AI-Powered Attention Monitoring System for Enhancing Online Learning Engagement

GROUP
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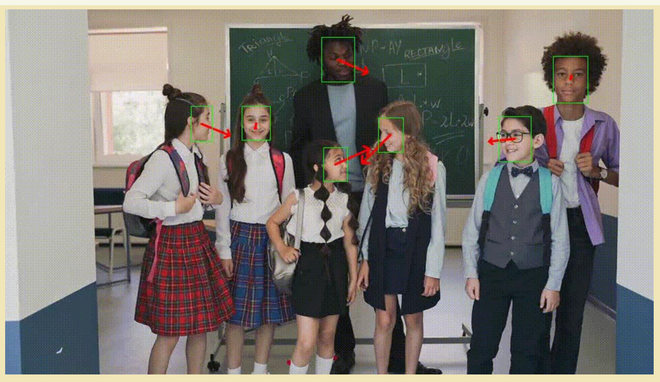
Introduction

This project proposes an application that leverages computer vision AI models to monitor and analyse student attentiveness through camera input, aiming to enhance online learning experiences by providing real-time feedback on student engagement.

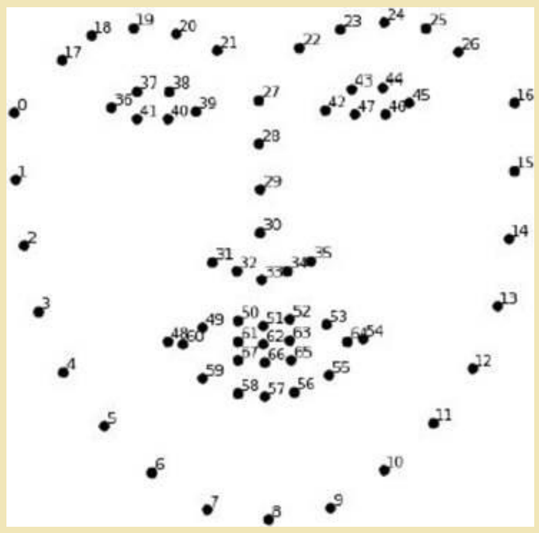
L2CS-Net

L2CS-Net predicts the gaze direction of a student. Attentiveness will be assumed if the student is looking forward; while inattentiveness will be assumed if the student is looking sideways, upward, downward, or backward.



Star Loss

Star Loss detects head pose, and facial landmarks. For the facial landmarks, the model predicts 68 facial landmarks as proposed by the 300W database. Eye aspect ratio (EAR) and yawn aspect ratio (YAR) will be calculated, which are indicators of the drowsiness of the person, and will be used to calculate attentiveness.

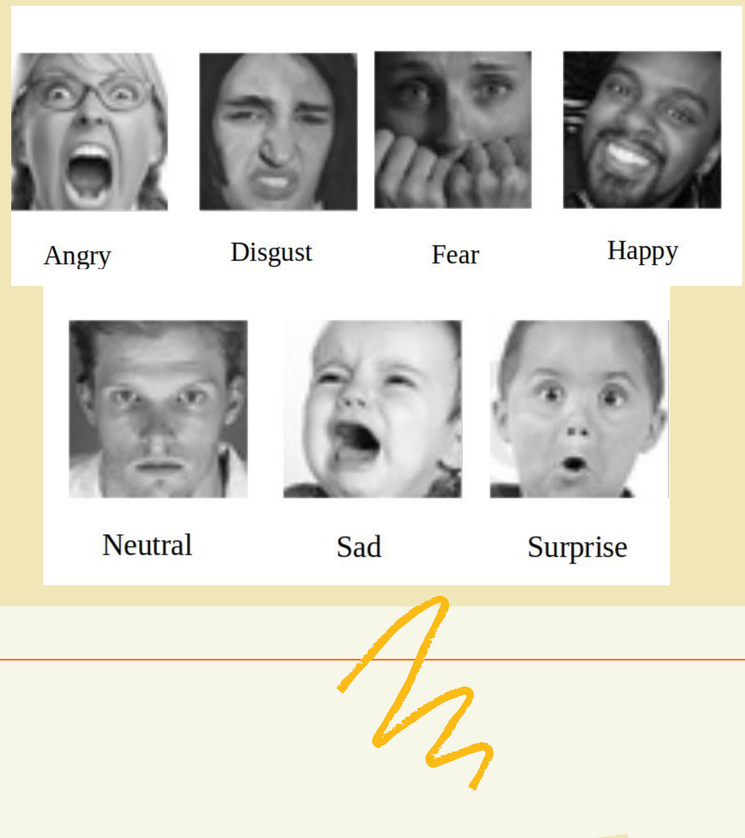


Yolov11

Yolov11 is employed for real-time phone detection. This model is chosen for its high performance and is pre-trained on the MSCOCO dataset.

ResEmoteNet

ResEmoteNet predicts the emotions of the student. The model categorises emotions as one of the seven classes: angry, disgusted, fearful, happy, neutral, sad, and surprised.



Application

The overall attentiveness of students will be assessed by integrating parameters derived from these models. The application, developed using OpenCV, processes camera input to visualize model predictions and overall attentiveness metrics in real time.