

INNOVATIVE PRODUCT DEVELOPMENT

Enhancing Railway Station Safety

Advanced Object Detection and Anomaly Monitoring

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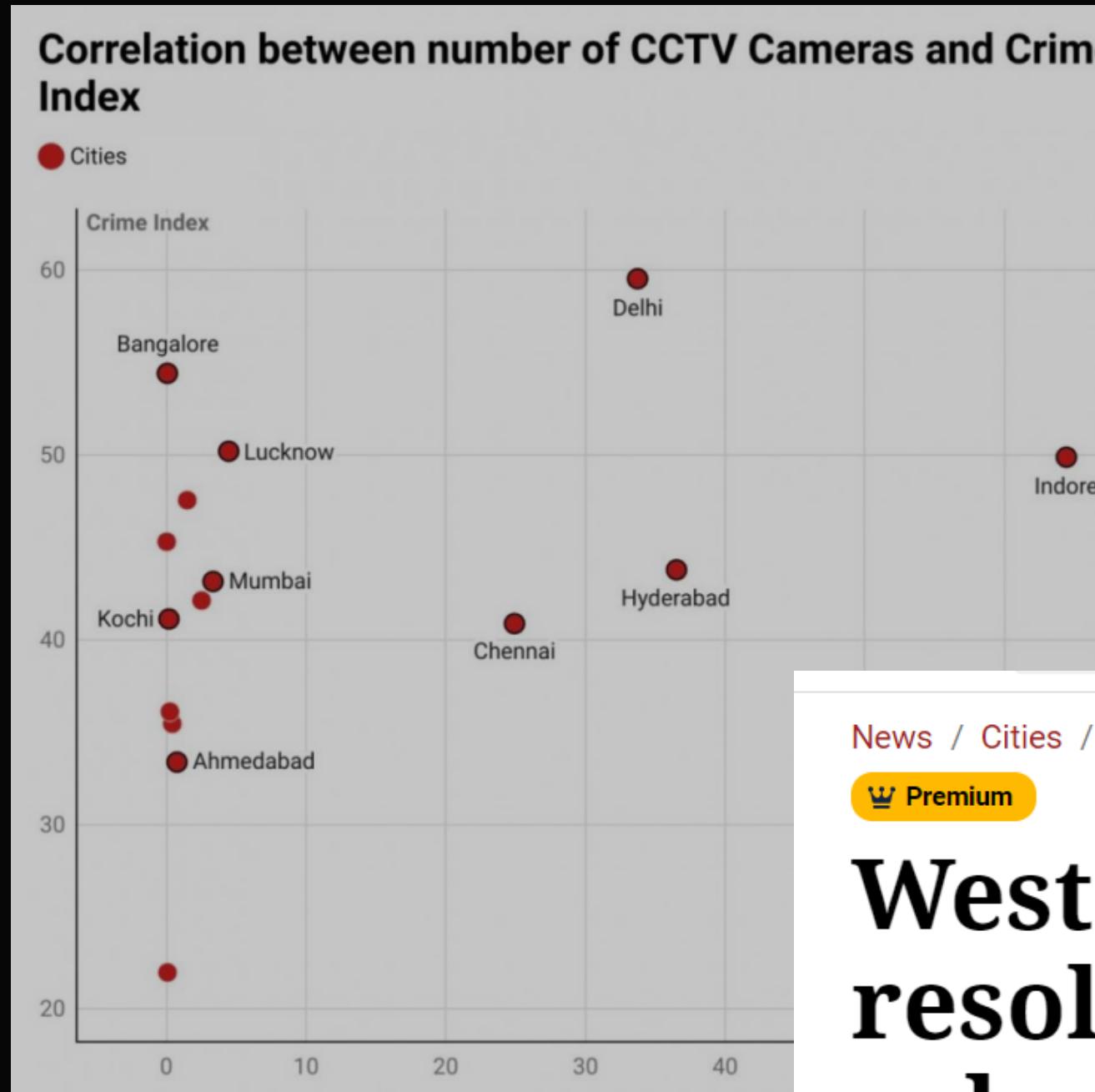


Presentation summary

Key topics covered
in this presentation

- Need for the product
- Survey
- Problem Formulation
- Proposed design
- Proposed GUI
- Implementation
- Future Scope

Need for the Product



News / Cities / Mumbai News / Suburban trains record four-fold rise in railway ac...

Suburban trains record four-fold rise in railway accident fatalities

By Megha Sood

Jan 23, 2023 12:42 AM IST

The accident data provided by the Government Railway Police (GRP) revealed the four-fold increase in fatalities on railway tracks in the MMR, with an average of about seven people losing

News / Cities / Mumbai / Western Railways installs 2,729 high-resolution cameras across 30 Mumbai suburban stations

Premium

Western Railways installs 2,729 high-resolution cameras across 30 Mumbai suburban stations

Of these high-resolution cameras, 450 are equipped with face-recognition technology which could help the authorities identify and trace criminals.

