STUDENT LIVE BEHAVIOUR MONITORING IN ONLINE CLASS 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 centers 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. Monitoring students using OpenCV shape landmarking models could involve tracking their facial landmarks in real-time to analyze their attention levels, engagement, or emotional state during lectures or classes. OpenCV provides various tools and libraries for face detection and facial landmark recognition. By utilizing these technologies, you can develop applications to monitor students' facial expressions and gestures, providing insights into their interactions and attentiveness during learning sessions.

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 behaviour 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 behaviour 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, 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,
2. Topic emotions which Certains to the issues discusses in the lessons
3. 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.

4. 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 behaviour (attentive or not attentive) based from face recognition during class session. This demonstrate a real-time detection of student behaviour. Using deep learning approach, the acquired data utilized the YOLO (you only look once) v3 algorithm in predicting student behaviour inside the classroom

PROBLEM STATEMENT

In the context of online learning, educators face significant challenges in assessing student engagement and participation effectively due to the lack of physical presence. Traditional online learning platforms provide limited capabilities for monitoring student behaviour such as attention, interaction, and emotional engagement. This gap in capabilities can lead to decreased educational outcomes and reduced effectiveness of online instruction. There is a need for an AI-based solution that can accurately monitor and analyze students' live behaviour during online classes. This system should provide real-time feedback to educators about students' engagement levels, participation, and overall learning environment dynamics, enabling timely interventions and personalized support. Additionally, this system must address privacy and ethical concerns to ensure that monitoring is conducted responsibly and constructively.

LITERATURE REVIEW

Resampling based ensemble methods for online class imbalance learning

(PDF) Resampling-Based Ensemble Methods for Online Class Imbalance Learning (researchgate.net)

ABSTRACT: Online class imbalance learning is a new learning problem that combines the challenges of both online learning and class imbalance learning. It deals with data streams having very skewed class distributions. This type of problems commonly exists in real-world applications, such as fault diagnosis of real-time control monitoring systems and intrusion detection in computer networks. In our earlier work, we defined class imbalance online, and proposed two learning algorithms OOB and UOB that build an ensemble model overcoming class imbalance in real time through resampling and time-decayed metrics. In this paper, we further improve the resampling strategy inside OOB and UOB, and look into their performance in both static and dynamic data streams. We give the first comprehensive analysis of class imbalance in data streams, in terms of data distributions, imbalance rates and changes in class imbalance status. We find that UOB is better at recognizing minority-class examples in static data streams, and OOB is more robust against dynamic changes in class imbalance status. The data distribution is a major factor affecting their performance. Based on the insight gained, we then propose two new ensemble methods that maintain both OOB and UOB with adaptive weights for final predictions, called WEOB1 and WEOB2. They are shown to possess the strength of OOB and UOB with good accuracy and robustness.

Design and implementation of virtual class box 5.0 for distance learning in rural areas

View article (google.com)

ABSTRACT: Educational resources and transportation infrastructure scarcity has become the major obstructions for Indonesian education development. To solve these problems, Virtual Class Box (VCB) 5.0 device is designed as an effort to support digital distance learning. It provides videoconference to connect teachers and students from different school. This paper explains the design and implementation of a videoconference system, along with its supporting operating system, applications and hardware. The hardware includes CPU, filter, converter and peripheral user interface modules while the software is built based on

Linux Ubuntu 14.04.3 LTS operating system, Linphone Voice-over-IP application, and other open-source packages. This videoconference system facilitates learning-multimedia-sharing with a simple user interface and can operate in internet bandwidth of under 2Mbps while generates delay propagation.

Design of Real-time Drowsiness Detection System using Dlib

View article (google.com)

ABSTRACT: Drowsiness while driving is a highly prevalent problem that leads to thousands of fatal accidents every year. A solution to prevent accidents and fatalities is the need of the hour and while there are complex systems developed that provide solutions for detecting drowsiness in drivers, this paper explores a simpler, yet highly effectual method of doing the same. In this paper, drowsy driver detection

system is designed using Python and Dlib model.

1.1 Learning through videoconference. research on teaching quality.

Technology Acceptance Model: Cloud HD Video Meetings in the Context of Medical Education | International Journal of Educational Communications and Technology (tci-thaijo.org)

ABSTRACT: The main aim of this paper is to shed light on the role of the cloud HD video meeting technology acceptance model in the context of medical education and to assess its benefits for academics, teachers, and students. The importance of the cloud deployment service model technology as an application model was tested in the context of five popular medical areas: 1) treatment, 2) medical education, 3) rehabilitation, 4) training, and 5) surgery. A concluding theory about the Technology Acceptance and its benefits to assist improving the values, applications, and methods to make such technology better tolerated in the context of medical education is also discussed

