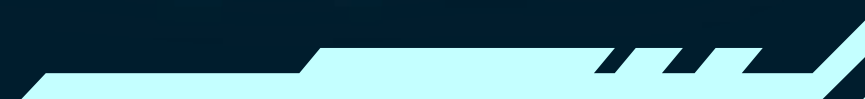# TEAM MEMBERS

M.AKANKSHA

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ABSTRACT

Clean and hygienic classrooms are vital for maintaining a healthy and effective learning environment. However, manual inspection and routine cleaning often result in inefficient use of time and resources, as some areas may be cleaned unnecessarily while others remain dusty. To address this issue, this project presents an automated dust detection system using Python to assist sweepers and cleaners in identifying dusty areas within classrooms.

The system utilizes image processing and computer vision techniques to analyze images or real-time video feeds from classrooms. By detecting visual cues and patterns associated with dust accumulation on surfaces like floors, desks, and shelves, the system provides real-time feedback about the cleanliness status of the room. This data can then be used by cleaning staff to prioritize areas that require attention, reducing unnecessary effort and improving overall cleaning efficiency

Introduction

This project proposes a dust detection system using Python to assist sweepers and cleaners in identifying dusty areas within classrooms more efficiently. By leveraging computer vision and image processing techniques, the system can automatically analyze classroom images or video feeds to detect dust accumulation on surfacsuch as floors, desks, or windowsills.

The proposed solution not only optimizes cleaning efforts but also ensures that resources are used effectively, improving both hygiene and operational efficiency. Implementing such a system empowers janitorial staff with actionable insights, enabling them to prioritize and target cleaning efforts where they are most needed.

Inovations
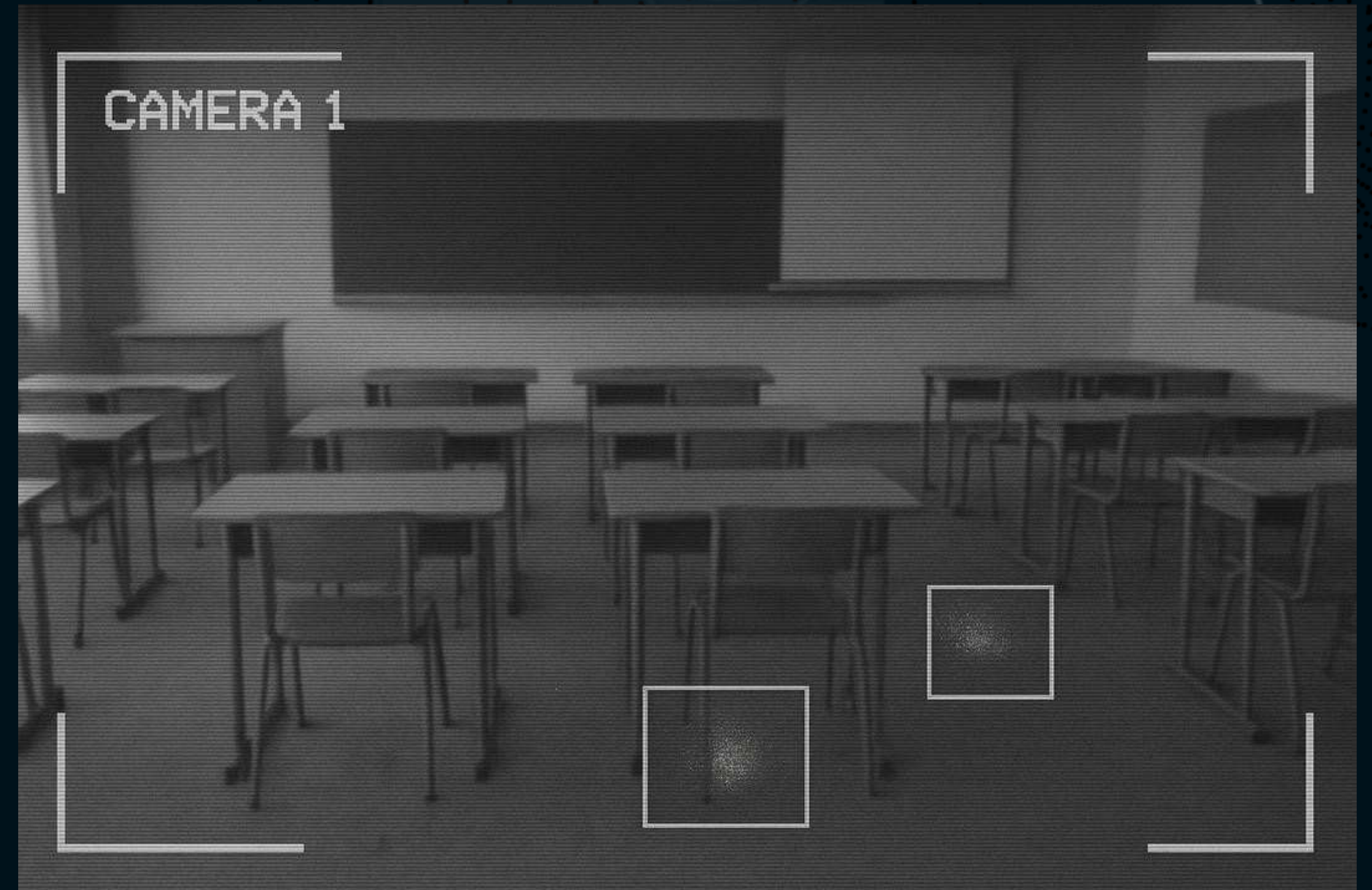
PROGRAM FOR DUST DETECTION USING PYTHON

