INVIGILATOR BOT

Capstone Project Proposal

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## BE Third Year - CSE/ENC/ECE CPG No. 46

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### TOPIC PAGE NO.

* Mentor Consent Form 3
* Project Overview 4
* [Problem Statement 4](#_TOC_250002)
* Need Analysis 5
* Literature Survey 6
* Objectives 9
* Methodology 10
* [Project Outcomes & Individual Roles 12](#_TOC_250001)
* Work Plan 13
* Course Subjects 14
* [References 15](#_TOC_250000)

I hereby agree to be the mentor of the following Capstone Project Team

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The Invigilator Bot is a software bot system which plays the role of an invigilator and conducts viva sessions for the candidates. The bot asks questions to the candidate in the form of speech based on the dataset provided. In response to the same, candidate provides the answers in form of speech and the bot records the answer and depending upon the similarities of the answers from the candidate and the answer provided in the database, the bot rewards points to the candidate. The grading algorithm takes into account factors such as accuracy of the candidate’s response, the completeness of the answer and any other relevant criteria.

The movement detection part of the bot helps in preventing unfair means of conduct during the question- answering session. The bot has camera access to keep track of the candidate's movements. In case the candidate’s movement has potential of gaining an unfair advantage, the bot will alert the candidate to check upon his/her actions. Then after a particular no. of alerts the bot will disqualify the candidate.

The Invigilator Bot will play an essential and valuable role in education & co-operate industry as it will reduce the load upon the questioner to ask similar kinds of questions to multiple candidates one after the other. This bot will help the candidates who may have faced difficulties during their vivas/interviews. This will boost the confidence of the students and will help them with their communication skills. This also reduces the possibility of partiality and favoritism which we all may have faced during the course of our lives.

# Problem Statement

Develop an Invigilator bot that can conduct viva of students in a fair and efficient manner. The idea of an Invigilator Bot came across due to the problems faced by both the teachers and students. During the viva session, teacher conducts the viva of several students which is a hectic task and takes a lot of time. The students also wish to get over with their question/answering as wait for their turn creates nervousness and panic among them.

The Invigilator Bot project is an automated system designed to supervise and track academic exams, replacing the traditional invigilator position played by a human. This system has been created in response to the growing demand for intellectual honesty and fairness in evaluation.

As online learning and remote education continue to grow, maintaining the same security and impartiality as conventional in-person tests becomes more challenging. Therefore, the Invigilator Bot has become increasingly significant in today's society. It provides a consistent and trustworthy monitoring system that can identify and prevent cheating and other types of academic dishonesty, thereby bridging the gap between in-person and online exams.

One of the key features of the Invigilator Bot is its ability to minimize bias and human error. Human proctors are fallible and may miss instances of cheating or misunderstand exam guidelines. However, the Invigilator Bot implements an automated process to observe the situation and ensure that every student is evaluated fairly, while the invigilator allocates the tests under regulations.

Moreover, the Invigilator Bot can aid in lowering expenses and boosting productivity. Conventional human invigilators require a lot of resources, such as hiring, paying, and training. These expenses can be reduced while an automated system improves exam monitoring speed and precision.

In today's academic environment, the Invigilator Bot project is pertinent and essential. It helps to ensure academic integrity and fairness, minimize human errors and bias, and increase efficiency and cost- effectiveness by providing a consistent and reliable monitoring system.[1],[2]

Automated exam proctoring, also known as invigilation, has gained immense popularity in recent years, especially with the rise of online learning. One of the critical components of invigilation bots is face detection, which helps to verify the identity of the test-taker and monitor their activities during the exam. This literature survey aims to provide an overview of invigilation bots that use face detection technology.

1. VIRTUAL INVIGILATION

A remote proctoring model built with Python and numerous modules illustrated how digital form invigilation may be implemented using audio, video, and various anti-cheating approaches in this project. This model comprises checking and recording the candidate's suspicious motion, background noises, and candidate validation. It intends to conduct a remote examination without physical invigilation, and the recorded snaps and noises can be analyzed to determine whether the candidate used unfair means or cheated. [4]

Tools and Libraries used:

* NumPy
* PyAudio
* OpenCV

Components used in Hardware:

* Webcam: To record video footage.
* Computer: To run the code and store data required.
* Microphone: To record audio.

Robot recruiters are chatbots that can perform AI-led video interviews on their own, assisting businesses in expanding the job prospect pool and ensuring consistency in hiring methods. [5]

Tools and Libraries used:

* Natural Language Processing
* TensorFlow
* Scikit-learn
* Speech-to-Text
* Text-to-Speech

Components used in Hardware:

* Webcam: To record the video of candidate during the time of examination.
* Computer: To process the video and audio.
* Cloud computing resources: To handle multiple interviews at the same time.

1. FACE DETECTION

Biometric security includes facial recognition. Voice recognition, fingerprint recognition, and retina or iris recognition are examples of biometric software. The technology is mostly utilized for security and law enforcement, although there is growing interest in other applications. [3]

* OpenCV
* Dlib
* PyTorch
* TensorFlow

Components used in Hardware:

* Cameras: To capture images and video.
* Display Devices: To show the output of face detection or facial landmark points.
* Storage devices: To store the captured data.
* Processing Units: To run the algorithms and process the video or image data.

