.wav
MoviePy - Done.
```

Fig. 3 Video to audio conversion

```
Audio Personality
1 1 0 0 1
```

Fig. 4 Personality from audio



Video Personality  
0 18 304 347 0

Fig. 5 Personality from video

Your personality is Confident but you also seem to be  
having a trait where face seems to be neutral  
You should be more interactive and try to be a good listener

Fig. 6 Predicted Personality

## VII. BENEFITS TO THE SOCIETY

1. As in today's world, we are unable to go out due to the pandemic and the work is being done from the home itself, so the system will be useful for the company to gather the employees for them.
2. It will be highly beneficial for the people who want to know the flaws in their personality skills.
3. As it tracks each and everyone's personality from speech and video so the candidate can understand in which he/she needs to be improved.
4. Similarly the application if built for management it will be helpful for the organization to monitor the personality of their employees and improve them.

## VIII. FUTURE SCOPE

1. In future, the technical aspects can also be added in the system which can test the technical knowledge of the candidate.
2. The user will be made aware on how to improve their personality to get improved in their field.

## IX. CONCLUSION

The personality can be predicted using this method and thus it can be used to identify and improve the personality of person

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