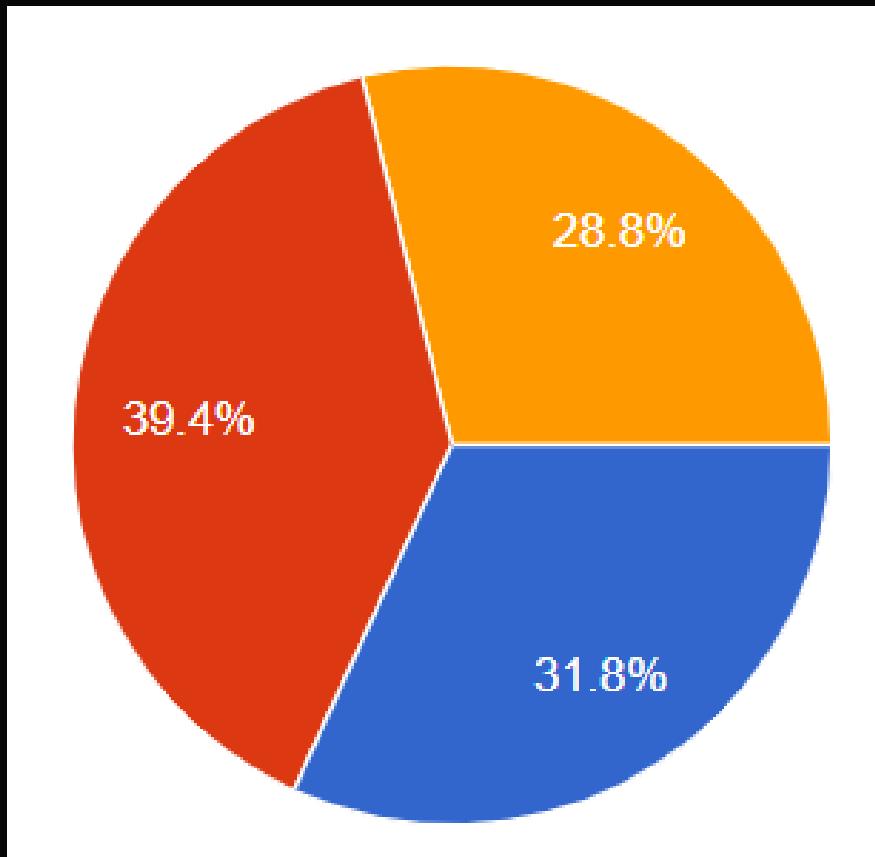
Survey Report



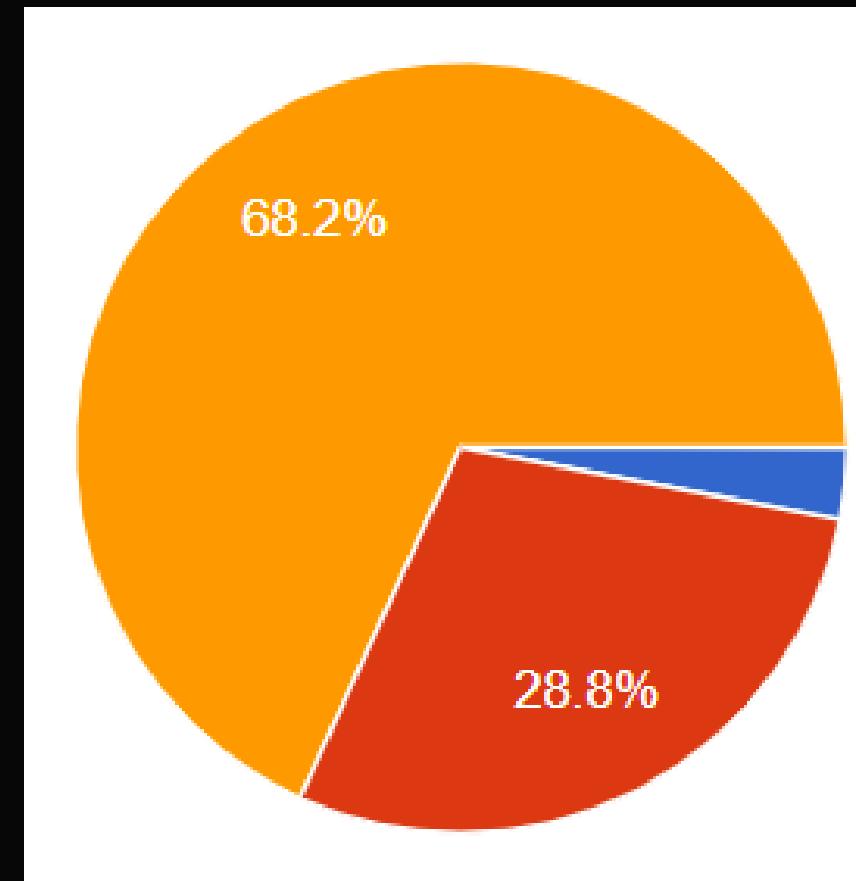
How often have you witnessed such incidents?

- Rarely (Once or twice)
- Occasionally (A few times a month)
- Frequently (Several times a week)