Learning during covid-19 pandemic: Online education community, based on discord

(PDF) Learning During COVID-19 Pandemic: Online Education Community, Based on Discord (researchgate.net)

ABSTRACT: Education has been highly affected during the Covid pandemic. From one day to another, from kindergartens to universities, everyone involved in education has struggled to keep it going despite all the difficulties and restrictions. In our department, we coordinate two study programs in Computer Science (bachelor and master level). More than a year ago,

we started to use the Discord communication platform to keep in touch in real time with our students and alumni. Our initial goal has been to create a strong ever growing community, in which our students, their former colleagues, and faculty can communicate easily. When the lockdown started, it was obvious that continuing to build and expand this community was the way to go. The last semester and the current one, we have been using Discord enhanced by a set of in-house developed scripts to communicate with the students, to keep going with both lectures and laboratories, according to the schedule, to have both the semester and the graduation exams, and so on. In this paper, we present our approach of continuing education during the pandemic (both requirements and solutions), and the lessons learnt during this experience.

PROPOSED SYSTEM

In proposed system artificial intelligent is used to predict behaviour 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.

SYSTEM ARCHITECTURE:

A system architecture or systems architecture is the conceptual model that defines the structure, behaviour, and more views of a system. An architecture description is a formal description and

representation of a system. Organized in a way that supports reasoning about the structures and behaviours of the system.

