STUDENTS LIVE BEHAVIOUR MONITORING IN ONLINECLASSES USING ARTIFICIAL INTELLIGENCE

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ABSTRACT :
Due to the health emergency situation, which forced universities to stop using their centers as a means of teaching, many of them opted for virtual education. Affecting the learning process of students, which has predisposed many of them to become familiar with this new learning process, making the use of virtual platforms more common. Many educational centres have come to rely on digital tools such as: Discord, Google Meet, Microsoft Team, Skype and Zoom. The objective of the research is to report on the impact of student learning through the use of the aforementioned videoconferencing tools. Surveys were conducted with teachers and students who stated that 66% were not affected in their educational development. Most of them became familiar with the platforms; however, less than 24% qualified that their academic performance has improved; some teachers still have difficulties at a psychological level due to this new teaching modality. In conclusion, teachers and students agree that these tools are a great help for virtual classes.
The primary objective of this project is to create a self-sufficient agent that can offer information to both teachers and pupils. The level of student involvement is directly related to important academic outcomes like critical thinking and the marks students get in a topic.

Keywords: Virtual education, videoconferencing tools, critical thinking.

INTRODUCTION

Human behaviour analysis is an important area of computer vision research dedicated to the detection, monitoring and understanding human physical actions . The teaching and learning cycle may be regarded to be the most critical operation in the academic institution. During classes, attendance and student behavior are closely monitored alongside teaching activities . Information has demonstrated that student interest is a central element in participation and performance . Teachers will be able to track student activity and recognize relevant indicators to draw assumptions regarding the student's real involvement in learning experiences . However, people's behavior is unpredictable to most situations and monitoring is quite challenging specially for a big scenario. According to research, emotions profoundly influence leaning and achievement. These emotions can be positive or negative. There are four known academic emotions relevant for student learning: (1) Achievement Emotions contribute to the tasks of accomplishment and the performance and loss of such practices; (2) Epistemic emotions re the feelings caused by neurological challenges, , such as the excitement of a new task; the interest, uncertainty and annoyance of obstacles; and the joy of overcoming the problem; (3) Topic emotions which pertains to the issues discusses in the lessons; and (4) Social emotions relates to teachers and colleagues in the school, such as affection, concern, compassion, respect, disdain, jealousy, rage or social anxiety. Such emotions are particularly relevant in teacher/student interaction and community learning. Attention is the emotional mechanism of dwelling on one part of the world while overlooking others. "Pay attention!" is an expression repeated used by so many teachers all over the word to students. Paying attention is the first step in the learning process . The application of machine learning and computer vision methods have made tremendous progress over a decade and have been successfully employed in various applications such as automated assessment such as ,security, image data investigation such as general identity verification and surveillances such as . One example of automated assessment is applied in a classroom setup. One way to determine whether or not the student is conscientious in the classroom is by facial expressions. Facial expressions are facial changes in response to a person's internal

mental states, thoughts, or social contact. Facial expression recognition refers to computer programs that seek to automatically interpret and identify facial expressions and facial changes in visual detail. For automated classroom evaluation, interaction may be split into two categories: single-person and classroom- based study. In a single-person study, facial gestures can include feedback on current neural functions and can be evaluated when observing action unit characteristics. In a classroom-based study, the emphasis changes from single individuals to common features and experiences between participants. Monitoring student behaviour is important to allow teachers to easily identify and correct improper behaviour. By tracking student actions, schools may assist students in achieving behavioural targets, help consider student own conduct and effect on others, and eventually empower student to identify and implement habits that are important for school performance. In this paper, single- person analysis was used in detecting the face of each student to determine the student behaviour. An experimental setup was installed for data collection. The researchers aim to present a new approach of predicting student behavior (attentive or not attentive) based from face recognition during class session. This demonstrate a real-time detection of student behavior. Using deep learning approach, the acquired data utilized the YOLO (you only look once) v3 algorithm in predicting student behavior inside the classroom.