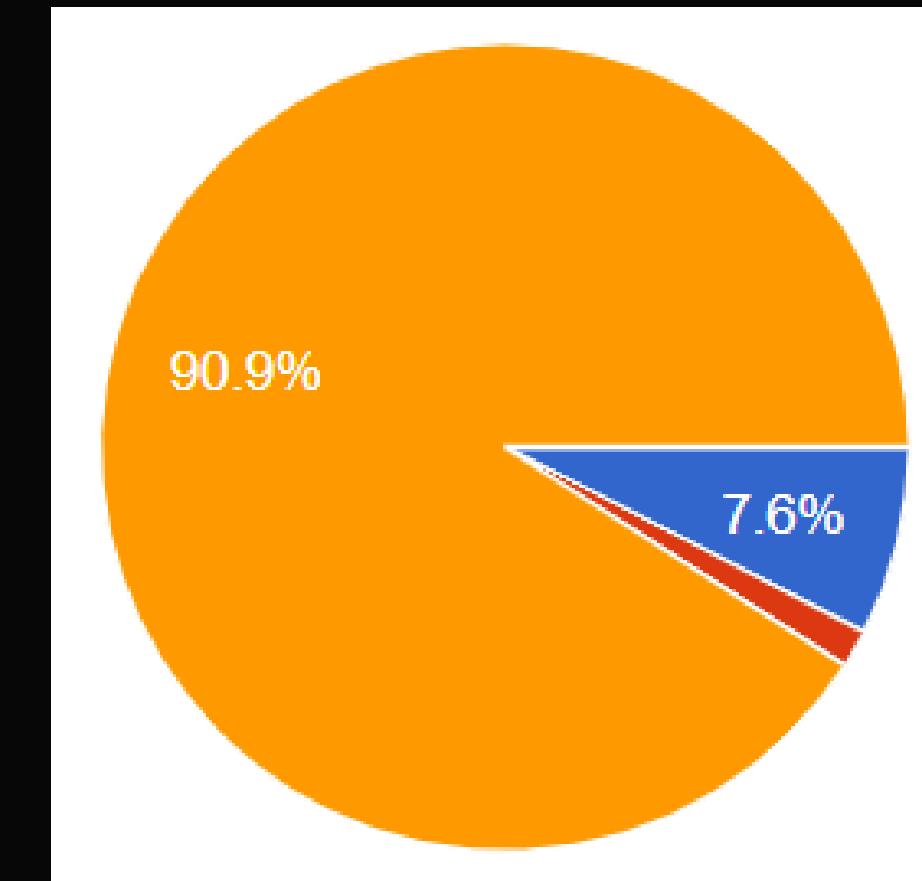
Abandoned Objects



Trespassing / Track crossing



Overcrowding

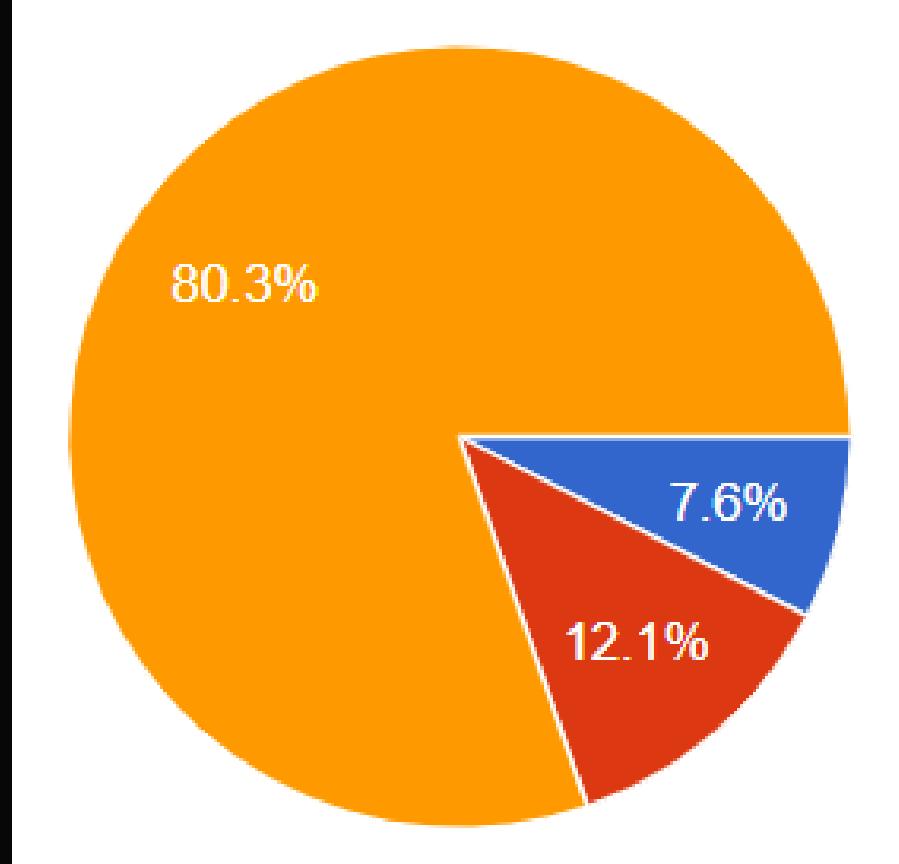


Survey Report

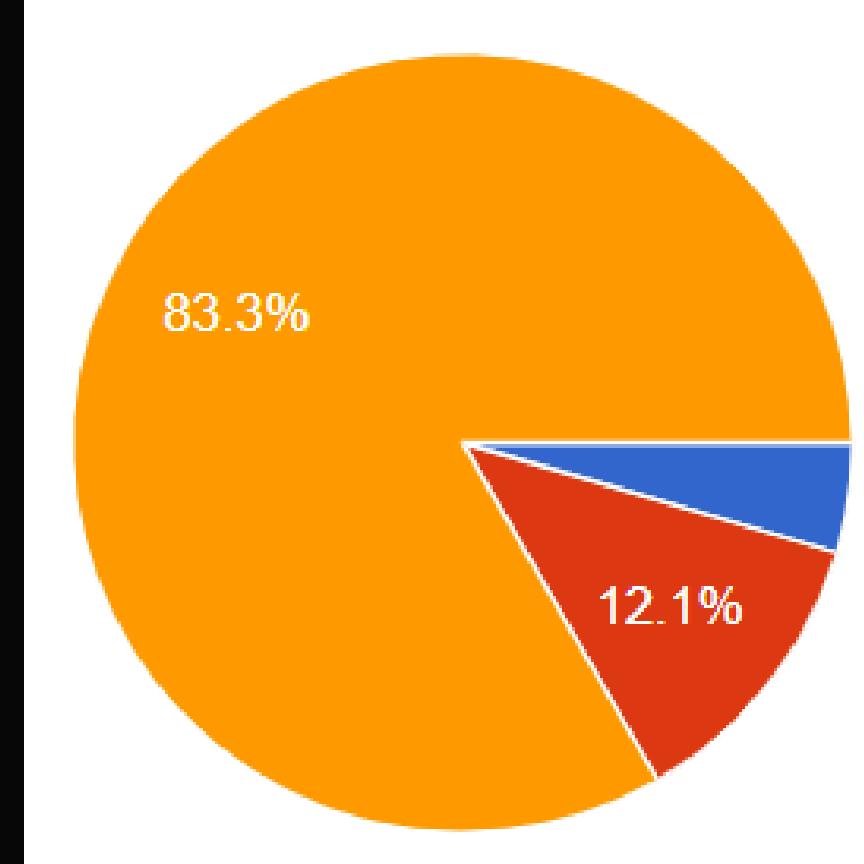
How often are such incidents reported by the passengers?

