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Virtual Recruitment System using Machine Learning and Artificial Intelligence

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ABSTRACT: Artificial Intelligence can make recruiting process faster by automation, efficiently handling assessments, processing resumes, analyzing candidate's personality and making unbiased decisions. Machine learning algorithms, AI and data analytics can be used for screening, assessing and recruiting. Computer vision can be leveraged in virtual recruitment, which include face detection and recognition. Face Recognition begins with extracting the coordinates of features such as width of mouth, width of eyes, pupil, and compare the result with the measurements stored in the database and authenticate (facial metrics). This can be further processed for desired output, like for proctoring assessments and determining personality of candidates by processing images and videos captured using Image processing algorithms. Speech recognition i.e, text to speech and speech to text APIs have enabled recruiters for better proctoring and interacting with candidates.

KEYWORDS: Face detection, Face recognition, Facial Expressions Analysis, Cascade Classifier, Fuzzy logic, CV Analysis

I. INTRODUCTION

To create a virtual recruitment system using artificial intelligence which will help automate some parts of high-volume tasks of recruiting workflow like screening, assessments, personality analysis etc, and help selecting potential candidates, and can help save recruiter's time. With an emphasis on virtual engagement, the online remote exam, also conducted by AI assistance, prevents cheating and recognizes the candidate's identity, without their physical presence. This can be done by using facial recognition technology. The adoption of artificial intelligence has also benefited in video interviews and discussions. It offers objective insights into the soft skills of the candidates like their creative and critical thinking capabilities. Both I/O psychology and computer science scholars have suggested that artificial intelligence (AI) may surpass humans in recognizing or predicting an applicant's personality for screening job applicants because applying AI techniques to audio-visual datasets can achieve more reliable and predictive power than human raters. "AI is a branch of computer science that seeks to produce intelligent machines that responds in a manner similar to human intelligence", and it aims to extend and augment human capacity and efficiency of mankind in tasks of remaking nature. In this project, we are planning to have company wise selection criteria, eligibility, and test designs. For now, it has been planned from the perspective of helping students to have a deep insight and practice of the recruitment process of various companies and for various job profiles. This can be scaled up in future for organization's use.

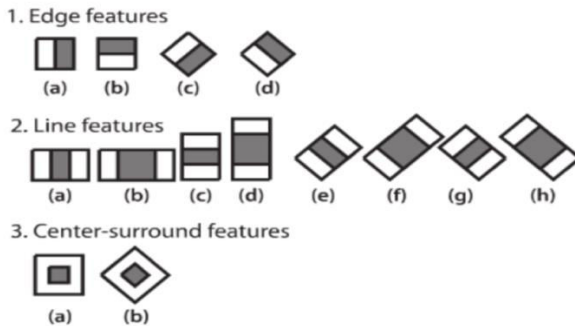
II. RELATED WORK

This project is done in 4 stages, Face Detection, and recognition wherein, Face Detection determines the locations and sizes of human faces in arbitrary images, and in face recognition, the use of face detection comes first to determine and isolate a face before it can be recognised. After authentication, the assessment part comes, where proctoring is done, video is captured, which further gets processed. Then come the AI interview, where there is speech to text and text to speech conversion and the interview is conducted, and the responses are processed using fuzzy Logic.

III. METHODOLOGY

STEP -1: REGISTRATION PROCESS

- Login /Logout page using Html,css,javascript, Django forms, DjangoSQLite database.
- Saving the image in NumPy array, then Using face detection dataset file, to build Cascade Classifier model for detecting faces, saving the 128 dimension face encodings by mapping coordinates of face for using it in recognition process.
- After login, face detection, reading user’s data from database and recognizing the face, using open-cv library in python.



Face Detection determines the locations and sizes of human faces in arbitrary (digital) images.

In **Face Recognition**, the use of Face Detection comes first to determine and isolate a face before it can be recognized.