## Main objectives for our project are as follow:

## To study and analyze existing projects related to invigilator bots.

## To generate data related to invigilator bot and apply pre-processing techniques to the generated data.

## To use appropriate algorithms to accurately evaluate candidate’s responses in an efficient manner.

## To design and develop the invigilator bot which involves selecting appropriate tools and technologies for its development.

## To test the invigilator bot using real-world inputs.

## Methodology for the project is as follows:

* To generate data related to invigilator bot and apply pre-processing techniques to the generated data:

1. Collect data that will be used to train and test the bot's performance. Quality and relevance of the data collected will directly impact the accuracy and effectiveness of the invigilator bot.
2. Cleaning and transforming the data to make it suitable for analysis and modeling. Pre-processing techniques could include removing irrelevant data, filling in missing values etc.
3. Use an automated system to conduct viva sessions, such as a chatbot or AI-based system that can understand and respond to candidates' responses.
4. Train the system with a large dataset of responses to improve its accuracy over time.

* To use appropriate algorithms to accurately evaluate candidate’s responses in an efficient manner:
  1. Use machine learning algorithms to analyze and evaluate candidates' responses.
  2. Use a standardized rubric for evaluating responses to ensure consistency and fairness.
  3. Topic Modelingwill be employed to extract the essence of the response and match against the source material. Subsequently, an accuracy score will be computed to evaluate the degree of similarity between the two.
* To prevent candidates from using unfair means or cheating during the exam by monitoring their movements through a camera:

1. Use a remote proctoring system like Face Recognition and Movement Detectionto monitor candidates' movements.
2. Ensure that the system is designed in a way that respects candidates' privacy and does not invade their personal space.

* To offer a user-friendly interface for candidates and administrators to interact with the system:

1. Design the system in a way that is intuitive and easy to use.
2. Implement a web appusing a responsive design approach to ensure that the system is accessible across different devices and screen sizes

* To provide a comprehensive and detailed report of the candidate's performance, providing useful insights for further study and preparation:

1. Develop a report that includes a summary of the candidate's performance, an overall score, and a breakdown of scores for each section of the exam.
2. Provide detailed feedback on the candidate's strengths and weaknesses, along with recommendations for further study and preparation.
3. Incorporate visual aids such as charts and graphs using Matplotlib, Seaborn and ReportLab

to help candidates understand their performance better.

1. Make the report available to candidates and administrators through the user-friendly interface.

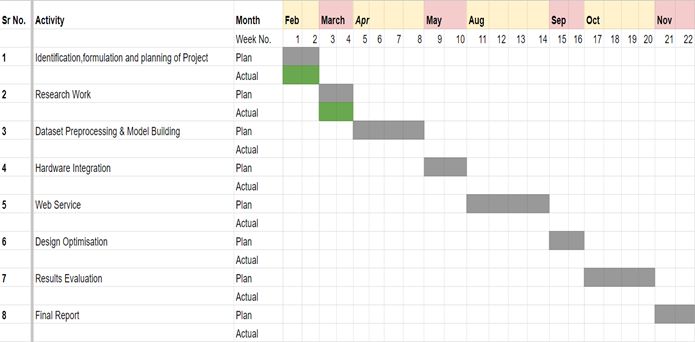
# Project Outcomes & Individual Roles

## Outcome of our Project:

* + The bot will make the viva/interview process more efficient, will be beneficial to the education and corporate industries, as it will reduce the burden on questionnaires and increase the quality of the assessment process.
  + The bot's grading algorithm takes into account various criteria such as accuracy, completeness, and relevance, which reduces the possibility of bias and favoritism and its ability to provide instant feedback to candidates
  + The movement detection feature will prevent unfair means of conduct during the session, thereby ensuring a fair and just process.
  + The bot will boost the confidence of candidates and improve their communication skills, as they will be able to interact with the bot in a more relaxed and natural way.

## Individual Roles:

|  |  |
| --- | --- |
| Akshat Girdhar | Dataset Preprocessing and Model Building, Web Service |
| Raunak Kumar | Dataset Preprocessing and Model Building, Web Service |
| Jasmine Batra | Data Collection, Data Preprocessing and Model Building |
| Ashmita Tandon | Data Collection, Face Detection and Report Generation |
| Sukhmani Hunjan | Data Collection, Face Detection and Report Generation |



The Invigilator bot project involves developing a bot that can monitor online exams and prevent cheating. Computer science course subjects that would be relevant to this project include:

* + Programming languages: The bot will need to be programmed using a programming language, and knowledge of programming concepts such as control structures, data structures, and algorithms will be important.
  + Artificial Intelligence and Machine Learning: The bot may use machine learning algorithms to detect patterns of behavior that could indicate cheating.
  + Computer Vision: The bot may need to use computer vision techniques to analyze video streams and detect suspicious behavior.
  + Database: The bot will need to process and store data in an efficient manner.
  + Data Structures and Algorithms: The bot also uses algorithms to analyze data and detect patterns.
  + Software Engineering: The bot will need to be designed, tested, and maintained in structured and organized manner, using software engineering principles and best practices.

# References

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