e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:07/July-2022 Impact Factor- 6.752 www.irjmets.com

AI-BASED PROCTORING SYSTEM FOR ONLINE TESTS

Mr. Vidhya SG[*1], Ms. Hema GA[*2], Ms. Jeevitha MG[*3],
Ms. Nischitha KB[*4], Ms. Vandana[*5]

[*1]Asst Prof., Dept. Of Information Science And Engg., BGSIT, India.

[*2,3,4,5]Student, Dept. Of Information Science And Engg., BGSIT, India.

ABSTRACT

From the past year, Online Examination has become most popular in all the educational fields due to covid-19 However, the institutions are facing a big difficulty in terms of proctoring methods. If the way we are living is to be the new normal then there is a need to find some solution. In this project, we have proposed a solution that to develop an AI-based integrated system that can helps to preventing cheating in examinations and we present some techniques and tools through which the proctor need not to be present throughout the exam. Our AI-based model will be able to detect any unfair in an examination.

Keywords: Proctoring System, Online Tests, Remote Learning, Convolutional Neural Network, Haar Cascade Local Binary Pattern Histogram Algorithm.

I. INTRODUCTION

In India, the number of internet users has nearly doubled in the past 6 years. This proved to be a boon for academics as many students could continue their education. This also facilitated examinations to go online which brought the concept of online proctoring at the academic level. A proctored exam allows the invigilators to invigilate remotely. They use video, audio, and various anti-cheating features to maintain the exam's credibility. Manual online proctoring in the remote examination is a difficult task as many students cannot be invigilated at the same time. During this a teacher can physically monitor students using all the senses, So the idea is to create an AI system that will monitor the student with the webcam and microphone and with that teacher can monitor many students at a time. The system should also keep a record of probable malpractices. Here comes an online proctored exam. This tool helps educational institutions monitor the examination process, preventing any type of cheating. Many online examination providers are using artificial intelligence-enabled technologies to proctor tests objectively. These advanced methods involve audio and video access techniques to ensure the candidates do not indulge in any cheating behavior.

The objective of Remote Proctoring software is to supervise students while conducting exams. Thus, developing computer algorithms to Identify students cheating. Student camera access is taken then monitor them for unfair practices. Then AI function is involved. And it helps to find candidates to monitor closely. Online proctoring enabling candidates to take exams from any location. The proctored exam software is used during online proctoring to allow students and proctors to take exams at any place. It must be sufficiently reliable and internet connected. Proctoring an online exam is no longer difficult. A good remote online proctoring system should facilitate movement and sound detection. It must be sufficiently reliable and internet connected. Proctoring an online exam is no longer difficult.

II. LITERATURE REVIEW

In paper [1] Online education is helping students and institutions worldwide to access knowledge base of wide variety. This form of learning and education is increasing rapidly, Evaluation and proctoring for the online courses has becomes major bottleneck for scalability of such learning systems. Manual human supervision is a common approach for exam proctoring and evaluation where examiner needs to be present in the testing environment or needs to monitor testing environment of a test taker visually and acoustically through a webcam. In our proposed system, we present a completely automated, exam proctoring solution that requires no human involvement. The system integrates all the inputs to process and estimate the variety of events, behaviors and patterns typically associated with cheating.

In paper [2] To demonstrate and maintain academic integrity, some institutions require proctor supervision of online exams. However, proctoring can be very expensive. Costs to students can include fees at testing centers, costs to purchase the RemoteProctor, time to find an approved proctor, and effort required to coordinate a time

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:07/July-2022 Impact Factor- 6.752 www.irjmets.com

for the exam. Costs to the institution include salaries of staff to administer a proctoring process, approval of proctors, maintaining testing centers, and potential loss of enrollments and revenue since not all institutions require proctors for online exams. This paper examines the control issues related to online exams and asserts that the total cost of proctors for online exams (time and money of both students and the institution) exceed potential benefits. The authors propose a less costly, non-proctor alternative to promote academic honesty, using eight control procedures that enable faculty to increase the difficulty and thus reduce the likelihood of cheatingby students.

