DAYANANDA SAGAR UNIVERSITY
SCHOOL OF ENGINEERING

Department of Computer Science and Engineering

Major Project Phase-I

Zeroth Review On

Smart Surveillance: AI-Driven Threat Detection and Women Safety Enhancement

Under the Supervision

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OVERVIEW

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- INTRODUCTION
- SOCIETAL IMPACT
- STATE OF THE ART WORK
- DESIGN
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PROBLEMS

PROBLEM STATEMENT

With the increasing need for enhanced security in public and private places, there is a pressing demand for real-time surveillance systems capable of identifying potential threats. Traditional CCTV systems are passive, requiring constant human monitoring, which is inefficient and prone to errors. Moreover, the growing concern for women's safety in urban areas calls for specialised solutions that can detect and respond to situations involving harassment, violence, or other gender-based threats.

SOLUTION

This project is to design an advanced system that integrates weapon detection, behaviour analysis, body language assessment, and facial expression recognition can not only identify general threats but also help in early identification of unsafe situations specifically for women. Real-time alerts and proactive measures could be triggered when the system detects signs of aggression or threatening behaviours toward women, providing an essential layer of protection in vulnerable scenarios

INTRODUCTION

In today's world, ensuring public safety is a paramount concern. One of the primary tools for maintaining safety in public spaces and as well as private places is Closed-Circuit Television (CCTV) systems.

This project aims to develop an intelligent surveillance system that can automatically detect weapons, instances of violence, With a special focus on women's safety, the system leverages AI to detect harassment, violence, and potential dangers using machine learning techniques.

SOCIETAL IMPACT

Enhanced Public Safety

Prevention of Crime
Faster Response Times

Public Perception and Trust

Fear of Constant Monitoring
Increased Security Confidence

Privacy Concerns

Surveillance Overreach
Bias and Discrimination

Contextual Awareness

Context-Aware Detection
Geospatial and Temporal Analysis

Legal and Ethical Challenges

Regulation and Accountability
Data Misuse

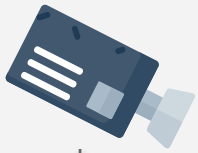
STATE OF THE ART-WORK

Author's Name/ Paper Title	Journal Name and year	Technology/ Design	Results shared by author	What you infer
Ishan Kokadwar, Anurag Kulkarni, Sayali Khare, Vaibhav Limbhore, Swati Chandurkar **Camera based Smart Surveillance System**	06 June 2020 www.irjet.net	tech-Haar Cascade Classifier,Image MosaicingClosed-circuit Television (CCTV)	In summary, the paper does not present new empirical data but concludes that a combination of existing technologies (IP-based cameras, CNNs, Haar Cascade Classifiers, and automation) is effective for developing advanced smart surveillance systems.	The paper explores automation in the surveillance using CNNs, Haar Cascade Classifiers, and IP-based cameras for efficient, In the real-time security system and monitoring.
Muhammad Tahir Bhatti, Muhammad Gufran Khan, Masood Aslam , Muhammad Junaid Fiaz / **Weapon Detection in Real-Time CCTV Videos Using Deep Learning**	12 February 2021 **IEEE ACCESS**	Tech-Haar Cascade , Image classifier	They created their own dataset from CCTV footage, achieving high accuracy and precision, with YOLOv4 performing best with a 91.73% mean average precision and a 91% F1-score.	The paper presents a deep learning-based method for real-time weapon detection in CCTV footage, achieving high precision using YOLOv4, and emphasizes improving security through automatic firearm detection.
A. S. Tolba, A.H. El-Baz, and A.A. El-Harby **Face Recognition**	22 may 2014 **Research gate**	Tech-Graph Matching,3D Morphable Models,Support Vector Machines (SVMs),Graph Matching	Achieved up to 96% accuracy under specific lighting, orientation, and scale conditions on a database of 2,500 images.reported a recognition rate of 86.5% for 15-degree rotated faces and 66.4% for 30-degree rotated faces on a database of 112 individuals.Achieved 90% accuracy on a database of 47 individuals using geometrical features like nose width, mouth position, etc.	High accuracy can be achieved using different methods like Eigenfaces, Neural Networks, SVMs, and HMMs under controlled conditions.
Ravindra Komte, Dr. Sunil Nimbhore **WomenViolences Detection Techniques using ICT**	March 16, 2022 **IOSR Journal of Computer Engineering**	Support Vector Machines (SVM),Decision Trees and Random Forests,Neural Networks,Data Mining	It emphasize the effectiveness of various ICT-based methods for detecting and preventing violence against women ,while having key points like Effectiveness of Computer Vision and Image Processing,Data Mining and Machine Learning Models e.g.- decision trees, K-NN, time series analysis	The paper reviews violence detection techniques using ICT, focusing on prediction and analysis.

