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**Affiliated to DBATU, RTMNU & MSBTE Mumbai**

**Department of Computer Science & Engineering**

*"A Place to Learn, A Chance to Grow"*

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## **Progress Seminar No.- 1**

### **Title: Colloquium AI**

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# Introduction

- An AI model or software which is capable of asking relevant questions, analyzing responses, and providing insights based on the answers given.
- This model can be tailored to suit different interview scenarios, such as for job applications, research, or assessments.
- It streamlines the interview process by ensuring consistency and reducing human bias, while also saving time.

# Problem Statement

- **Problem Statement:** “Traditional interview processes are often prone to human bias, inconsistency, and inefficiency in evaluating candidates. This can lead to suboptimal decisions in hiring, research interviews, or assessments. There is a need for an AI-driven solution that automates the interview process by asking relevant questions, analyzing responses, and providing objective insights, ensuring fair and time-efficient evaluations across different interview scenarios.”
- This problem statement encapsulates the key challenges addressed by the “Colloquium AI” system, as described in the document.

# Scope

**Objective:** Develop an AI-powered tool that automates the interview process, providing structured questions, analyzing responses, and scoring candidates based on their answers.

## Features :

- 1.Document parsing and question generation using Natural Language Processing (NLP).
- 2.Real-time answer evaluation with deep learning models like BERT and RoBERTa.
- 3.Confidence checks based on speech, body language, and posture analysis.
- 4.A scoring system to assess the relevance, correctness, and completeness of answers.

# limitations

- **NLP Accuracy:** While NLP technologies like SpaCy and NLTK are robust, they may struggle with highly complex or domain-specific language, which can affect the accuracy of question generation and response evaluation.
- **Bias in Training Data:** The AI models (BERT, RoBERTa, GPT) depend heavily on the training data. If the training data contains biases, the model's question generation and evaluation may inherit these biases.
- **Body Language Analysis:** Tools like OpenPose may not capture subtle body language cues perfectly, especially in a virtual environment, which could affect the confidence assessment.
- **Speech and Sentiment Analysis:** Real-time speech-to-text conversion and sentiment analysis can be affected by accents, background noise, and speech patterns, leading to less reliable confidence checks.

# Methodology

- **Requirement Gathering:** Analyse various interview scenarios and requirements (job interviews, research interviews). Identify key features like question generation, response evaluation, and scoring mechanisms.
- **NLP-based Question Generation:** SpaCy and NLTK are used for parsing the provided documents, tokenizing them, and generating relevant interview questions using Large Language Models (LLMs) like GPT. Generate follow-up questions based on the initial answers, maintaining context.
- **Answer Evaluation:** BERT is employed to compare candidate responses with the expected responses. RoBERTa helps determine the quality of the response (relevance, depth, and detail).

# Methodology

- **Confidence Assessment:** Google Speech-to-Text transcribes verbal responses. Sentiment analysis of the speech is conducted to gauge emotional responses. OpenPose is used to assess body language and posture during the interview. Combine these analyses to assign a confidence score.
- **Scoring System:** Customized scoring logic built using BERT/RoBERTa embeddings to evaluate the relevance, completeness, and correctness of answers.
- **3D Animation and Interaction:** Create animated interviewers using Blender or Adobe Character Animator. Integrate these animated characters into the interview environment using Unity or Unreal Engine for interactive scenarios.



# Tools & Techniques

## 1. Document Parsing and Analysis:- • SpaCy –

- a) Named entity Recognition (NER).
- b) Dependency Parsing

## • NLTK –

- a) Text processing and Tokenization
- b) POS (part of speech)
- c) Text classification

## 2. Question generation:- GPT or Gemini

- a) Generate relevant questions from given context
- b) Generate follow up questions
- c) Generate questions based on responses

# Tools & Techniques

## 3. Answer evaluation:-

- BERT or RoBERTa:-
  - a) BERT – Compare responses with expected response
  - b) RoBERTa – Determine the response is sufficiently detailed and relevant.

## 4. Confidence check:-

- a) Verbal response analysis GPT-4 – prompted to evaluate confidence level.
- b) Speech pattern analysis google speech-to-text and sentiment analysis
- c) Body language and posture analysis.

# Tools & Techniques

**5. Scoring System:-** Custom scoring with embeddings – RoBERT ascoring based on the relevance, completeness and correctness. How well answer align with the expected response.

**6) Animated evaluator:-**

- 3D model – blender or Adobe
- Voice generation – google TTS or Amazon polly
- Dialogflow or RASA – for managing and processing conversational interaction.
- Syncing voice and animation – Adobe character animator or FaceFX
- Unity or Unreal Engine – for creating interactive 3D environments and integrating animations with AI

# Work Plan

Developing an efficient AI-powered Interview interface for taking interview is a complex and multi-disciplinary project that involves various steps, including problem identification, requirements gathering, design, The following work plan outlines the high-level tasks and timeline for each stage of the project:

- Problem identification: 15/07/24
- Requirements gathering: 10/08/24
- Design: Ongoing
- Development and testing:
- Implementation and deployment:
- Monitoring and evaluation:

# Implications

- Colloquium AI automates the interview process, reducing the time and effort required for conducting interviews. Organizations can handle multiple interviews simultaneously without overburdening HR or interview panels.
- By using AI to generate and evaluate questions, the system reduces unconscious human biases that might influence hiring decisions, ensuring a fair and objective interview process.
- Colloquium AI can be easily scaled to interview hundreds or even thousands of candidates in various fields, making it suitable for mass recruitment drives or large academic assessments.
- Candidates receive immediate feedback and insights based on their performance, improving their interview experience and helping them understand areas of improvement.

# Conclusions (expected)

Colloquium AI represents a significant advancement in automating and optimizing the interview and assessment process. By leveraging advanced AI models, natural language processing, and machine learning, it provides a scalable and unbiased platform for conducting interviews. The system's ability to generate relevant questions, evaluate responses, and provide real-time insights ensures a consistent and efficient process for both organizations and candidates.

In summary, Colloquium AI not only improves the quality of the interview process but also sets a new standard for efficiency and fairness in modern assessments.

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# Thank You!!!