In paper [3] Online education continues to grow, bringing opportunities and challenges for students and instructors. One challenge is the perception that academic integrity associated with online tests is compromised due to undetected cheating thatyields artificially higher grades. To address these concerns,proctoring software has been developed to address and prevent academic dishonesty. The purpose of this study was to compare online test results from proctored versus un proctored online tests.

III. EXISTING SYSTEM

Existing online systems have only one manual proctor for watching multiple students simultaneously which is not cost- effective and we have to depend on a manual proctor sitting at home or college for monitoring the students. If we continue like this traditional online proctoring systems then we need many proctors to conduct an examination or tests. when the proctor is focusing on one student, other students can cheat at that time. So, simultaneously proctoring the students is notPossible.

DISADVANTAGES IN EXISTING SYSTEM

- Simultaneously Proctoring is not possible.
- If a student misses an exam rescheduling exam id notpossible.
- Difficult to interface for students and it is not user friendlyfor students.

IV. PROPOSED SYSTEM

We have proposed a web-based system to identify, andanalyze the malpractices carried out by students during online examinations using Artificial intelligence. Awebcam is installed into the computer of a student or the front cameraif the student is giving anexam on a smartphone, using face recognition the student is recognized and if the face matcheswith the stored face image, then the student is verified and allowed to give the exam.

ADVANTAGES OF PROPOSED SYSTEM

- It verifies the student ID.
- Face Recognition is to verify the students, which easily identify students faces and match them with their details.
- Voice Recognition helps pick up sounds and match it with the background noise to remove instances of cheating by recognizing speech patterns.
- This proctoring is User-friendly Interface for the students.

V. METHODOLOGY

The First step is to registration of students using their personal details and face image on the platform. For every test a student get register with the latest face image which will be verified with an image stored in database. Objects detection, Mouth open detection, Eye tracking, Multiple Face detection and no face detection will get detected. Head Posing will be tracked, Multiple Voices will be detected. If a student is found doing fraudulent activities in logs it will leads to disqualification.

VI. SYSTEM REQUIREMENTS

The hardware and software requirements are very minimal and the software can run on most of the machine even of the past. Here we have used the system of below specification to develop. To be used efficiently, all computer software needs certain hardware components or other software resources to be present on a computer. These prerequisites are known as (computer) system requirements and are often used as a guideline as opposed to an absolute rule. Most software defines two sets of system requirements: minimum and recommended. With increasing demand for higher processing power and resources in newer versions of software, system requirements tend toincrease over time.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:07/July-2022 Impact Factor- 6.752 www.irjmets.com