STATE OF THE ART-WORK

Author's Name/ Paper Title	Journal Name and year	Technology/ Design	Results shared by author	What you infer
Abhijit Paradkar,Deepak Sharma / **All in one Intelligent Safety System for Women Security**	03 May 2021 **Research Gate**	infrared sensors for spy camera detection	the paper demonstrates that the proposed intelligent safety system offers a comprehensive, cost-effective, and reliable solution to enhance women's security, helping them avoid or respond to dangerous situations more effectively	The paper presents an integrated, tech-driven solution for enhancing women's safety in emergencies.
Thepul Ginige **Armed and Partially Covered Face Related Robberies Alerting System Using Computer Vision**	25 April 2023 **Research gate**	computer Vision technology-YOLO v3 (You Only Look Once),Facial Landmark Detection,Google Colab	The firearm and knife detection model achieved over 70% accuracy using the YOLO object detection algorithm.The partially covered face detection system provided satisfactory results, though no specific accuracy percentage is given	The system detects weapons and masked faces, offering real-time robbery alerts efficiently.
Yangsun Lee **A Study on Abnormal Behaviour Detection**	02 December 2022 aasmr.org	tech-C3D (3D Convolutional Networks),E2ON Image Dataset,Loss and Accuracy Evaluation,High-Performance Hardware	he system detected theft in a parking lot with 99% accuracy and the detailed type of behaviour (hovering near a vehicle) with 96% accuracy.but the detailed type (pacing alone) had an accuracy of 22%,	The C3D model effectively detects crime types with high accuracy but struggles with detailed behaviour differentiation, indicating challenges in distinguishing subtle abnormal behaviours.
Gaurav Kumar Singh,Vipin Shukla,Dr. Pratik Shah. **Automatic Alert of Security Threat through CCTV**	29 May 2014 **Research gate**	tech-Background Subtraction Algorithm,Human Posture and Activity Analysis,High-End Computing and Software Tools	It describes how the system could improve surveillance and reduce storage requirements, but it doesn't include quantitative results such as accuracy rates, detection times, or storage reductions based on experiments.The discussion centers around the system's potential effectiveness, rather than reporting any measured, numerical outcomes from testing or deployment.	The paper proposes an automated video surveillance system combining motion detection and sensors for efficient, real-time threat detection in security.

DESIGN



CCTV Feed

INSIGHT model

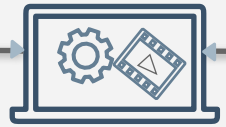
Video Input

[store only critical events]

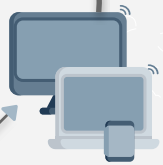
Dedicated Memory

Graphical User Interface

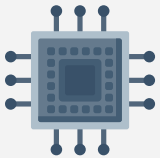
Live streaming to monitor



Alert and Notification System



Real-Time Monitoring



INSIGHT Model

The direct notification from model to receiver

Alert Management

Frame extraction and resizing for consistent input

Using WhatsApp chatbot to send the video clip Along with the address

Analytical Modules

Utilises distinct models for each of the following tasks

Weapon Detection

Violence Detection

Women harassment

Dataset

To Train and Test the models

Factors To Satisfy

- Facial expression
- Behaviour Analysis
- Body language Analysis

system focus on behaviours, expressions and actions that are common in gender-based violence and harassment situations.

FEASIBILITY OF THE PROJECT

	Components	Feasibility	Requirements
Technical Feasibility	CCTV Feed Integration	High	Existing CCTV infrastructure, network connectivity for data transmission, and compatible video formats.
	Video Preprocessing	High	High-performance computing resources for real-time video processing, algorithms for frame extraction, resizing, and noise reduction.
	Analytical Modules	Moderate To High	Leveraging extensive datasets and computational power, the system employs deep learning models for real time inference. High-quality datasets
Economic Feasibility	Hardware	High	Monitors and CCTV
Legal Feasibility		High	Utilised in both public and private sectors
Schedule Feasibility		High	Can be done in the given timeframe

DELIVERABLES

01

Rapid Alerting System

02

End-to-End Systems integration

03

Seamless User Interface

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THANKS!