- Yes, frequently
- Occasionally
- Rarely or never

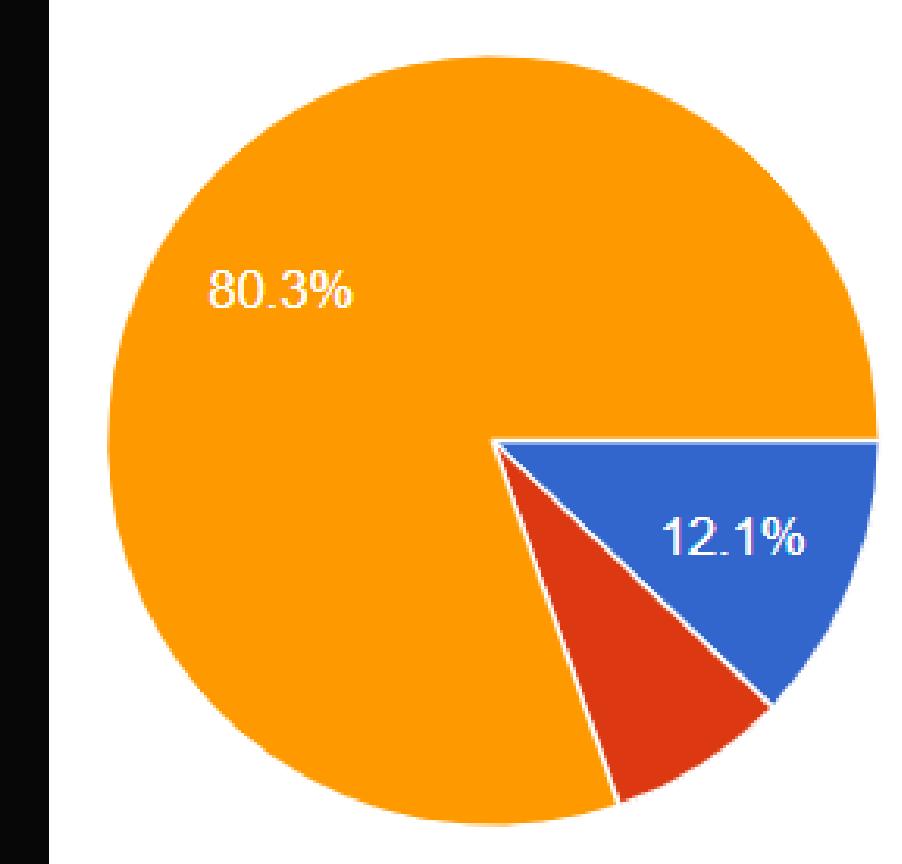
Abandoned Objects



Trespassing / Track crossing



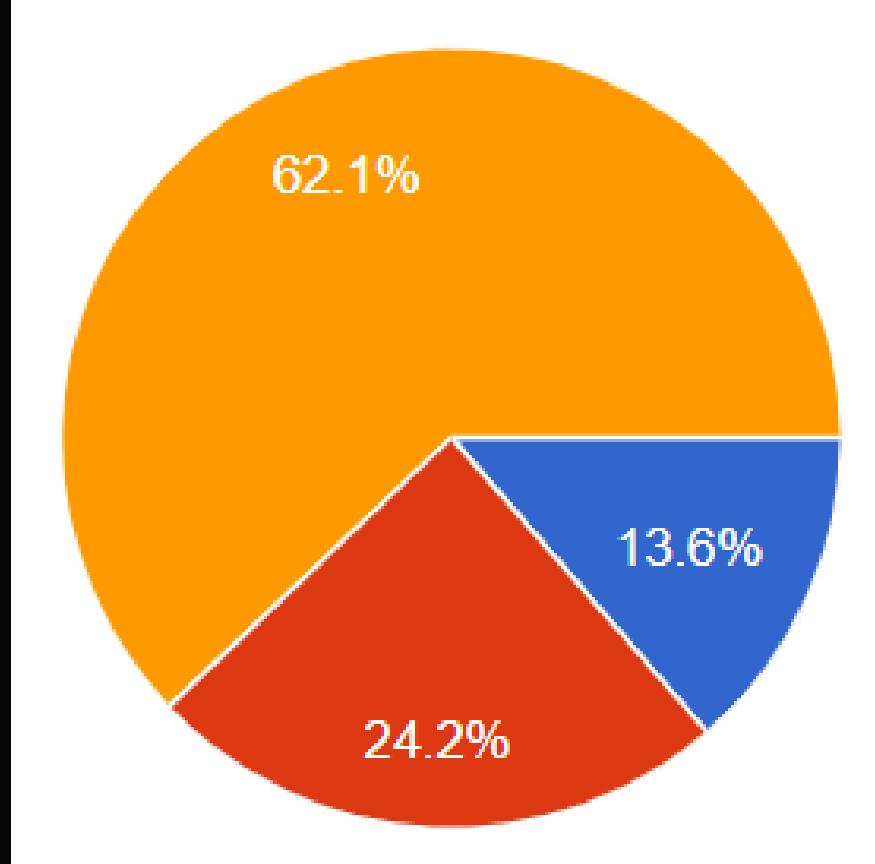
Overcrowding



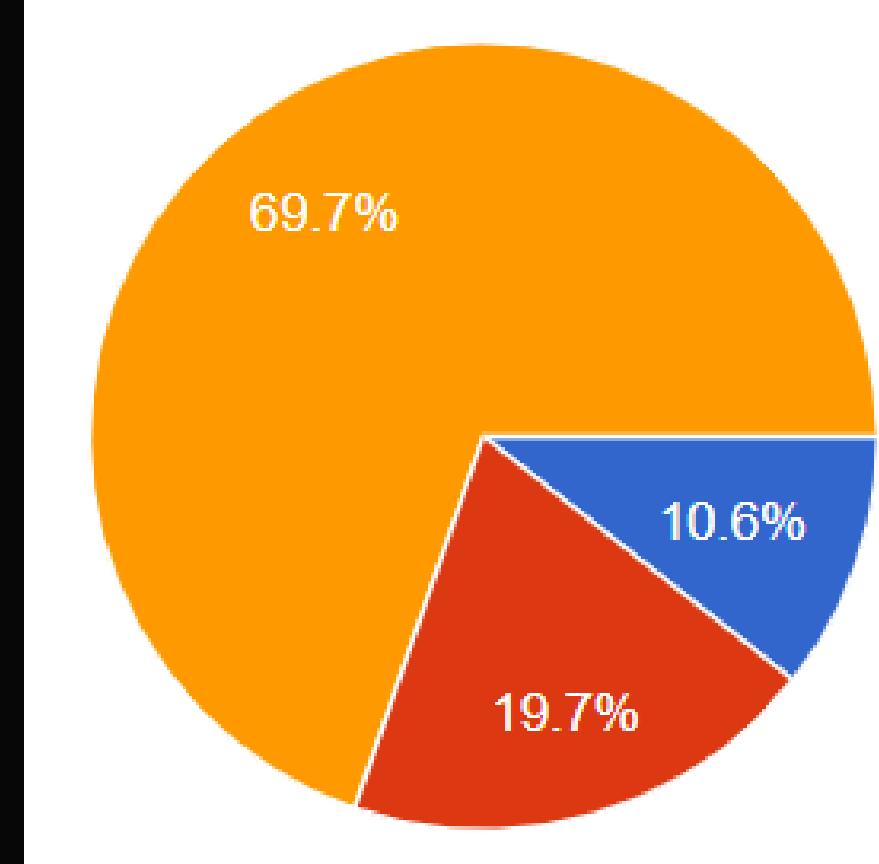
Survey Report

Are actions promptly taken upon reporting such incidents?