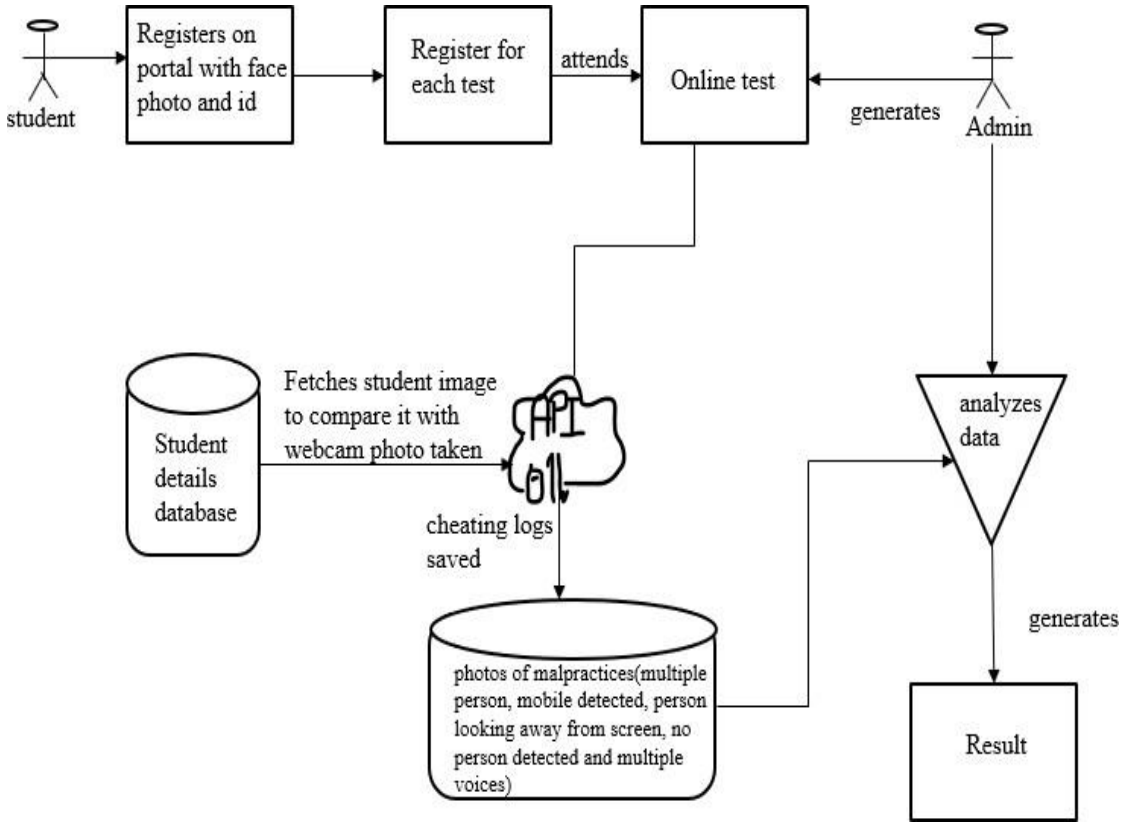

Figure 1: System Methodology

Hardware Requirements

Processor type : intel i3/i5

Processor speed : Minimum 2.4 GHz or fasterRAM : 4/8 GB

HARD DISK : 500 GB

Software Requirements

Operating System : Windows XP / 10Coding Language : Python 3

Tool : Python IDLE

VII. SYSTEM DESIGN

The design which is used to design the software related requirements. In this paper, complete system design is generated and shows how the modules, sub modules and the flow of the data between them are done and integrated. It is verysimple phase that shows the implementation process. The errors done here will be modified in the coming processes.

The system design mainly consists of:

1. Image Collection
2. Image Preprocessing
3. Image Segmentation
4. Feature Extraction
5. Training
6. . Classification

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:07/July-2022 Impact Factor- 6.752 www.irjmets.com

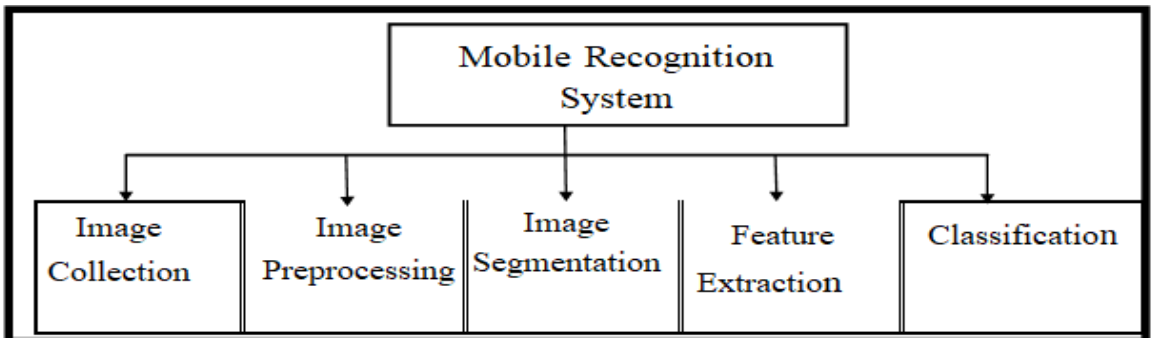

Figure 2: System Design

1. Image Collection:

Input to proposed system is the real time video. The real time video is captured from the web cam of the user's pc orlaptop.

