

# **FINAL YEAR PROJECT PROPOSAL**

MAULANA ABUL KALAM AZAD  
UNIVERSITY OF TECHNOLOGY,  
WEST BENGAL



## **TITLE OF THE PROJECT**

### **SUBMITTED BY**

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IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF  
BACHELORS OF TECHNOLOGY IN COMPUTER SCIENCE ENGINEERING  
(ARTIFICIAL INTELLIGENCE & MACHINE LEARNING) or COMPUTER SCIENCE FOR  
BUSINESS SYSTEMS

### **SUPERVISED BY**

**BIPASHA MAHATO**



**INSTITUTE OF ENGINEERING & MANAGEMENT**  
Good Education, Good Jobs

**INSTITUTE OF ENGINEERING & MANAGEMENT**  
**(UNDER MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY)**  
**(JULY, 2024)**

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## APPROVAL OF PROPOSAL

This final year project proposal titled, “**TITLE OF THE PROJECT**” is submitted by the following members.

- **Adrija Majumder – 12021002016058**
- **Ambar Roy– 12021002016011**
- **Nilanjan Bhattacharya – 12021002016054**

And would be conducted under the guidance of

- **Bipasha Mahato, Professor, CSE(AIML), Institute of Engineering & Management**

The project proposal is approved as a partial fulfilment of the requirement for the award of bachelors of technology in **COMPUTER SCIENCE ENGINEERING (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)**

**Date of Submission : 26/07/2024**

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**Supervisor**

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**Head of the Department**

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## DECLARATION BY THE STUDENT

We declare that this proposal represents our ideas in our own words written under the guidance of our allocated supervisors. Where others' ideas and words have been included, we have adequately cited and referenced the original source. We declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated, or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will cause disciplinary action by the Institute and can also evoke penal action from the source which has thus not been properly cited or from whom proper permission has not been taken when needed.

### TEAM MEMBERS

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# 1. INTRODUCTION

Employment competition in the current world has become stiff and time-conscious and this has made the process of hiring personnel to take the following facets. Among these innovations, the AI-based job interview analyzers have turned out to be powerful to assess candidates in a better way. These systems make use of state of the art artificial intelligence technology to analyze not only what the candidate is actually saying, but also how and, in some cases, even why they are saying it, such as the nonverbal signs which include eye movement, facial expressions, bends in vocal inflections, and stutters. Thus, the AI can assess emotions such as confidence, anxiety, enthusiasm or sincerity on the basis of the non-verbal behavior. This approach of measuring the interviewee in this case provides a more comprehensive insight of the personality, fluency of the candidate, and EQ which are vital elements for eligibility to a position.

In addition, the new job interview analyzer based on artificial intelligence contains the elements of machine learning that can reveal micro-facial expressions which are the reaction of the interlocutor in response to certain questions. These together with the analysis of the vocal characteristics allows the system to identify the lack of consistency or the presence of stress points in the candidate's answers. For example, a speaker will modify the rate or frequency to express insecurity or when hesitating, a person will stutter. As the tool gives the recruiters a detailed report on these fine categories, it helps to improve the precision and equality in hiring decisions.

Apart from examining face and voice signals, the AI-based job interview analyzer employs edge detection procedures to evaluate an interviewee's body language. This particular part of the assessment is arguably very important since nonverbal communication can express a lot about a subject regarding self-confidence, interest, and courtesy. Using edge detection the system can also see and follow through the contours of the interviewee in the webcam feed to measure body movements and changes of posture. For instance, when a person leans forward he may be interested and being attentive whereas slumping or excessive squirming may depict nervousness or self-uncertainty. The observations made by the AI system about the candidate's body language in the interview can be understood in the context of the interview to have more ideas about the candidate's stance or posture. Such a concerning factor provides a better insight into all grammatical and punctual qualities of a candidate's presentation, providing a better view of his/her fitness for a position.

## 2. LITERATURE SURVEY (NATIONAL & INTERNATIONAL)

Emotion detection through facial expression : Since emotion detection from the face in the context of the AI-based job interview analyzer is to be accomplished through PyTorch, the first step is to create a Convolutional Neural Network (CNN) specifically for the goal of emotion detection. The dynamic computation graph making changes at run time and highly modular makes PyTorch a good choice for building models and makes it easier to debug. First, the data set of facial images and corresponding emotions is formed. This data goes through types of image processing, normalizing, and augmentation to improve the model's resilience. In this architecture of CNN several numbers of convolutional and pooling layers are used for the feature extraction and several fully connected layers classify the extracted

features into the various emotions. PyTorch's torch. that gives the framework for these layers creation and such items as Cross-Entropy Loss, and Adam to help in the model training. The training procedure consists of the gradual reduction of the loss, while the quality of the model is assessed concerning accuracy and F1-score. After training, it can analyze live video feeds or videos in real-time and determine the subjects' emotional states. This capability added to the job interview analyzer enables the determination of the candidates' suitability for a position depending not only on the answers to questions but the feelings as well.