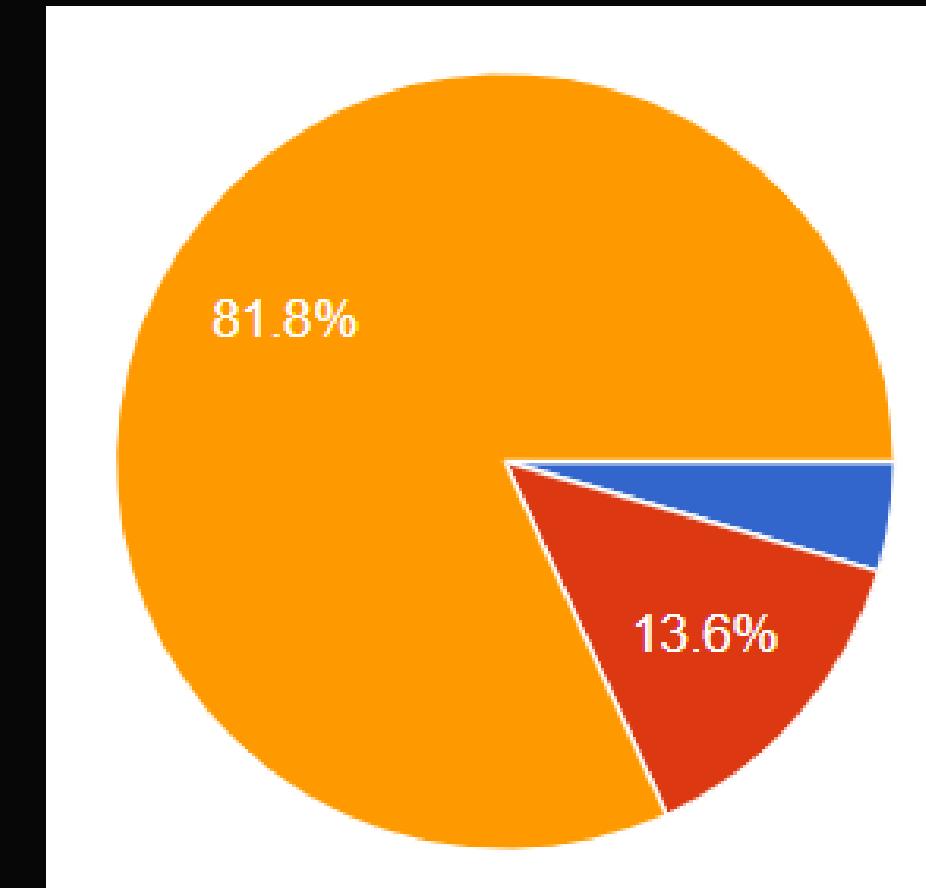
Abandoned Objects



Trespassing / Track crossing



Overcrowding



Problem Formulation

INEFFICIENCY OF
MANUAL
MONITORING

HUMAN VIGILANCE
LIMITATIONS

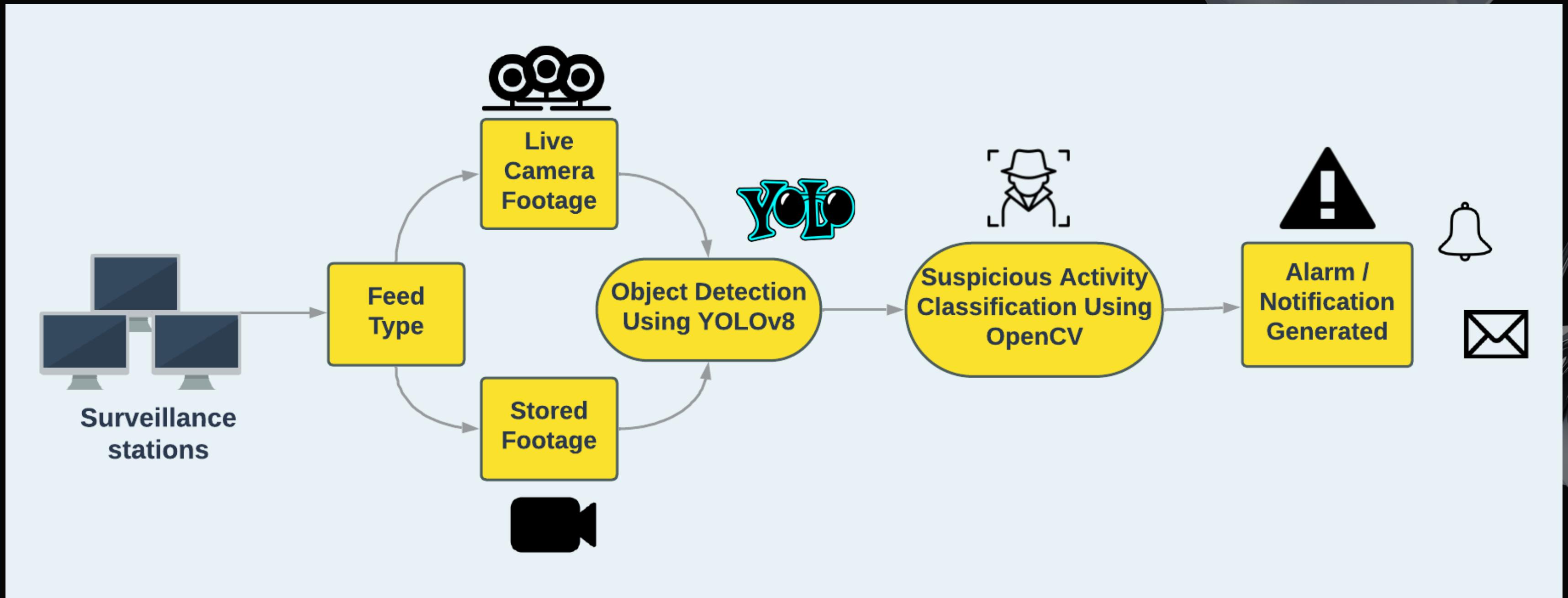
REDUCED
DEPENDENCE ON
MANUAL
MONITORING

UTILIZATION OF
YOLOV8 MODEL

IMPROVED
RESPONSE TIMES

UTILIZATION OF
HIGH-RESOLUTION
CAMERAS

Proposed Solution



Proposed GUI



Anomalies +3

Platform 1

CAM 1
05:23
PF 1
HIGH

Fighting detected in platform

CAM 2
03:13
PF 4
LOW

ENTRY | CAM 0918

CAM 3
03:13
PF 4
LOW

Platform 2

CAM 1
03:13
PF 4
LOW

BACK | CAM 0458

CAM 2
03:13
PF 4
LOW

Over crowd detected in platform

CAM 3
03:13
PF 4
LOW

Platform 3

CAM 1
12:34
PF 3
MID

ENTER | CAM 0448

CAM 2
12:34
PF 3
MID

5 people rushing in platform

CAM 3
12:34
PF 3
MID

UPSIDE | CAM 1124

CAM 1
23:12
PF 1
LOW

Violence detected in platform

CAM 2
23:12
PF 1
LOW

Fighting Detected

CAM 3
23:12
PF 1
LOW

ENTER | CAM 0945

Notification +3

Live Crowd Count

PF 1 230+ ↑ PF 2 124+ ↓ PF 3 60+ ↓ PF 4 246+ ↑ PF 5 230+ ↓ PF 6 230+ >

Forecasted Crowd Count showing results for next 1hr

PF 1 230+ PF 2 124+ PF 3 60+ PF 4 246+ PF 5 230+ PF 6 230+ >

select time period ▾

Crowd Trend | Live

select date ▾ select platform ▾

00:00 AM 02:00 AM 04:00 AM 06:00 AM

Announcements

Auto announce

Crowd standing ahead of yellow line Announce in PF 3

Crowd standing ahead of yellow line Announce in PF 2

Crowd standing ahead of yellow line Announce in PF 5

Crowd standing ahead of yellow line Announce in PF 1

Live Camera View: Platform 1 showing a crowd of people at the train station.

Crowd Trend: A line graph showing the number of people over time from 0:00 AM to 06:00 AM. The green line shows an overall increase, while the orange line shows a dip around 04:00 AM.