2. Image Pre-processing:

Goal of pre-processing is an improvement of image data that reduces unwanted distortions and enhances some image features important for further image processing. Image pre-processing involves three main things.

a) Gray scale conversion

b) Noise removal

c) Image enhancement

3. Image Segmentation:

The next step after image pre-processing was to segment theobject from the surrounding image. Since a clear color distinction existed between the object and the face, thresholding was very suitable for the task. A black and white image was produced with its contrast adjusted to provide better segmentation.

4. Feature Extraction:

The purpose of feature extraction (glcm) is to suppressed the original image data set by measuring certain values or features that helps to classify different images from one another.

5. Classification:

A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image,assign importance (learnable weights and biases) to variousaspects/objects in the image and be able to differentiate onefrom the other.

VIII. ALGORITHMS

A. Convolution Neural Network:

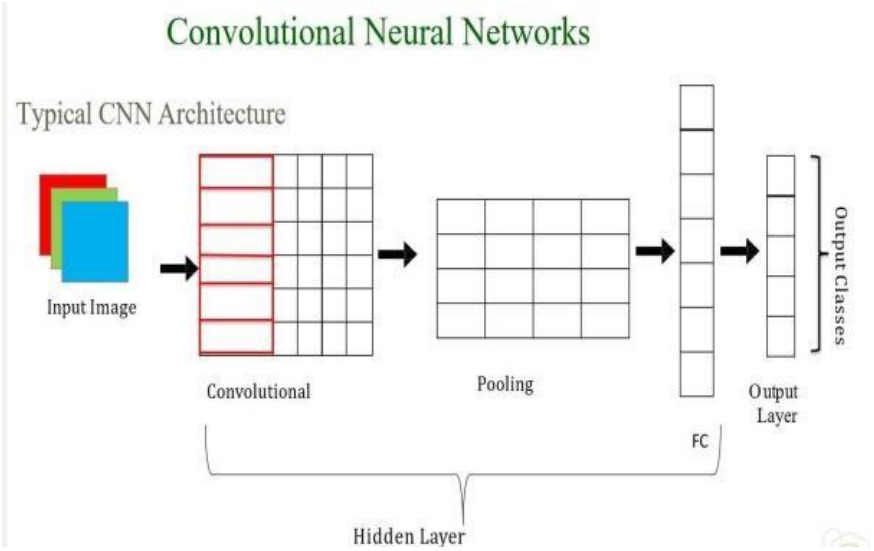

Figure 3: CNN Algorithm

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:07/July-2022 Impact Factor- 6.752 www.irjmets.com

Convolutional neural network (CNN) is a type of artificial neural network used in image recognition and processing that is specifically designed to process pixel data. Convolutional neural network is the special type of feed forward artificial neural network in which connectivity between the layers are inspired by visual cortex. CNN is a class of deep neural network which is applied for analyzing visual imagery.

In neural networks, Convolutional neural network (ConvNets or CNNs) is one of the main categories to do images recognition, images classifications. Objects detections, recognition faces etc., are some of the areas where CNNs are widely used. Convolution is the first layer to extract features from an input image. Convolution preserves the relationship between pixels by learning image features using small squares of input data.It is a mathematical operation that takes two inputs such as image matrix and a filter.