Review of LITERATURE

Face Recognition:

Face Recognition (FR) is rising as a new research area due to a large variety of applications in the fields of commercial and law enforcement [2]. Face identification is the most significant aspect of facial detection. It needs detection for different applications such as defense, forensic investigation, etc. This includes appropriate strategies for identifying and understanding the complexities of various facial features, presenting patterns, occlusion, ageing and clarity of either fixed picture frames or video sequence pictures [3]. The Facial Recognition algorithm is used to identify human faces from picture or video data recorded utilizing digital cameras for identification purposes [4]. In the case of classroom supervision, this would assist with manual student participation marking [5] and behavior analysis of students [2]. There are many face detection algorithms to extract the specifics of the face field. Some most common face detection algorithms are Eigen face detection, Fisherfaces, and Haar cascades [6]. There are also other algorithms with templates such as Voila and Jones, which comprised of three main ideas: the integral image, classifier learning with AdaBoost, and the attentional cascade structure [17], [18], and the Integral Image, also known as a summed area table [9].

B. YOLOv3 Model :

There have been significant advances in face recognition utilizing deep learning techniques and different researches applied these in many important areas [2]. YOLO (you only look once) is one of the deep learning regression algorithms and is categorized under single-stage detectors. The YOLO algorithm is a typical one-stage target detection algorithm that combines classification and target regression problems with an anchor box, achieving high efficiency, flexibility and generalization results. This is very popular in the engineering field due to its backbone network Dark net that can also be replaced with many other frameworks [1]. In addition, the YOLO series models may be the fastest object detection algorithms with state-of - the-art detection accuracy and thus become one of the most common deep object detectors in practical applications. It has been stated that the real-time performance of the YOLO series models is evaluated on powerful graphics processing unit (GPU) cards with high performance computing capability [2]. YOLOV3 is a new end-to-end target detection model after R-CNN, Fast R-CNN, and Faster R-CNN. Research has shown that the corresponding enhancement of the general target detection approach applied to face detection tasks will yield better results than conventional methods. The above network, however, followed a two-stage detection method and the speed was slow. Among the version of YOLO, the utilization of YOLOv3 had a better detection effect, achieving an mAP effect of 57.9 percent within 51ms on the COCO dataset. Therefore, could guarantee the accuracy and detection rate at the same time in the

target detection field [3].YOLOv3 is the latest algorithm of YOLO. Because of its improvement in object detection using deep learning [24], many researches used this algorithm in different areas such as vehicle targeting detection, real- time face detection [5][6] and medical applications [7].

EXISTING SYSTEM

Currently, in times of pandemic, teaching is at a distance where the use of different means of videoconferencing is relevant in education. Since, it has a very significant role in the learning experience of the students [8]. The author [9], indicates that ICT has contributed to the new educational reforms. Google meet was mostly used by students in work meetings as opposed to teachers who preferred to zoom in on class meetings.

Presently, in instances of epidemic, teaching takes place over long distances, necessitating the employment of various forms of conferencing in schooling. Because it plays such an important part in students' learning experiences [8]. According to the authors [9], ICT has aided in the implementation of new education policies. Children are more likely to use Google Meet in work meetings than instructors, who prefer to zoom in on classroom sessions.

PROPOSED SYSTEM

In proposed system artificial intelligent is used to predict behavior of student in online classes when student is live. Student features are captured from every frame and data is analyzed based on different types of activity related to eye movement, mouth movements, head movements and analysis is done on student active status on that respective class. Graphical representation is used to show performance of student.

METHODOLOGY

Experimental Set-up:

In this section, the experimental set- is provided for the acquisition of test data collection, data annotation techniques, attention level assessment as observed by annotators, and correspondence to student actions. The conditions for the experiment are as follows:

1) The brightness of the testing environment (computer laboratory room) is fixed.
2) The scale of the classroom is set over the course of the study and there are 15 undergraduate students as subject of the study, made up of 4 female and 11 male students.
3) The camera used is a webcam attached directly to a laptop at the top of the teacher's desk. The location of the camera is mounted in front of the classroom and is set at a height of 1.5 meters at an angle of 40 degrees. The camera is capable of clearly capturing both students and the entire laboratory room.
4) Video recording and image capturing were recorded during session.