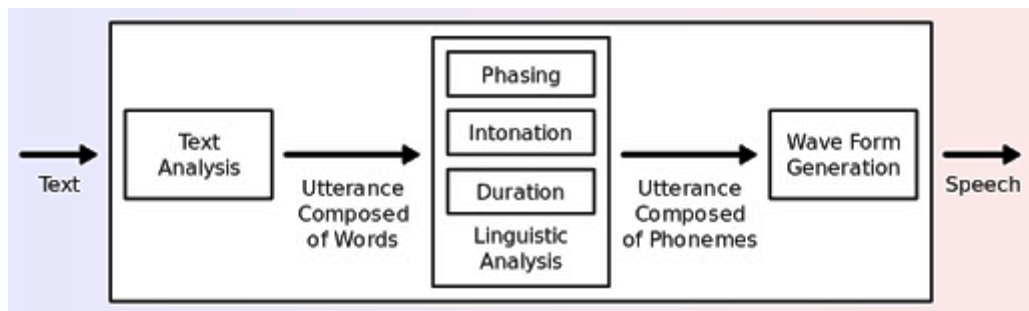
F.no 1 : Face Detection and Recognition Techniques

STEP-2: APTITUDE TEST

- From the database, randomly a question set will be generated for each candidate.
- After assessment selection, the assessment timer starts.
- The camera is on during the assessment, and the video is being recorded for expressions analysis.
- When the aptitude test is completed, results will be processed and analysed at the backend and will be conveyed to the candidate.

STEP-3: AI- BASED INTERVIEW

- Invoking pyttsx3 engine, (which is a text to speech conversion library in python)
- Responses will be recorded and processed using fuzzy logic using Fuzzywuzzy library.
- Pyttsx3 helps convert speech to text and vice versa, which is designed using CNN.
- The image of candidate is captured using OpenCV for emotions analysis.



F.no 2 : Interview Overview

STEP-4: EXPRESSIONS ANALYSIS

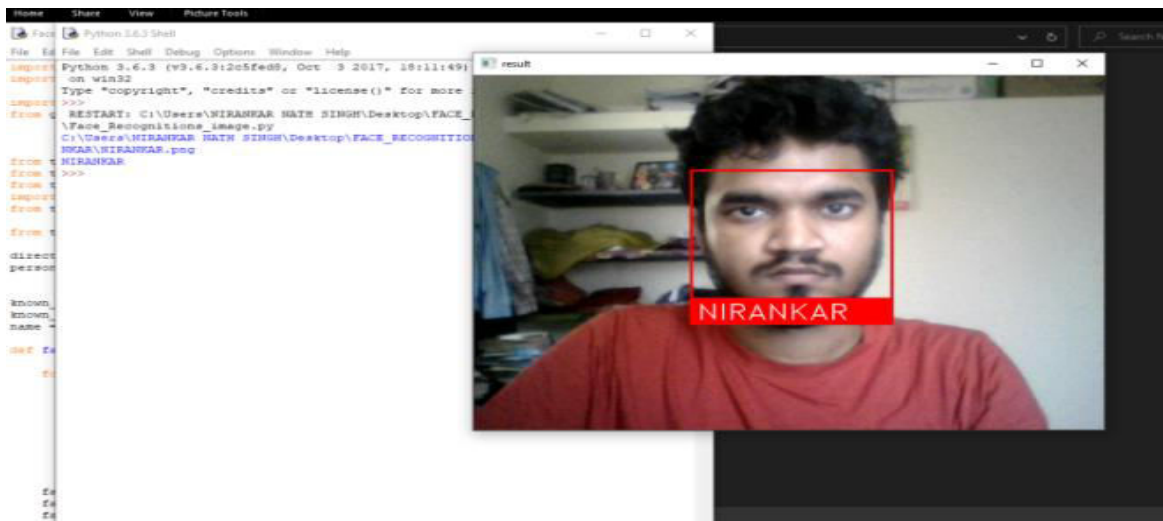
- **Cascade Classifier** using haarcascade-frontalface_default dataset and emotion_model.hdf5.
- Image loaded, face detected, boundary box drawn using SciPy module, offsets are applied and processed.
- Graph of candidate’s emotion is generated using Matplotlib and using statistic module of python, the overall result(mode) is found.
- The expressions result will be generated, and result will be displayed.



IV. EXPERIMENTAL RESULTS



F.no 3 : Aptitude Test



F.no 4 : Face Detection and Recognition

V. CONCLUSION

We have implemented the Virtual Recruitment System using face detection, face recognition and expressions analysis using cascade classifier, and we found out that it is successfully allowing only authenticated users to appear for the assessment. We are also analysing the personality of the candidate by processing the facial expressions of the candidate during Assessment and AI interview. We allowed various users to use the system developed by us and it worked successfully. We are also using Fuzzy Logic to process the response given by the candidate during interview and extract the required answer and give the feedback.



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