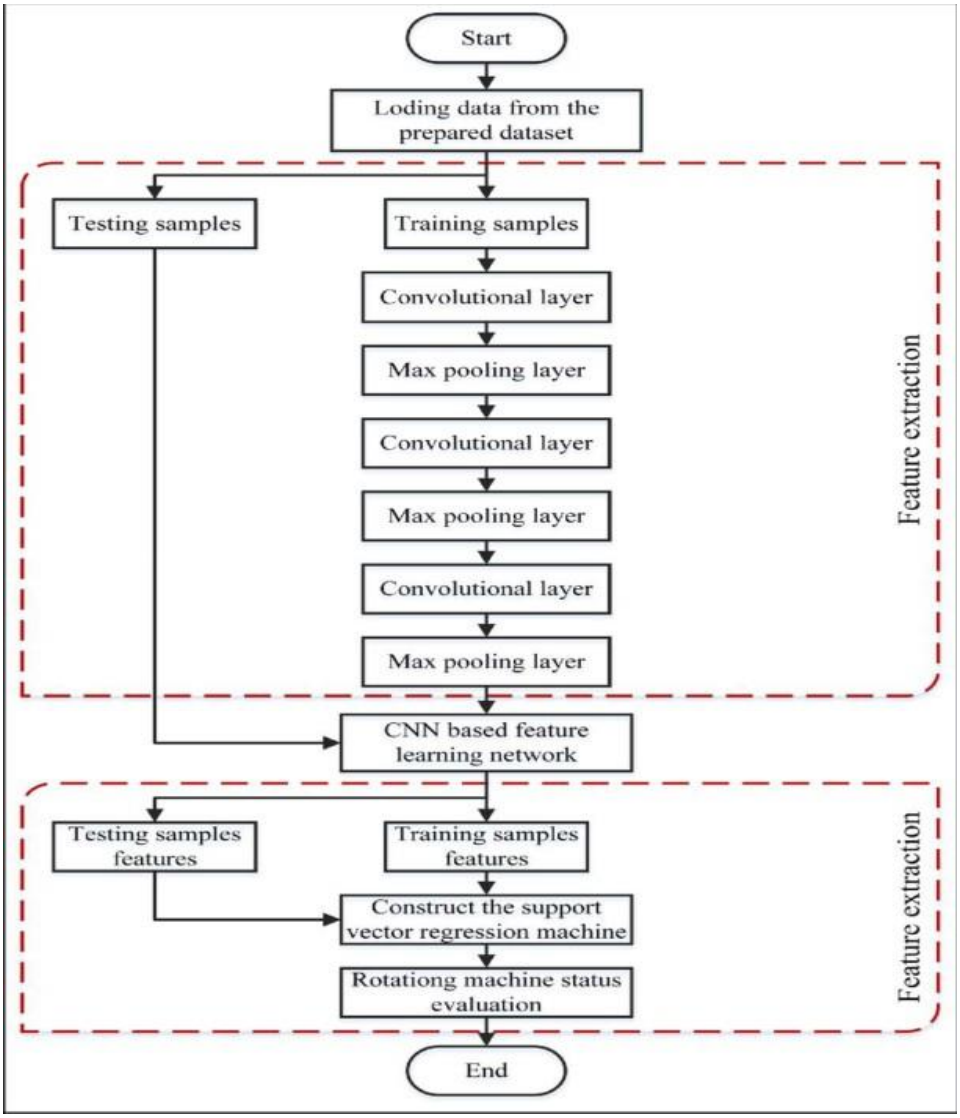

Figure 4: CNN Flow chart

The input to the fully connected layer is the output from the final pooling or convolutional layer, which is flattened and then fed into the fully connected layer. it reduces the number of parameters to learn and the amount of computation performed in the network. The pooling layer summarizes the features present in the region of the feature map generated by a convolutional layer.

B. Haar Cascade Classifier

It is mainly used for recognitions of face, nose, eyebrows and mouth., It will select in 3 forms such as edge feature, line feature and four-rectangle feature. The figure shows the Haar Feature Selection, it is divided into 2 parts, right part and left part. Right part is the brighter part of human face and left part is the darker part of human face. The pixel would be taken and some of the pixel will be identified.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:07/July-2022 Impact Factor- 6.752 www.irjmets.com