OS Used: Frontend- OPENCV
Backend- PYTHON

```python
import cv2
import numpy as np

# Open webcam (0 is usually the default camera)
cap = cv2.VideoCapture(0)

if not cap.isOpened():
    print("Error: Could not access camera.")
    exit()
ret, frame = cap.read()

if not ret:
    print("Error: Could not read frame.")
    cap.release()
    exit()

# Convert frame to grayscale (dust might appear as bright spots or haze)
gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)

# Simulate dust level as average pixel intensity
dust_level = int(np.mean(gray))
print(f"Dust Level (simulated): {dust_level}")

# Determine room cleanliness based on average intensity
if dust_level > 180:
    print("□Room is too dusty! Displaying RED color on screen.")
elif dust_level > 100:
```

```python
# Determine room cleanliness based on average intensity
if dust_level > 180:
    print("□Room is too dusty! Displaying RED color on screen.") elif
dust_level > 100:
    print("□ Room is not much dusty. Displaying YELLOW color on screen.")
else:
    print("□ Room is very clean. Displaying GREEN color on screen.")

# Display the captured frame
cv2.imshow("CCTV Feed", frame)
cv2.waitKey(0)
cv2.destroyAllWindows()
cap.release()
```
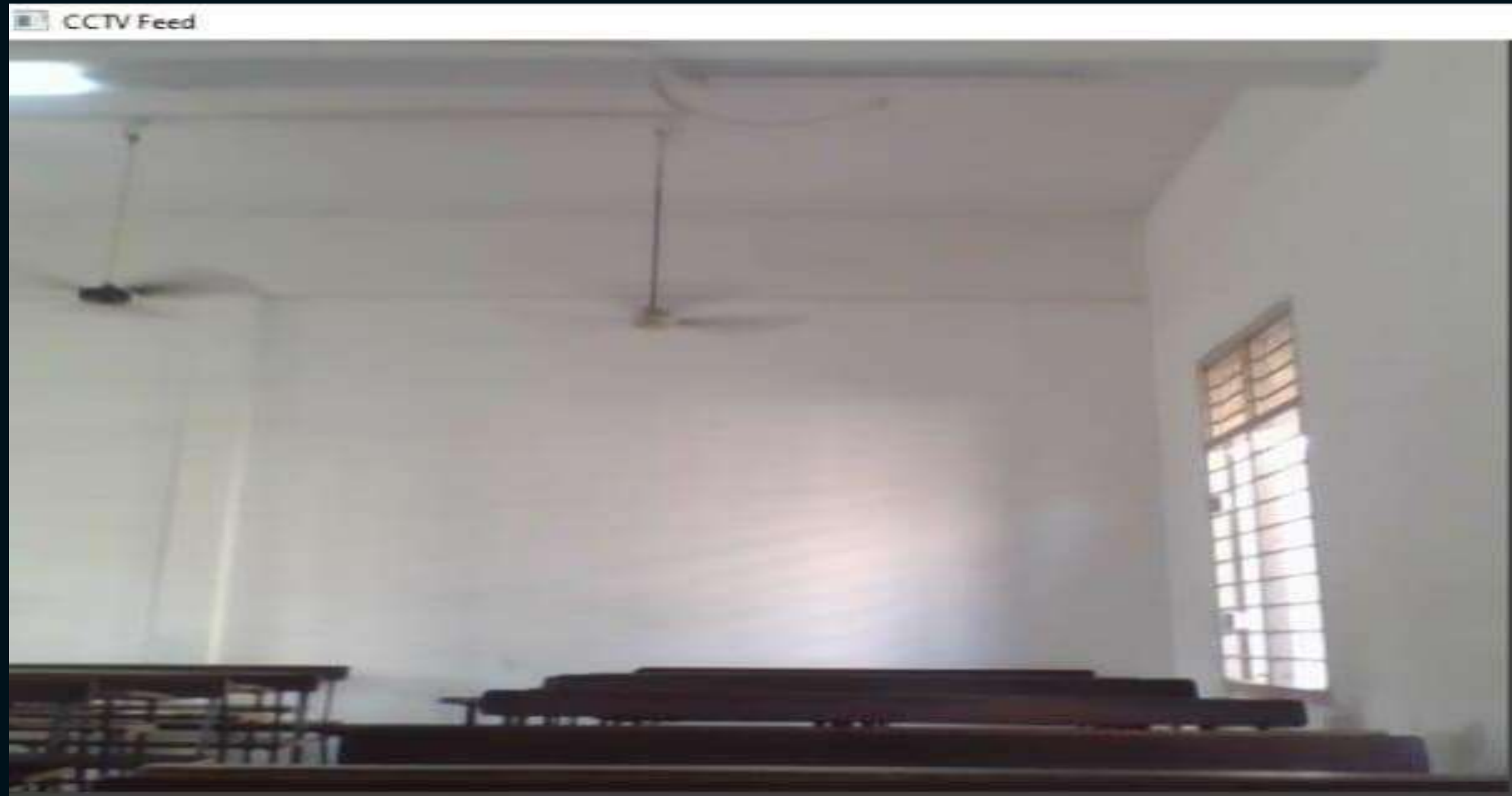
Output:-
Dust Level (simulated): 177
Room is not much dusty. Displaying YELLOW color on screen

CONCLUSION:

Dust detection through CCTV in classrooms provides an effective way to monitor cleanliness and support the work of sweepers and cleaners. By integrating surveillance cameras with image processing and recognition technology, it becomes possible to automatically identify dust accumulation on classroom floors. This system helps cleaning staff prioritize areas that require attention, ensuring faster response times and more efficient cleaning schedules. Ultimately, such a solution not only reduces manual inspection but also improves hygiene standards, creating a healthier learning environment for students and staff