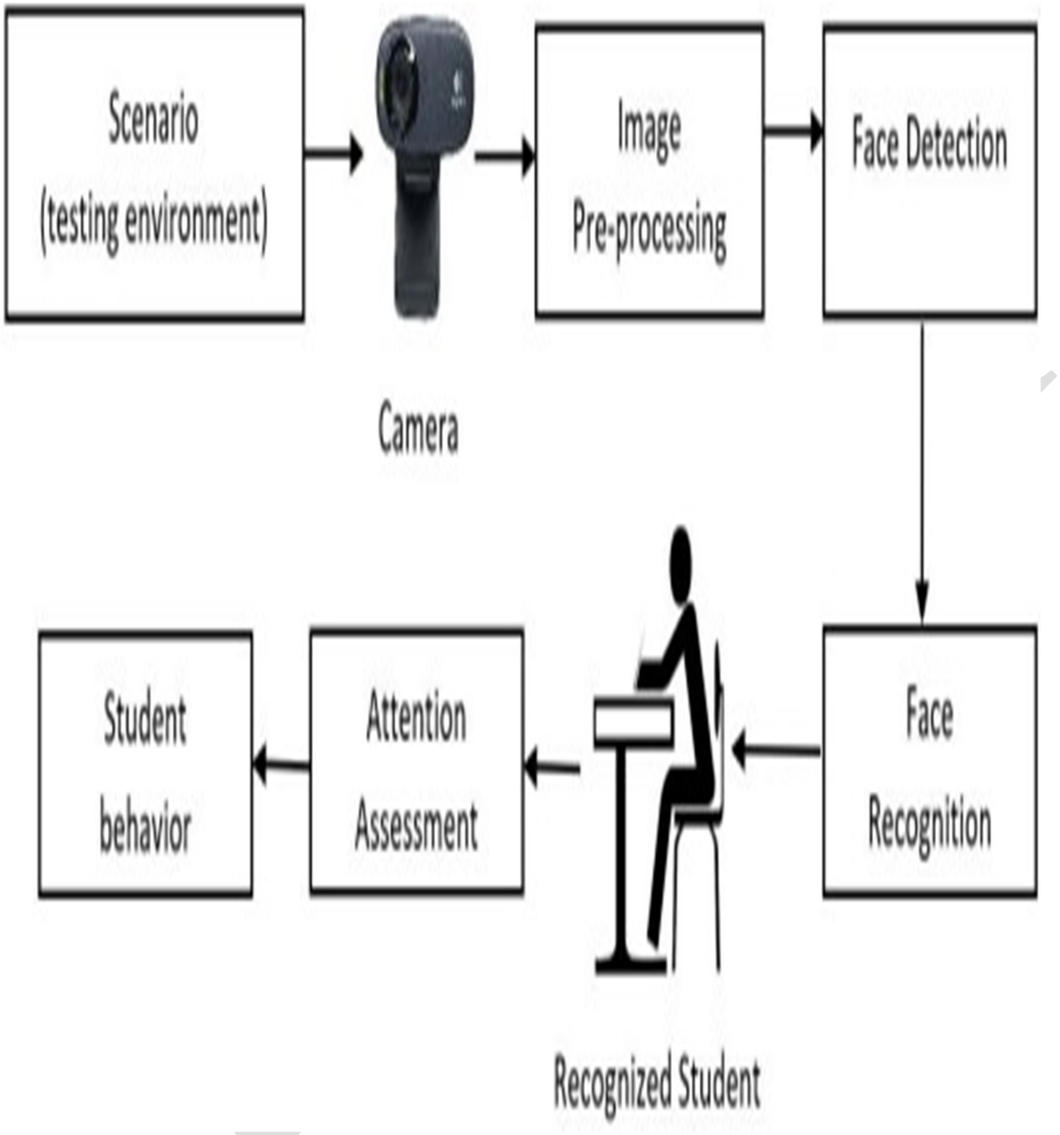

Fig 5.1 System architecture

IMPLEMENTATION

MODULES

Shape land mark module

The "shape landmark model" typically refers to a facial landmark detection model, often used in computer vision and image processing applications. The dlib library is a popular choice for this purpose due to its accuracy and efficiency in detecting facial landmarks.

Here's a detailed explanation of how the shape landmark model in dlib works:

1. **Facial Landmark Detection**: The primary task of the shape landmark model is to detect and localize key points on a face, known as facial landmarks. These landmarks are specific points on the face such as corners of the eyes, tip of the nose, corners of the mouth, etc.

2. **Model Architecture**: Dlib uses a combination of machine learning techniques to accomplish facial landmark detection. The model typically involves a shape predictor trained using a set of annotated facial images. This predictor is based on regression trees and works by predicting the coordinates of facial landmarks based on the image input.

3. **Training Process**: The shape landmark model is trained using a large dataset of facial images where each face is annotated with the coordinates of predefined facial landmarks. The training process involves learning a mapping from image pixels to landmark coordinates.

4. **Key Points Detection**: Once the shape model is trained, it can be used to detect facial landmarks in new images. Given an input image, the model will output the coordinates of predefined facial landmarks. These landmarks can then be used for various tasks like face alignment, pose estimation, facial expression analysis, etc.

5. **Applications:** The shape landmark model has numerous applications in computer vision and beyond:

   - Face Alignment: Aligning faces based on detected landmarks.
   - Face Recognition: Preprocessing step for face recognition algorithms.
   - Emotion Analysis: Understanding facial expressions by analyzing landmark positions.
   - Augmented Reality: Mapping digital content onto facial features accurately.

- Gaze Tracking: Estimating where a person is looking based on eye landmarks.

6. Accuracy and Performance: Dlib's shape landmark model is known for its accuracy and robustness, even under varying conditions such as changes in lighting, pose, and facial expressions. The model is designed to work efficiently on different platforms including desktop and mobile devices.

SYSTEM TESTING

Testing is the debugging program is one of the most critical aspects of the computer programming triggers, without programming that works, the system would never produce an output of which it was designed. Testing is best performed when user development is asked to assist in identifying all errors and bugs. The sample data are used for testing. It is not quantity but quality of the data used the matters of testing. Testing is aimed at ensuring that the system was accurately an efficiently before live operation commands.

Testing objectives:

The main objective of testing is to uncover a host of errors, systematically and with minimum effort and time. Stating formally, we can say, testing is a process of executing a program with intent of finding an error.