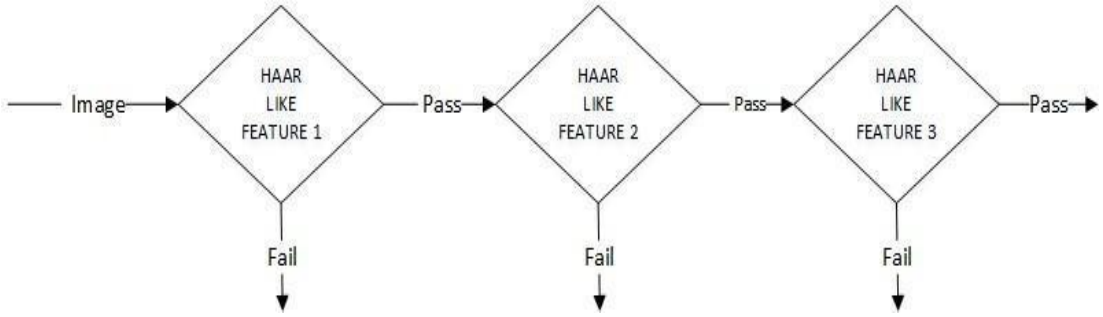

Figure 5: Haar cascade algorithm Flow chart

Modern day Smartphones and Laptops come with in-built face detection software's, which can authenticate the identity of the user. There are numerous apps that can capture, detect and process a face in real time, can identify the age and the gender of the user, and also can apply some really cool filters. The list is not limited to these mobile apps, as Face Detection also has a wide range of applications in Surveillance, Security and Biometrics as well.

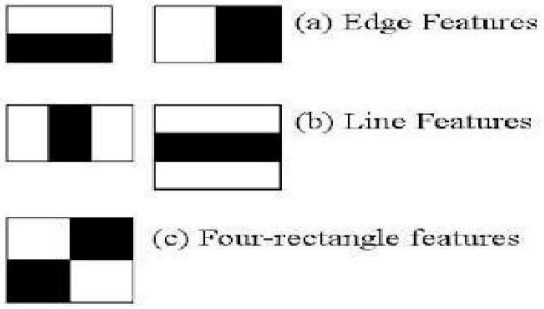

Figure 6: Feature Extraction in haar cascade Algorithm

Feature extraction plays an important role in extracting information present in given image. Here we are using GLCM fortexture image analysis. GLCM is used to capture spatialdependency between image pixels. GLCM works on gray level image matrix to capture most common feature such as contrast, entropy, energy, homogeneity, correlation, ASM, cluster- shade. The purpose of feature extraction (glcm) is to suppressed the original image data set by measuring certain values or features thathelps to classify different images from one another.

IX. RESULTS AND DISCUSSION

The student is looking outside the computer screen and logs it as malpractice. Here, the Admin can login the page by using their login credentials. the fraudulent activities like objects, person and voice detection will be recorded. the detection of objects like phone, book and electrical devices and the detection of multiple persons. the face spoofing like if the person doesn't focus for the camera, then it will be detected. he mouth open detection and it willbe recorded in the database. the eye tracking that is when the personturns left or right then it will be considered as malpractice and it will be recorded. student is looking outside the computer screen and logs it as malpractice.

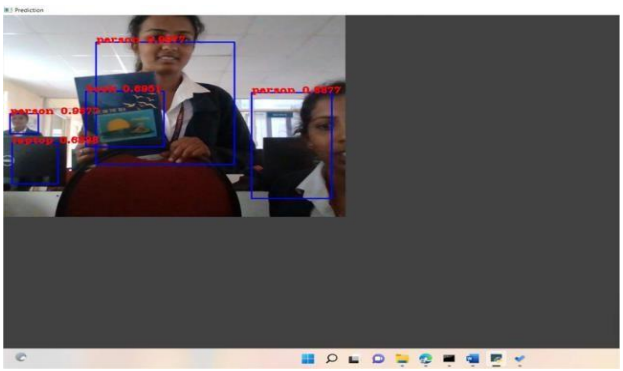

Figure 7: Objects Detection

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:07/July-2022 Impact Factor- 6.752 www.irjmets.com

The above figure 7 shows the detection of objects like phone, book and electrical devices and the detection of multiple persons.

Figure 8: Face Spoofing

The above figure 8 represents the face spoofing like if the person doesn't focus for thecamera, then it will be detected.

Figure 9: Mouth Open

The above figure 9 shows the mouth open detection and it willbe recorded in the database. and also detects the eye tracking that is when the person turns left or right then itwill be considered as malpractice and it will be recorded. And also if a student is looking outside the computer screen and logs it as malpractice.

