

## **Automated Attendance Management System using facial recognition in real time**

The conventional attendance marking system, a tedious and time consuming technique to monitor attendance records for students, is followed in almost every educational institution in Bangladesh. It has turned more problematic in recent days with the distinctive rise of e-learning, whereby teaching is undertaken remotely and on digital platforms owing to the COVID-19 pandemic. We are living in the age of algorithms that looks into the extraordinary ways in which people are interacting with AI through Machine Learning. It has become obvious that a digital strategy should be incorporated in attendance management system to comply with the rapid growth of online learning and to take the edge off calculation of consolidated attendance which may cause manual errors.

Facial recognition, one of the many biometric methods available for identification, can be maneuvered to make the system work and to replace the traditional manual process with an advance computerized software program with machine learning capabilities. The proposed project is all about marking the attendance of students in an online class through facial recognition in real-time and processing it in an excel sheet without any human interference. In this project, histogram of oriented gradients (HOG) is in effect to recognize and to detect the faces at the backend. To make the identification task more efficient in case of unwanted tilting or low light images in the current frame, 'image warping' service is secured by dint of 'dlib' toolkit equipped with face landmark estimation. Initially, we create a manual database that encompasses the most recent images of the students with their names and Ids well written as the image file name. We import these stored images from our database folder at once by conveying command to the 'os' module and later find the encodings for each of the images by sending the facial landmark to a pre-trained neural network. Neural network, which learns by itself by way of training, determines the distance of separate facial locations that are unique for every discrete image and interpret it. In addition, we can either initialize the webcam or the capturing screen mode that serves our purpose the most to capture the faces of attendants during a live class. As thrilling as it may sound, there is a prospect of detecting multiple faces in the webcam/live capturing screen frame which may add perplexity to the class controller/faculty to identify the unknown faces instantaneously. To account for this, we specify the location of the target face from the live screen for encoding purpose by looping through the face location and face encoding function for every individual face in the live screen which allows enclosing all these discrete faces within separate rectangles and labeling the known faces with their 'Names and Ids' and unknown faces with the text 'Unknown' right below each rectangle. Afterwards, when the users turn on their cameras in a live meeting, the program compares the encodings of the detected faces in current frame with the images stored in database folder to perceive the faces in full conformity by employing linear SVM classifier and 'face distance' function that demonstrates how likely is the faces match in terms of numbers. The lower the distance between two faces, the better the match. Once the system finds the best match, it stores the corresponding identity, status and enrollment time against that particular person in the attendance file which is in (.csv) format. This is to mention that once a user's information gets stored in the excel file during an ongoing meeting, the system won't re-enter his/her information if the person reconnects himself/herself again in the meeting after being disconnected for any specific reason. Last but not the least, if the controller of the meeting finds anything unpleasant in the attendant's webcam, he/she can turn off the live capturing screen instantaneously through a single click in 'q' button from the keyboard without dragging the mouse.