Platform Status:

- Cleanliness:** 20% (WET)
- Est. time to onboard:** 3 Minutes
- Alerts:** Cleanliness | Crime | Work

ATTENTION: WET Floor, Need 2 Security Guards

Notification +3

- Platform 1:** Dirty floor detected (CAM 0918, 05:23, PF 1 HIGH)
- Platform 2:** Productivity Rate 40% (CAM 0458, 03:13, PF 4 LOW)
- Platform 3:** Quality check required (CAM 0448, 12:34, PF 3 MID)
- Platform 4:** Wet floor detected (CAM 1124, 23:12, PF 1 LOW)
- Platform 5:** Resource allocation alert (CAM 0945, 16:2, PF 5 HIGH)

Recommended Worker Count: showing live results

Assign Duties to workers: select platform ▾ select worker name ▾ Assign | Send Alert

Work Monitoring: A line graph showing work monitoring trends from 0:00 to 12:00.

Notification +3

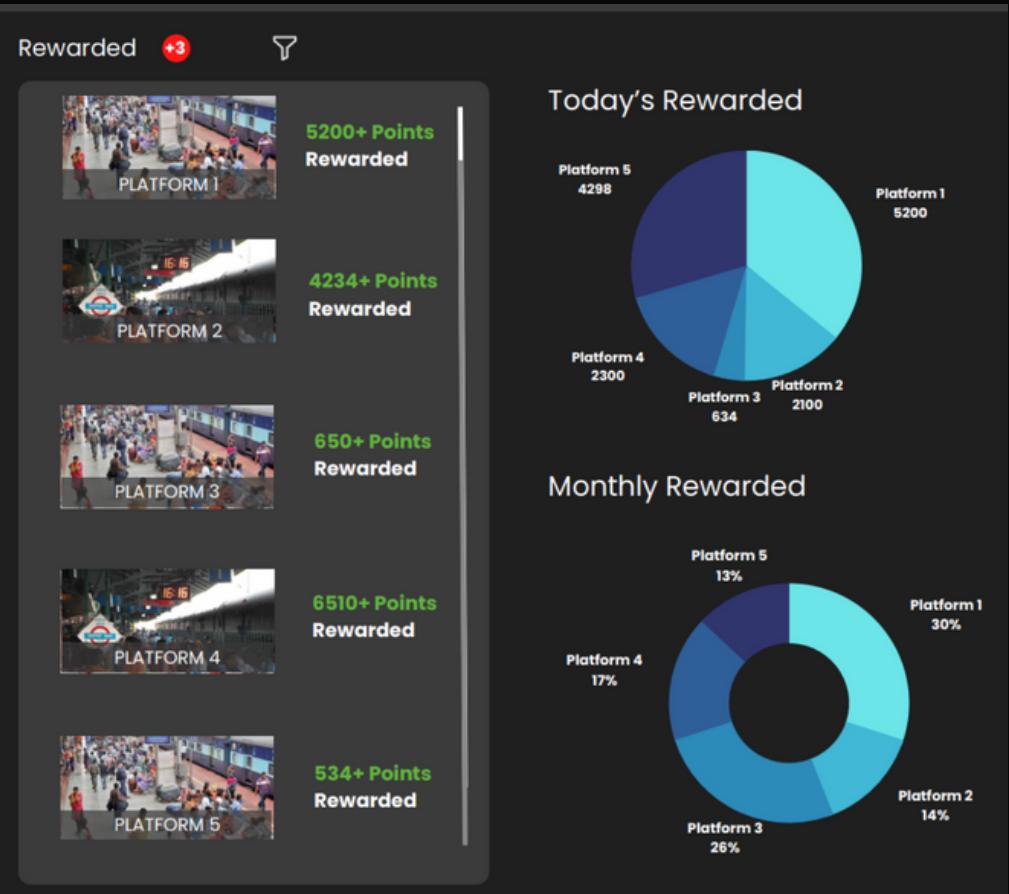
- Platform 1:** Fighting detected in platform (CAM 0918, 05:23, PF 1 HIGH)
- Platform 2:** Crime Potential 40% (CAM 0458, 03:13, PF 4 LOW)
- Platform 3:** Crime Potential 10% (CAM 0448, 12:34, PF 3 MID)
- Platform 4:** Over crowd detected in platform (CAM 1124, 23:12, PF 1 LOW)
- Platform 5:** Violence detected in platform (CAM 0945, 16:2, PF 5 HIGH)

Recommended Guard Count: showing live results

Assign Duties to guard: select platform ▾ select guard name ▾ Assign | Send Alert