Annotation and Prediction:

After building a dataset of several images, these images have been annotated, marking each student's face whether they are attentive or not. The based in the format of CNN model. This program helps to create boxes that enclose the student's face for subsequent facial recognition and mark it in their respective classrooms. Each file will contain the object class, x, y, width, and height. The x, y, width, and height are float values that contain the relative width and height of the image.

Face Recognition and monitoring Movements:

The camera was used as an input device for facial recognition. The created model was applied to every frame of the camera. Face detection will take place with the produced model shown in each frame.

Using Land mark model features are detected from the live face and values are captured and stored in array variables.

Graphical Analysis:

In this step analyzed data is displayed in the form of graph in figure 1.

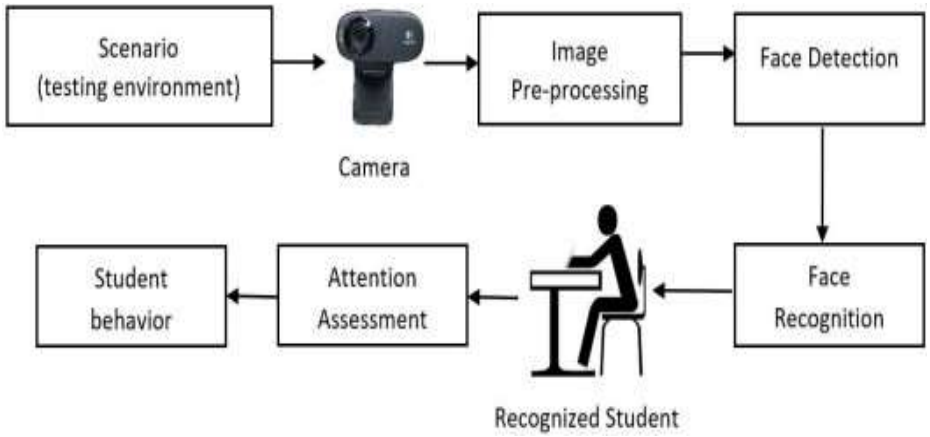

Figure 1 Architecture of the model

MODULES

Client:

This application is run by student where camera will open and students' video is displayed on screen. Details of each frame are shared is sent to other modules for processing and analyzing with trained model. Result is shown in graph after analysis.

Server Module:

This module is executed to track details of student and analyze actual performance. Each frame is sent to face processing module for checking with trained model. Server Module is used to process data between client and face processing module.

Face Processing Module:

This module each frame is taken as input and shape predictor model is used to predict various aspects of features like (eye aspect ratio, mouth aspect ratio, drowsy, yawn, head pose). After calculating these values are sent to server module.

In proposed system artificial intelligent is used to predict behavior of student in online classes when student is live. Student features are captured from every frame and data is analyzed based on different types of activity related to eye movement, mouth movements, head movements and analysis is done on student active status on that respective class. Graphical representation is used to show performance of student.