OUTPUT SCREENSHOOTS

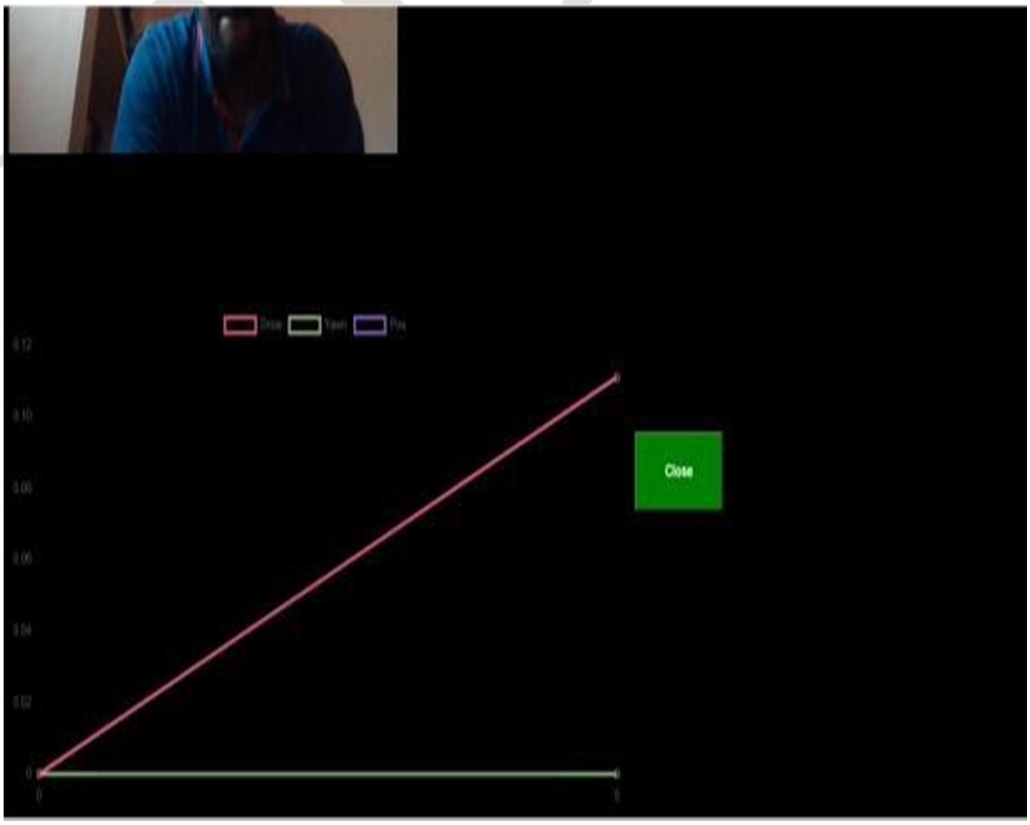

Fig 8.1 Graphical representation of Drowsiness

Fig 8.2 Graphical Representation of Yawns

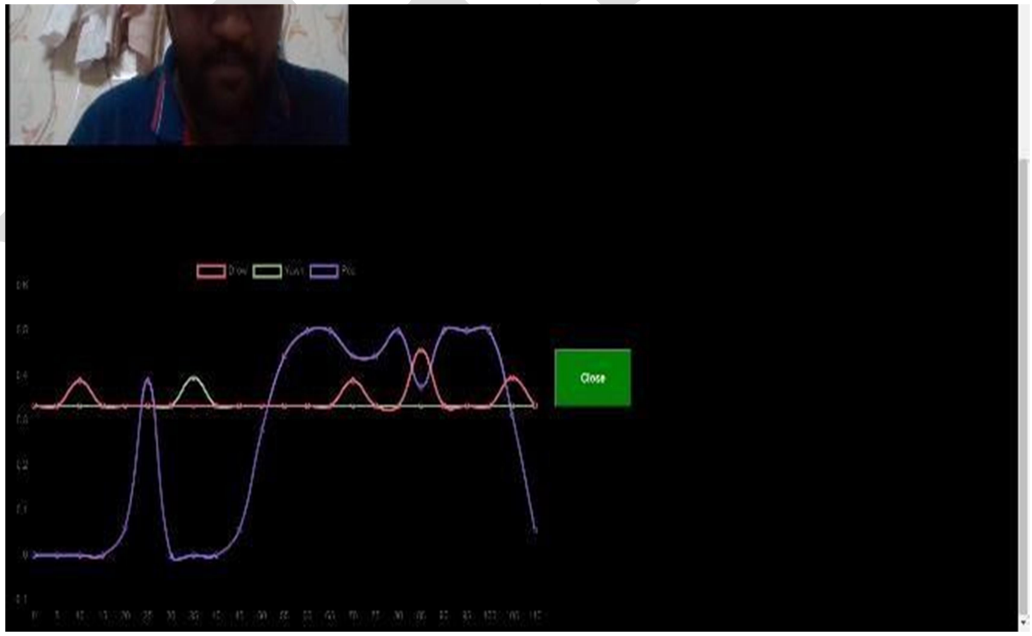

Fig 8.3 Graphical Representation for Drowsiness,Yawn, Head Pose

CONCLUSION

A deep learning method using the YOLOv3 algorithm was used to evaluate the student's observable

actions in the classroom teaching system. display the live identification of student actions based on specified scenes. The evaluation was created right after the live feed review. Several models have been produced. Such models were tested using mAP to decide which model is appropriate for object detection. The mAP (mean average accuracy) is a common measure used to determine the precision of the artifacts being observed. This measure was focused on the following class: high = Attentive and low = Not Attentive. The experimental testing shows that model accuracy is 88.606%. 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.

FUTURE ENHANCEMENT

In the future, we would like to improve this idea and use the model more wisely. This will develop the effect of the model and students who are working hard will have other opportunity to work and prepare more easily for future exams. So, extra classes or visits to the teacher's was not successful; therefore, we should plan to add an extra module to the proposed construction. The recommendation module will automatically send personalized recommendations to readers depending on their current status. We aim to use the model in other subjects and expand the vision across the entire set of courses at the institution. Implementing behaviour analytics modules within existing virtual classroom platforms can enhance monitoring capabilities. These modules can track student attendance, participation, responsiveness, and even emotional states during class. In summary, leveraging technology, multimodal approaches, and behavior analytics can lead to more engaging and effective online classes. As we continue to adapt to virtual education, these enhancements will play a vital role in supporting both teachers and students

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