**Vocal and Verbal Cues :** Applying NLP in the job interview analyzer that is based on AI includes determining of emotions based on pitch, tone, and speech disorders such as stutters. The information that can be obtained from the text with the help of NLP techniques and audio features can include aspects such as change of pitch, speaking rate, pauses, etc. They are then processed with machine learning models to determine the emotion such as confidence, nervousness, or enthusiasm. For example, increasing the pitch might provide information about the speaker's excitement level and the frequency of stuttering – anxiety. Thus, the incorporation of these two features offers an opportunity to gain a more detailed understanding of a candidate's emotional state, which can be used along with the identification of other facets of a candidate's personality.

**Body posture detection using edge detection :** When applying edge detection in an AI-based job interview analyzer to look for emotions based on the candidate's body language, what is being measured is the image area captured by a webcam in terms of contour and shape. It is used to recognize regular poses and motions of the body which could be signs of emotions or stances people have. A Canny or Sobel filter, both of which are edge detection algorithms, are used to outline the conceivable extent of the candidate's body in relation to the video feed. When these outlines are followed, the system can isolate particular gestures; these could be crossed arms, leaning forward or constantly changing posture. For example, where a person bends forward might mean they are interested or paying attention while crossing his or her arms might mean that the person is uncomfortable. Furthermore, how often and how the subject moves can tell if he or she is nervous or confident; quick and successive movements depict nervousness, whereas, steady movements depict confidence. Such insights alongside with data obtained from the facial expression and tone of voice analysis give comprehensive outlook on the candidate's emotional status and general interview demeanor. This general evaluation is useful to the recruiters because it gives them a more explicit revelation of the candidate's character and behavioral patterns for wise decision making in the hiring process.

### **3. PROPOSED METHODOLOGY & HYPOTHESIS**

- Detection of a candidate's body posture involves processing the live camera feed for the identification and evaluation of the key body positions, using classification and edge detection in an AI job interview analyzer. The process initiates with edge detection, wherein filters like Laplacian, Prewitt, or Roberts are used to outline the contours and edges of the candidate's body. These filters clearly outline the candidate's profile, focusing on critical areas such as the head, shoulders, and arms. Once such edges have been identified, the system uses classification algorithms to analyze extracted features and determine the kind of posture the candidate is displaying.

- The classification model was trained with a plethora of body postures, all labeled by their appropriateness for the setting of a professional interview. This model makes a distinction between different types of postures: sitting upright, forward, slouching, crossing arms, or fidgeting. For example, an upright posture with straight shoulders can be associated with confidence and focus, while slouching or falling backwards could be indicative of boredom or a general lack of interest in the proceedings. This system includes more subtle cues related to the hand positions or head orientation to arrive at an assessment of overall posture.
- These classifications are then rated by the AI for the candidate's posture for an interview. A high score will connote a professional and fitting posture that shows confidence and engagement, while a low score may point out areas where the candidate's body language needs work. This score will then be shown to the candidate, providing real-time feedback on their nonverbal communication. Such feedback enables candidates to identify and improve their posture in real time, which is the essence of every presentation and communication. By adding edge detection and classification, the AI job interview analyzer gives a comprehensive description and classification of body language, hence enabling more informed hiring decisions.

## **4. CHALLENGES AND OPPURTUNITIES**

### **Challenges :**

- Lack of a suitable dataset : Due to limited research and projects under this topic, there is a lack of a suitable and usable dataset.
- Lack of references : Good and useful references are lacking for this particular topic due to less number of projects and very limited amount of research.
- Inaccessible research : Some papers which could be used for literature survey are hard to access due to lack of citations.

### **Opportunities :**

- The lack of practical work and research, while definitely a challenge, indicates unexplored and uncharted territory for us, which could yield a positive outcome for the development and application of AI based job interview analyzers.

## **5. INFRASTRUCTURE REQUIREMENTS**

- High-performing GPU
- High-Performing CPU
- Deep learning frameworks
- Git to manage codes

## **6. OUTCOMES & DELIVERABLES OF THE PROJECT**

## Outcomes :

The AI job interview analyzer uses edge detection and classification algorithms to evaluate a candidate on the basis of body posture. The model evaluates two key postural indicators: uprightness and body alignment, returning a suitability score. This score provides real-time feedback about the appropriateness of the candidate's posture for a professional setting.

## Deliverables :

This AI-based job interview analyzer model will be integrated into a website and score a candidate based on his/her body posture with live webcam feeds. The edge detection and classification algorithms will be used for the assessment of posture and provide a suitability score. This score will appear in real-time to the candidates for them to adjust their body language in such a way that they come out as more professional during the interview.

## **7. TIMELINE OF THE PROJECT**

1. Empirical study : July to mid-August
2. Algorithm design : August to October
3. Coding, implementing, testing : October to February
4. Paper writing : March to May



## 8. CONCLUSION

In conclusion, This AI-based job interview analyzer website is a resourceful tool to help improve one's interview performance by assessing and scoring body posture in real time. further, it flows a response immediately on the body language of a candidate with the aid of state-of-the-art edge detection and classification algorithms, ultimately projecting a professional image with confidence. This approach not only enables the candidates to improve in non-verbal communication but also aids the interviewer in becoming much more familiar with each applicant beyond what words can say. In the long run, this tool helps on both sides in building up a much more effective and insightful hiring process.

## REFERENCES

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