

# INTERNET OF THINGS

PROJECT - FINAL REPORT

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**PROCTOR - E**

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# 1 ABSTRACT

In this Project, we intend to create a web based examination system named Proctor-E which can detect any malicious activities and flag them, to ensure fair way of examination. Essentially, we detect malpractices by incorporating visual movements and computer Audio using webcam and microphone. While it allows students to take a test from any location with specific technical prerequisites, it also removes the need for physical examination centers.

## 2 OBJECTIVE AND MOTIVATION

With the advent of COVID-19, remote learning has blossomed. Schools and universities may have been shut down but they switched to applications like Zoom, Microsoft Teams to finish their academic years. Regarding Examinations Some have changed it to an assignment form where students can easily plagiarise. Many have preferred proctored online examinations.

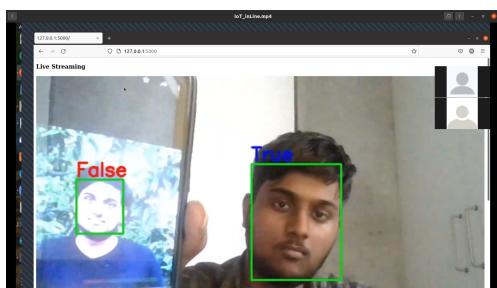
Although COVID -19 wave is about to end proctoring sites can still be used because they are automated. They can be used to monitor a large number of students at once. Students can give examinations from any place. Students are monitored through whole duration of exam. Taking this as Motivation we implemented an Online proctoring site using Python and Flask which monitors the visual and audio movements of a student using web cam and microphone.

## 3 SYSTEM INFORMATION

As said before the System works using two sensors using camera and Microphone. We have used python language for programming the system and flask for the working of website. A PC is used for running the program. A person can take the exam by sitting in front of camera with microphone on. The system has five features .

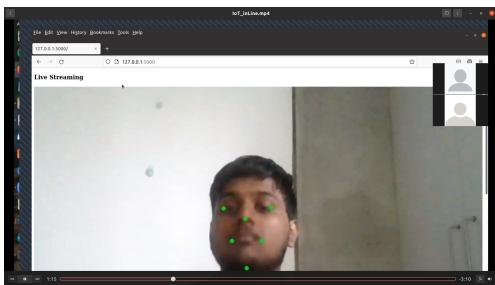
### 1. Face Spoofing

Face spoofing feature is used to find whether a person is true or not . It shows an annotation box denoting True/False. The program uses a Pre-trained model to detect this.



### 2. Head Pose Estimation

This Feature notes the Head position - Up/Left/Right/Down. It marks the facial marks on the image. Based on the angle turned the Head position of the person is recorded by the program.



### 3. Mobile Phone Detection

This Feature detects the presence on the Mobile phone.



### 4. Person Count Estimation

This Feature keeps track of the person count appearing on the camera. An alarm is noted if there is no person or more than one person is appearing on screen.



### 5. Audio Detection

This Feature Keeps track of the audio for every 2s if any audio is detected from the microphone then it is recorded and converted to a text file. The text file is checked with the given question paper and if any common words are noticed than it an alarm is noted.

We have used Pre-trained Face detection, Face spoofing models to program Face spoofing and Head pose features. Mobile phone and person count features are implemented using YOLO based object detection methods. YOLO understands the generalized object representation well and sees the entire image during training and test time so it implicitly encodes contextual information about classes as well as their appearance.

Speech recognition and pyaudio are used for recording and converting the audio to text for Audio detection feature. Each frame of the image is sent through the features and the results are noted for every feature. Finally we give a plagiarism score combining all the results.

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## 4 RESULTS/OUTCOME

Weights are assigned to each of the feature based on how malicious is the activity.

Weight(w)	
Feature	Weight
UP	1/7
DOWN	2/7
LEFT	1/7
RIGHT	1/7
Mobile Phone	1
No Person	3/7
Many Person	5/7
Audio	6/7

We have conducted two experiments for the validation of our system.

### Experiment - 1

In this experiment we have run the features each for 200 frames one after another by testing all the features and the results are as follows.

Exp-1	
Feature	Frames/Alarms Noted(n)
UP	4
DOWN	1
LEFT	19
RIGHT	31
Mobile Phone	2
No Person	1
Many Person	0
Audio	1

Plagiarism Score =  $\Sigma n.w = 11.2857$

### Experiment - 2

In this experiment we have run all the features conducted the exam for 50s the results are as follows.

Exp-2	
Feature	Frames/Alarms Noted
UP	5
DOWN	3
RIGHT	1
LEFT	6
Mobile Phone	10
No Person	5
Many Person	0
Audio	5

Plagiarism Score =  $\Sigma n.w = 16.8571$

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We can observe the plagiarism score in high in the second case compared to first case because of number of mobile detection are more in second case. Face spoofing model isn't accurate so we didn't include it in the plagiarism score. Audio detection feature is accurate in recording the text but it is not accurate while converting to text. Head Pose Estimation and Yolo based features are very accurate and efficient.

## 5 FUTURE SCOPE AND CHALLENGES

Running all the features at a time is making the camera disturbed and slow. So for the validation of our system we tried the case running the features one by one for a certain number of frames. This problem has to be resolved by finding an efficient way to run all the features at once. As described above audio detection is not accurate we can make the feature such that an alarm can be given if a sound is recorded for a long time. We have done only a simple implementation of website it can be developed by adding more features like login, Exam section etc..

## 6 CONCLUSION

Web based examination systems can be used for conducting examinations from anywhere. The system is affordable and convenient to use from the user's perspective, since it only requires having a camera and a microphone. Fair way of examination can be achieved malicious activity can be reduced. The system we proposed functions with vision and audio based features. Vision based features include face detection and object detection, audio feature would record from microphone.

## 7 REFERENCES

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