X. CONCLUSION

Our system ensures the ethical examination environment without any malpractice activities. Our system keeps the track of the activities of the students from remote places. Our system can help in detection and prevention of cheatingduring the online exam process. Entire examination activitycan be completed in a paperless manner. We can save a huge cost of exam administration and management by shifting tousing our system. Our system can be used along withtraditional exam process.

XI. FUTURE ENHANCEMENT

It is possible to create an AI proctoring system with high accuracy. Through this project, we will try to show that online proctoring is the future, and using online proctoring cheating in exams can be reduced drastically.

XII. REFERENCES

[1] A Video Analytics System for Class RoomSurveillance Applications Saeed Ahmed, Nirmal Krishnnan, Thanmay Ganta, Gurusamy Jeyakumar

[2] Research on Abnormal Behavior Detection of Online Examination Based on Image Information Senbo Hu1 , Xiao Jia2 , Yingliang Fu3 Dalian Maritime University College of Information Science and Technology Dalian, Liaoning Email:senbo@dlmu.edu.cn, jiaxiao222@126.com,fuyl8125@dlmu.edu.cn

[3] E-cheating Prevention Measures: Detection of Cheating at Online Examinations Using Deep Learning Approach - A Case Study Leslie ChingOw Tiong and HeeJeong Jasmine Lee

[4] An Evaluation of Online Proctoring ToolsMohammed Juned Hussein, Javed Yusuf, Arpana Sandhya Deb,

Letila Fong & Som NaiduThe University of the South Pacific (Fiji)

[5] MALPRACTICE DETECTION IN EXAMINATION HALL USING EMP R. Mohanpriya1, R.Indhumathi2,L.K. Hema3 1,2Asst. Prof.(Gr-II), 3Associate Professor, ECE Department, Aarupadai Veedu Institute of Technology, Vinayaka Mission's ResearchFoundation, Deemed to be Universitymohanapriya@avit.ac.in

[6] DOI: 10.5815/ijmecs.2016.09.06 Copyright © 2016 MECS I.J. Modern Education and Computer Science, 2016, 9, 43-50 Virtual Examination Supervision System for Nigerian Universities

[7] Video Analysis for Malpractice Detection in Classroom Examination T. Senthil Kumar and G.Narmatha E-INVIGILATION: PANACEA TO EXAMINATION MALPRACTICE IN NIGERIA O.O. Fayomi, L. Amodu, Charles K. Ayo, O. R. Idowu, Francis O. Iyoha Covenant.

[8] Research and Development of Intelligent Online Examination Monitoring System SHI Jun Department of Computer Science Huaihai Institute of Technology Lianyungang Jiangsu222005, China sj_lfg@hotmail.com

[9] Automated Video Surveillance System for Detection of Suspicious Activities during Academic Offline Examination G. Sandhya Devi, G. Suvarna Kumar, S. Chandini

[10] O. Tuzel, F. Porikli, and P. Meer. Pedestrian detection via classification on riemannian manifolds. IEEE Trans. Pattern Anal. Mach. Intell., 30(10):1713–1727, 2008.

[11] P. Viola and M. Jones. Rapid object detection using a boosted cascade of simple features. In Proc. IEEE Conf. Computer Vision and Pattern Recognition (CVPR), volume 1, pages 511– 518, 2001.

[12] A. Wahid, Y. Sengoku, and M. Mambo. Toward constructing a secure online examination system. In Proc. of the 9th Int. Conf. on Ubiquitous Information Management and Communication, page 95. ACM, 2015.

[13] B. Xiao, P. Georgiou, B. Baucom, and S. Narayanan. Head motion modeling for human behavior analysis in dyadic interaction. IEEE Trans. Multimedia, 17(7):1107–1119, 2015.

[14] Y. Zhang, X. Liu, M.-C. Chang, W. Ge, and T. Chen. Spatio-temporal phrases for activity recognition. In Proc. European Conf. Computer Vision (ECCV), pages 707–721, Florence, Italy, Oct. 2012.

[15] A. Tsukada, M. Shino, M. Devyver, and T. Kanade. Illumination-free gaze estimation method for first-person vision wearable device. In Proc. Int. Conf. Computer Vision (ICCV) Workshops, pages 2084–2091, 2011.