Project Title: Automated Attendance and Attention Tracker

Background:

Traditional attendance tracking methods are prone to various challenges, such as students forgetting to log in, loss of mobile phones/laptops, no battery on device to register attendance on campus connect, dishonest practices, etc. The proposed system addresses these issues by automating the attendance process using state-of-the-art facial recognition and attention detection technologies. Additionally, the system aims to provide valuable insights into student engagement and interest levels during lectures.

## Aims:

The primary objective of the project is to develop an automated system for tracking attendance and attention in a classroom setting. The system aims to enhance traditional attendance monitoring by incorporating facial recognition technology and attention detection algorithms. Key goals include:

1. Detect Face: Implement YOLO (You Only Look Once) algorithm for accurate and real-time face detection.
2. Verify Detected Person's Identity and Register Attendance:
   1. Utilize a Siamese neural network for face verification to ensure the accurate identification of students.
   2. Automate attendance registration based on verified identities.
3. Check Lecture Leave Rate:
   1. Analyze attendance patterns to identify instances where students leave lectures early.
   2. Generate metrics on the frequency of early departures.
4. Audience Focus Detection:
   1. Implement attention detection using the YOLO algorithm to assess the engagement levels of students.
   2. Recommend breaks or call for attention if more than 51% of the class is distracted.
5. Interest Rate Detection:
   1. Utilize facial data analysis to determine the level of interest or difficulty students experience during specific lecture topics.
6. Detect Number of Registered and Unregistered Students for a module:
   1. Provide insights into the attendance status of both registered and unregistered students.
   2. This information is retrieved from no SQL db containing student enrolment detail and image.

Deliverables:

1. Automated Attendance: System capable of automatically registering attendance based on verified facial recognition.
2. Lecture Sentiment Analysis: Implementation of attention and emotion detection to analyze the sentiment of the lecture audience.
3. Interest Rate Metrics: System-generated metrics indicating the level of interest or difficulty perceived by students during specific lecture topics.
4. Identification of Unregistered Students: Ability to identify and flag unregistered individuals in the classroom.
5. Participation Report: Generation of participation reports, detailing student interactions such as asking questions, overall sentiment level of individual students, punctuality of student.

Advantages of the System:

1. Streamlined and automated attendance tracking.
2. Enhanced lecture sentiment analysis.
3. Identification of interest levels to improve lecture materials.
4. Detection of unregistered students.
5. Detailed participation reports for instructors. Which can be used to predict exam performance or determine what students may find difficult and test them on that (weekly quizzes) in preparation for exams.
6. Assist lecturers to Identifying and changing rather boring style of teaching
7. Assist lecturers to potentially forecasting their (lecturers') end-of-semester students' rating based on student interest levels.

Definition of Terms:

1. Distracted: Not facing the camera for more than 30 consecutive seconds. This camera is placed at the location of the instructor e.g above PC.
2. Interested in Lecture: Maintains a focused or happy expression for a third of the class duration.
3. Not Interested in Lecture: Maintains a distracted or unhappy expression for a third of the class duration.
4. Leave Early: Spends less than half of the class duration.
5. Came Late: Marked present at a time exceeding half of the lecture duration.

## Dataset Sourcing Information: The dataset for fine-tuning the proposed attention detection feature will be gathered using a collection of images, primarily featuring friends and individuals seated in a classroom environment who have granted explicit permission for the use of their images.