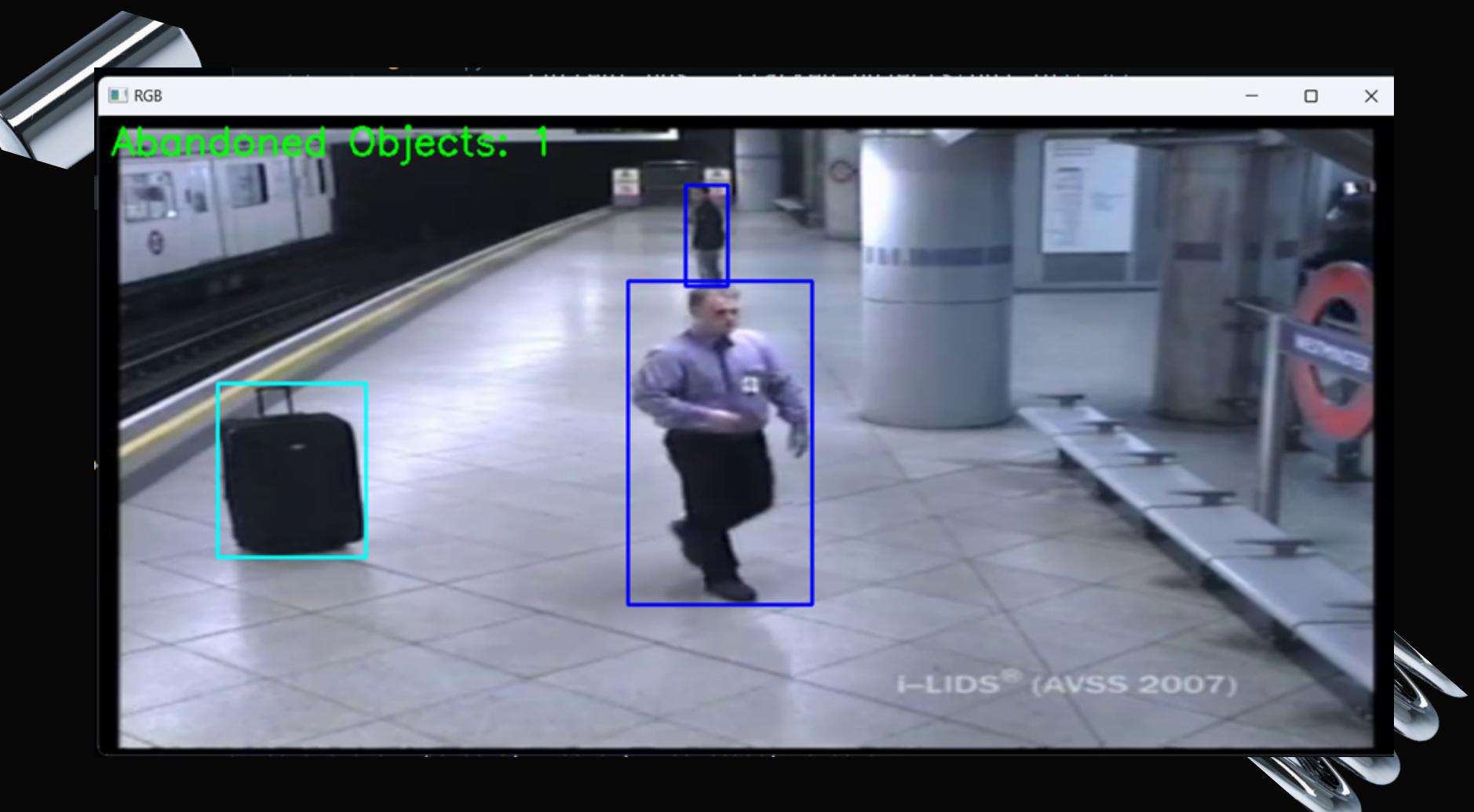
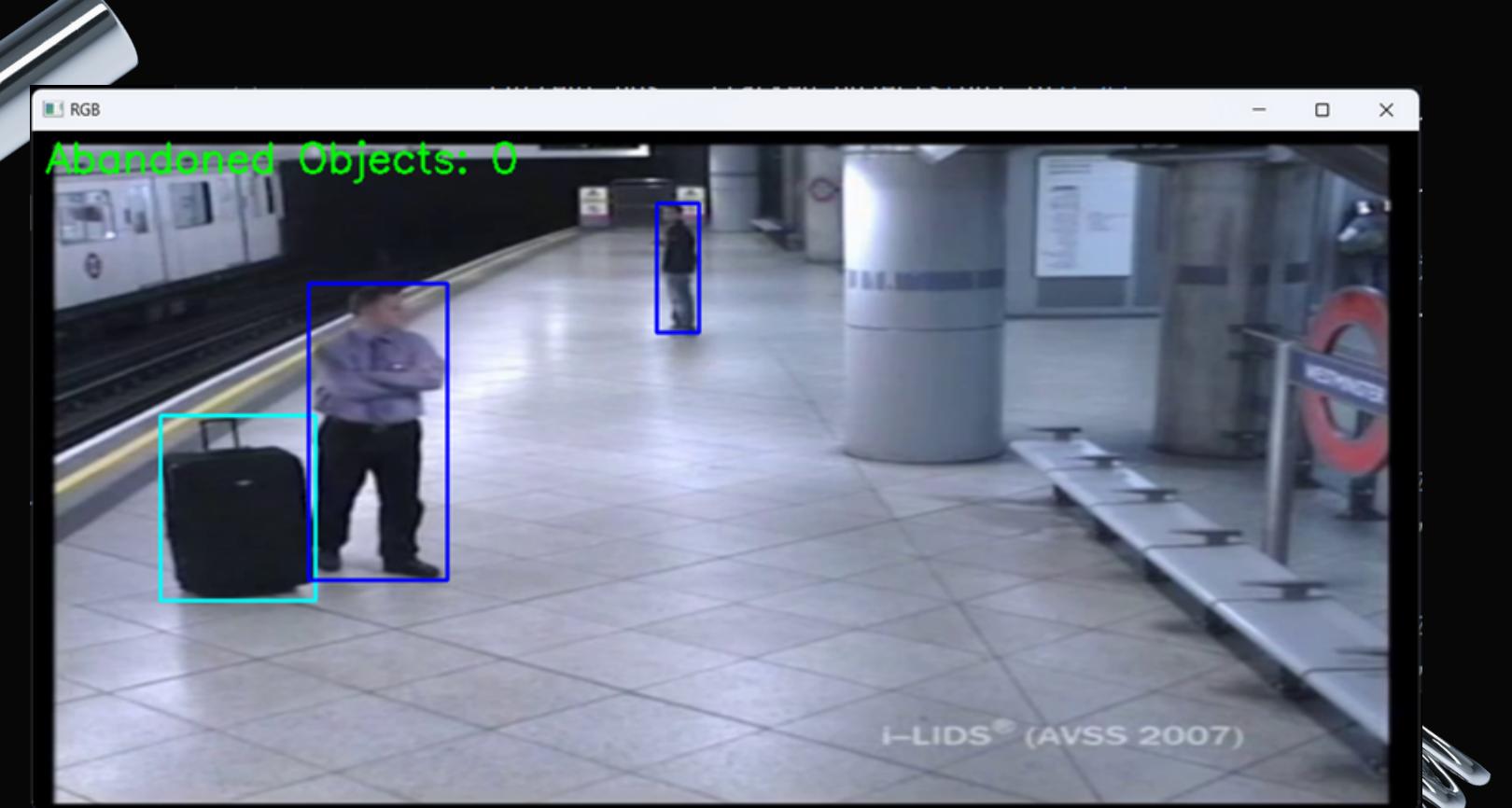
Emergency Announcements: Auto announce:

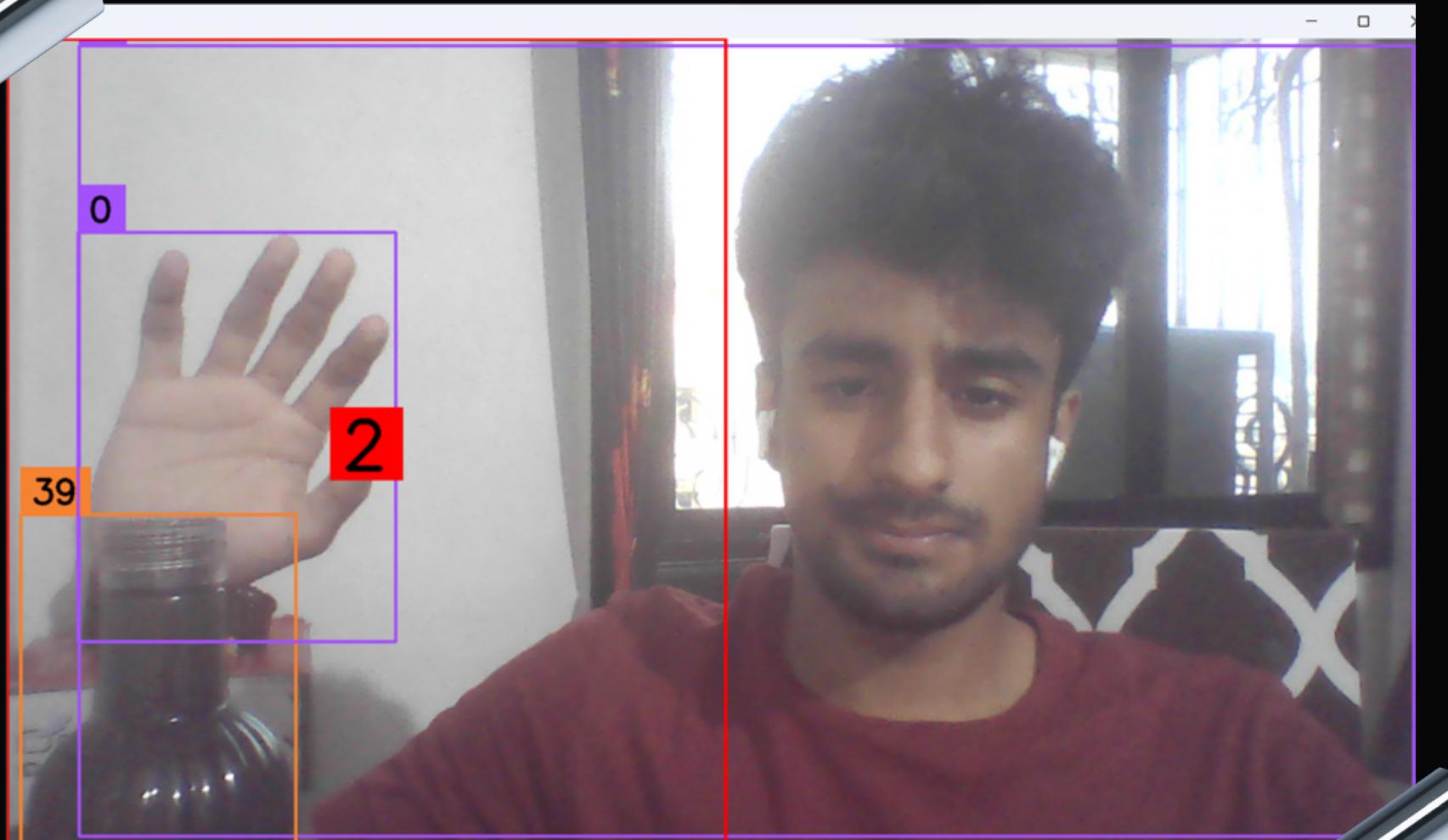
- Fire detected, need evacuation
- Person detected on rail track
- Gun detected in person hand
- Fire detected, r evacuation



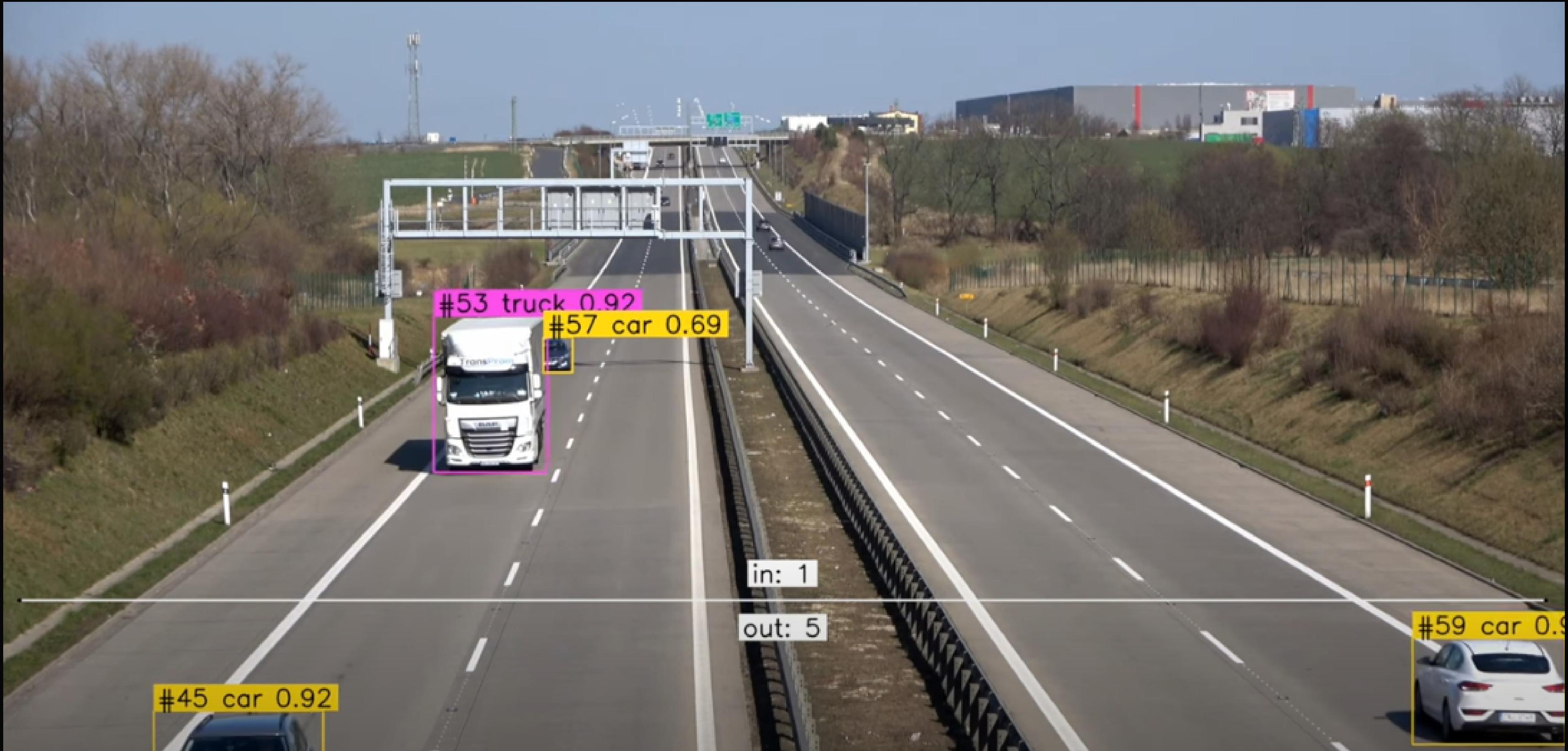
Implementation













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Future Scope

- Detection for More Suspicious Activities
- Integrating Facial Recognition Systems
- Expanding beyond Mumbai Suburban Railway Stations
- Unified Platform for Passengers and Authorities