**AI POWERED EXAM SUPERVISION ARTIFICIAL SYSTEM**

**Submitted**

**By**

**Shaik Nabi Baba (BU21EECE0100565)**

**Nithin Reddy M (BU21EECE0100602)**

**Under the Guidance of**

**(Sanhitha Manna, Associate Professor)**

**(Duration: Date/Month/Year to Date/Month/Year)**



**Department of Electrical, Electronics and Communication**

**GITAM School of Technology**

**GITAM**

**(DEEMED TO BE UNIVERSITY)**

**(Estd. u/s 3 of the UGC act 1956)**

**NH 207, Nagadenehalli, Doddaballapur taluk, Bengaluru-561203 Karnataka, INDIA.**

**DECLARATION**

**I/We declare that the project work contained in this report is original and it has been done by me under the guidance of my project guide.**

**Name:**

**M Nithin Reddy**

**Shaik Nabi Baba**

**Date: Signature of the Student**

**Department of Electrical, Electronics and Communication Engineering [GITAM School of Technology, Bengaluru-561203**

**A logo with text on it

AI-generated content may be incorrect.**

**CERTIFICATE**

**This is to certify that Shaik Nabi Baba and M Nithin Reddy bearing (Regd. No.: BU21EECEO0100565, BU21EECE0100602) has satisfactorily completed Mini Project Entitled in partial fulfillment of the requirements as prescribed by University for VIII semester, Bachelor of Technology in “Electronics and Communication Engineering” and submitted this report during the academic year 2024-2025.**

**[Signature of the Guide] [Signature of HOD]**

**Table of contents**

|  |  |  |
| --- | --- | --- |
| **CONTENTS** | | **Page No** |
| **Chapter 1** | **INTRODUCTION** |  |
| 1.1 | Overview of the problem statement |  |
| 1.2 | Objective goals |  |
| **Chapter 2** | **Literature Review** |  |
| **Chapter 3** | **Strategic Analysis and Problem Definition** |  |
| 3.1 | SWOT Analysis |  |
| 3.2 | Project Plan – GANTT chart |  |
| 3.3 | Redefinition of problem statement |  |
| **Chapter 4** | **Methodology** |  |
| 4.1 | Description of the approach |  |
| 4.2 | Tools and techniques utilized hardware usage |  |
| 4.3 | Design consideration |  |
| **Chapter 5** | **Implementation** |  |
| 5.1 | Description of how the project was executed |  |
| 5.2 | Challenges faced and solutions implemented |  |
| **Chapter 6** | **Results** |  |
| 6.1 | Outcomes |  |
| 6.2 | Interpretation of results |  |
| 6.3 | Comparison with existing literature or technologies |  |
| **Chapter 7** | **Conclusion** |  |
| **Chapter 8** | **Future work** |  |
|  | **References** |  |

# **Chapter 1: Introduction**

AI-Powered Examination Invigilation Monitoring System: Artificial intelligence technology designed to monitor students during classroom and online examinations. Commonly, human invigilators watch over the students during the conduct of examinations to ensure that they do not engage in cheating; however, the method has many pitfalls, including human error, fatigue, and bias.

AI can equip cameras to monitor students automatically, determine suspicious activities, and recognize prohibited items such as the use of unauthorized devices, unusual movements, or looking away too frequently. As a matter of fact, the system sends real-time alerts the moment it feels something abnormal to invigilators, therefore making the process of monitoring much more accurate and reliable.

## Overview of the problem statement

## 1. Human Error and Bias: Invigilators can get tired, distracted, or may not notice all cheating attempts. They can also be biased, and that biases the manner in which they monitor students.

2. Hard to Scale: As more exams go online or large numbers of students are involved, it becomes very hard and expensive to provide enough invigilators to watch everyone.

3. Advanced Techniques: The students have devised more sophisticated ways of cheating through the usage of hidden gadgets or software, which might be highly difficult for invigilators to notice.

4. High Cost and Inefficiency: Human supervision in examinations is usually costly and time-consuming, especially for large or remote locations.

5. Need for Response on Instant: Most cheating is usually noticed during periods far from the examination, so effective action cannot be sought.

## 1.2 Objectives and goals

1. Develop an AI-powered system for automated exam invigilation using CCTV footage.
2. Implement deep learning algorithms (YOLO) to detect and classify suspicious behaviours during exams.
3. Improve upon existing AI models by enhancing accuracy, reducing false positives/negatives, and enabling real-time processing.
4. Create a more reliable alternative to human invigilation, addressing issues such as fatigue and limited observation capacity.
5. Contribute to maintaining exam integrity and fairness in educational settings.

**Main Goals**

* To reduce academic dishonesty and cheating among the students during examinations.
* To monitor and capture the prevalence of academic dishonesty among the students in the higher education context more precisely and accurately.
* To reduce the burden on the Invigilation staff members.
* To identify the students interpreting any suspicious task through the face recognition module.
* To generate are port in which all students’ names are written along with the percentage of cheating activity.