I. RESULTS

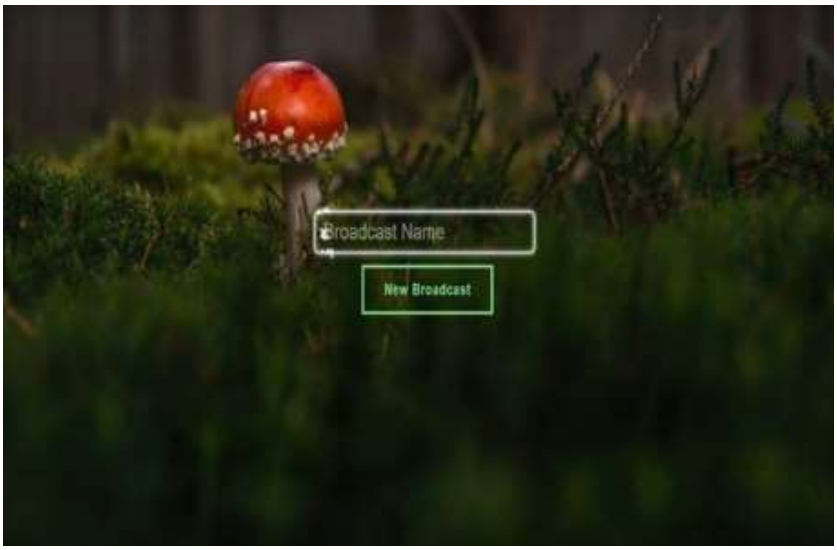

Figure 2 Home Page

Figure 3. Observing the students behavior

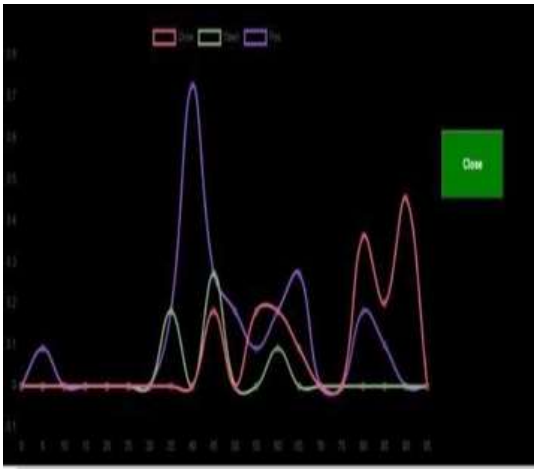

Figure 4. Displaying the results of the student's behaviour whether interested or not

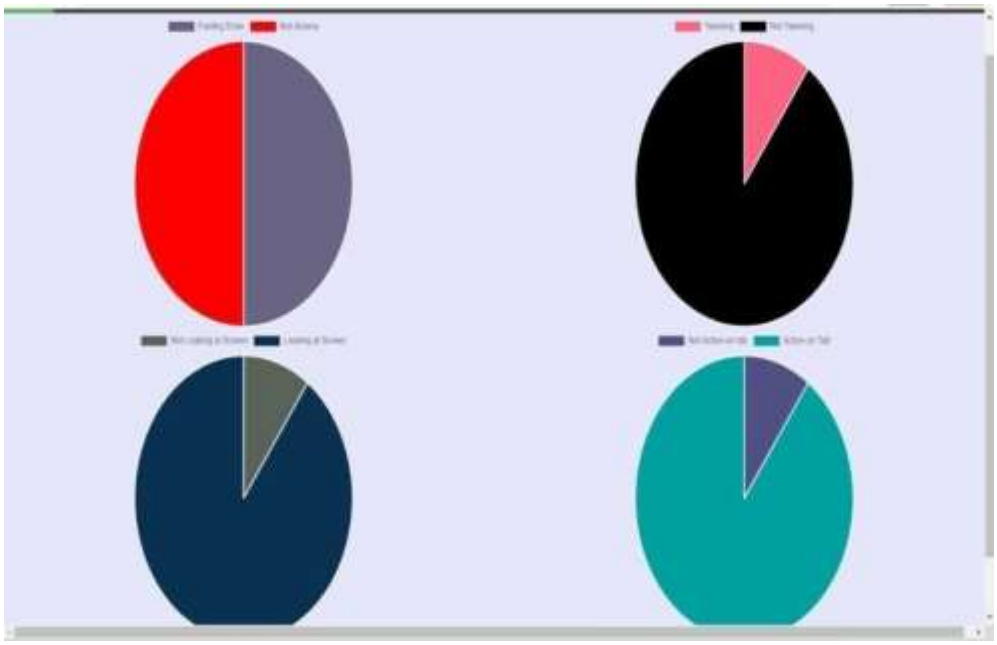

Figure 5. The results in pie chart

The figures 4 and 5 displays the results of the students behaviour in the form of graphs and pie charts .This shows whether they are interested or not.

CONCLUSION

A deep learning method using the YOLOv3 algorithm was used to evaluate the student's observable actions in the classroom teaching system identification of student actions based on specified scenes. The evaluation was created right after the live feed review. DLIB models have been produced. Such models were tested using OPENCV for object detection. Tests indicate that this method offers reasonable pace of identification and positive outcomes for the measurement of student interest dependent on observable student actions in classroom instruction. The suggested approach is often versatile and responsive to different situations, since more students would be interested in greater room sizes, utilizing a higher form of camera with certain enhancements such as IP camera for continuously capturing images of the students, detect the faces in images and compare the detected faces with the database. It may be used such as greater input picture measurements, anchor box dimensions ideal for different situations and further training details.

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