# **Chapter 2: Literature Review**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Method & Year** | **Authors** | **Result** | **Accuracy** | **Technology Used** |
| AI-based Online Exam Proctoring System (2024) | S. Satre, S. S. Soni, and S. S. Soni | An AI-based system monitors online exams using webcam surveillance to detect malpractices, enhancing academic integrity. | **95%** (based on facial recognition and behavior analysis) | Machine Learning, Computer Vision, NLP, Cloud Computing |
| Systematic Review on AI-based Proctoring Systems (2021) | S. K. Sharma and S. K. Sahay | A review of AI and non-AI-based proctoring systems, covering architectures, parameters, trends, issues, and future directions | Varies (comparison study, no single accuracy mentioned) | AI, Deep Learning, Statistical Analysis |
| iExam: Face Detection and Recognition for Exam Monitoring (2022) | Xu Yang, Daoyuan Wu, Xiao Yi, Jimmy H. M. Lee, and Tan Lee | An intelligent exam monitoring system using face detection and recognition for real-time student identification and abnormal behavior detection. | 98% (for face recognition and identity verification) | Deep Learning, Face Recognition, OpenCV, TensorFlow |

# **Chapter 3 : Strategic Analysis and Problem Definition**

## 3.1 SWOT Analysis

Strength

* Automated Monitoring
* Accuracy
* Real-time Detection
* Scalability

Weakness

* Reliability on Environmental Conditions
* Limited Behaviour Detection
* False Positives/Negatives
* High Computational Requirements

Opportunities

* Integration with Online Platforms
* Wider Adoption in Educational Institutions
* Multi-behaviour Monitoring
* Data-Driven Improvements

Threats

* Student Resistance
* Technological Obsolescence
* Cybersecurity Risks
* Regulatory Challenges

### 3.2 Project Plan - GANTT Chart

#### 

##### 3.3 Refinement of problem statement

* Traditional monitoring of exams, whether in class or online, becomes ineffective since monitors are human beings who get fatigued, act out of biases, and possibly cannot be deployed to oversee many students at once.
* The initiative aims for an examination surveillance system through artificial intelligence independently identifying unusual behavior in any test session by remotely scanning video feeds in real-time.
* The system introduces artificial intelligence and machine learning to identify indicators of academic dishonesty such as head movements, peer interactions, or the use of prohibited devices. In that direction, this AI approach coupled with the already existing closed-circuit television systems helps to reduce human dependency like proctors, increases precision, and promotes a safe environment for examinations.

**Chapter 4: Methodology**

## 4.**1** Description of the approach

Description of Approach

1.Problem Analysis and Requirement Gathering:

* Understand the core challenges in traditional exam monitoring.
* Identify the behaviour that need to be flagged as suspicious (head turning, communication with others).
* Gather functional and non-functional requirements from stakeholders (educators, exam administrators).

2.Data Collection and Preprocessing:

* Collect video datasets from real or simulated exam settings.
* Annotate and label key behaviour associated with cheating (eye movements, body posture).
* Preprocess the data (normalization, frame extraction) to ensure it is clean and suitable for training the AI model.

3. AI Model Development:

* Develop machine learning models (using computer vision) capable of detecting suspicious behaviour.
* Train the model on the pre-processed datasets using supervised learning techniques.
* Test and validate the model's performance (accuracy, precision, recall) using a separate test dataset.

4.System Integration:

* Integrate the trained AI model with live CCTV or video feeds.
* Develop a user-friendly interface that displays real-time alerts and notifications when suspicious behaviour is detected.

5.Testing and Validation:

* Test the system in real-world or simulated exam scenarios.
* Validate its ability to detect cheating behaviours accurately while minimizing false positives.

6.Deployment and User Training:

* Deploy the system in actual exam environments.
* Provide training and support for exam invigilators and administrators on using the system effectively.

### 4.2 **Tools and techniques utilized**

1. Machine Learning Frameworks:

* **YOLOv11n-seg.pt**: For developing, training, and deploying AI models focused on computer vision tasks.
* OpenCV: For image and video processing, including face and object detection, which are critical for analysing behaviours.

1. Programming Languages:

* Python: For implementing machine learning algorithms, processing video feeds, and building the user interface.

1. Data Annotation Tools:

* Instance Segmentation: For labelling suspicious behaviours in video frames, Identify and separate each individual object within a image which is crucial for training the AI model.

1. Development Environment:

* VS CODE (Visual Studio): For experimenting with data, visualizing model performance, and conducting rapid prototyping

1. Version Control:

* GitHub: For tracking changes in the project and collaborating across the development team.

#### 4.3 Design considerations

1. Accuracy and Minimizing False Positives:
   * The system must be highly accurate in detecting cheating behaviours to avoid generating too many false alarms. Multiple training iterations and model optimizations are carried out to balance detection accuracy and system sensitivity.
2. Real-Time Processing:
   * The system must process video feeds in real time to detect and alert invigilators of suspicious behaviours immediately. This requires efficient algorithms and possibly leveraging hardware acceleration for video processing.
3. Scalability:
   * The system should be scalable to handle multiple exam rooms and students simultaneously. Cloud computing resources and distributed architectures can be considered for large-scale deployments.
4. Privacy and Security:
   * Since the system deals with video footage of students, strict privacy measures must be in place. Data encryption and secure storage of video footage are essential to comply with privacy regulations.
5. User Experience:
   * The interface must be intuitive for invigilators, allowing them to easily understand alerts and take action when necessary. Simple yet effective dashboards with visual indicators should be incorporated.
6. System Integration:
   * The AI model should seamlessly integrate with existing CCTV systems and any exam management software currently in use. Compatibility with various camera setups and resolutions is crucial.

# Chapter 5 : Implementation

## 5.1 Description of how the project was executed

### 5.2 Challenges faced and solutions implemented

# Chapter 6:Results

## 6.1 outcomes

### 6.2 Interpretation of results

### 

#### 6.3 Comparison with existing literature or technologies

# Chapter 7: Conclusion

Here write Suggestions for further research or development and Potential improvements or extensions

# 

# Chapter 8 : Future Work

#### Here write Suggestions for further research or development Potential improvements or extensions

#### 

# References