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AI based Automatic Bank Surveillance Monitoring System using YOLOv3

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ABSTRACT: An AI-based automatic theft detection system was developed to identify incidents involving such as bank miles and weapons with intelligent surveillance. The system uses the Yolo algorithm (see only once) trained on custom data records derived from CoCo's data records (common objects in context) to recognize and classify weapon objects in real-time video feeds. It adopts folding fish network (CNN) image recognition function, allowing accurate identification of suspicious objects such as knives and weapons. Once a potential weapon is recognized, the system will immediately send an alert via SMTP-Email to certified employees, including security guards and local police. The system allows for a quick response to weapons theft testing, improving bank safety by improving both the accuracy and efficiency of security protocols. The integration of AI-based threat detection and real-time communications radiates the process of protecting bank assets and securing customers.

I. INTRODUCTION

AI-based automatic theft detection systems for banks, particularly weapon detection. The aim is to improve security by providing real surveillance and threat identification. The system uses the Yolo algorithm (looking only once) to use quick and efficient object recognition. Yolo uses real-time analysis of video feeds to enable accurate identification of weapons, such as weapons and knives. The system is trained with custom data records derived from COCO data records to improve identification accuracy.

II. OBJECTIVES

The weapons and classification recognition module uses models trained on custom datasets to identify weapons of actual surveillance materials and improve bank security. The system focuses on accuracy and reliability, integrates into monitoring regulations, triggers warning systems, and notifies security personnel immediately. identification. The system uses advanced deep learning algorithms such as Yolo to identify weapons, knives, and other weapons in real time with high accuracy and speed.

III. LITERATURE SURVEY

Mansi G. Chidgopkar, Aruna P. Phatale, "Automatic and Low-Cost Saline Level Monitoring System Using Wireless Bluetooth Module and CC2500 Transceiver," 2020 This paper focuses on a wireless system for monitoring saline levels using a low-cost Bluetooth module. The system aims to replace manual saline monitoring with an automatic solution, enhancing hospital care. The low-cost nature of the system makes it highly applicable for widespread use in healthcare. It demonstrates the integration of wireless technology for real-time health monitoring.[2] Sourabh Das, Santanu Kumar Ratha, "AI-Based Crime Detection and Surveillance System," 2021 The study presents an AI-powered surveillance system that uses machine learning for crime detection. This system analyzes surveillance footage in real-time and identifies suspicious activities, improving security in various public spaces. It highlights the role of AI in crime detection, including banks and retail environments. The system uses deep learning models for accurate threat identification.[3] P.S. Chien, L.T. Hong, "Smart Surveillance System for Bank Security Using Machine Learning," 2021 The paper explores the use of smart surveillance systems equipped with machine learning for improving bank security. It discusses the importance of facial recognition and object detection technologies. The system can identify suspicious behaviors and unauthorized access, alerting security staff. This method enhances real-time threat detection, making banks safer for customers and staff.[4] Sanjay Kumar, Rakesh Kumar, "Deep Learning-Based Theft Detection System for Banking Surveillance," 2021 This work investigates a deep learning-based surveillance system to detect

theft and robbery in banks. The system employs convolutional neural networks (CNN) for real-time object detection. The focus is on recognizing suspicious activity such as theft and robbery attempts. It provides timely alerts to security personnel, improving response times.[5]Amir M. Al-Maadeed, "Real-time Robbery Detection in Surveillance Video Using YOLO," 2021.This paper presents the application of YOLO (You Only Look Once) for real-time robbery detection in video surveillance systems. The method accurately identifies weapons and suspicious behavior in real-time footage. It is implemented to ensure immediate alerts to the security staff, preventing theft or robbery in progress. YOLO's real-time processing enhances bank security.

IV. EXISTING & PROPOSED SYSTEM

EXISTING SYSTEM

Existing systems improve weapon detection by incorporating advanced models for machine learning to maintain better accuracy in complex environments. Use more diverse and updated data records to improve detection capabilities and reduce the risk of biased or inaccurate results. Real-time alerts are optimized by integrating faster processing algorithms with more reliable network infrastructure to ensure faster response times. The system is designed to work effectively with different camera types and improve the accuracy of identification even under poor or low resolution conditions. Advanced evasion recognition techniques are integrated. Ability to identify disguised weapons or objects to mimic weapons and ensure greater reliability. Existing systems use adaptive learning techniques to enable continuous improvement in accuracy by learning from new data and real scenarios.

DISADVANTAGES

The system can be difficult to recognize weapons in overcrowded or complex environments, which can lead to false positive or overlooked perceptions.The effectiveness of the system depends heavily on the quality and variety of the dataset used for training. Insufficient or biased data can lead to poor performance in real scenarios

PROPOSED SYSTEM

In particular, the rise in weapon theft and violent crimes to banks requires better security systems to protect customers and assets. AI integration into intelligent surveillance technology improves threat detection in real time. The system uses yolo and CNN for fast, accurate weapon detection in dynamic environments. When recognizing a weapon, the system sends an immediate warning to security and law enforcement, including images. Increases efficiency in security protocols and response times with threat detection and automation. Yolo (You're looking for once) is a cutting-edge real-time object detection model that offers a high level of accuracy when recognizing weapons in live video flow. This reduces the time required to identify threats and allows for faster interventions. CNN improves the system's ability to recognize threats with high accuracy.

ADVANTAGES

The proposed system improves weapon detection by including advanced machine learning models for better accuracy in complex environments.It uses more diverse and updated data records to improve detection capabilities and reduce the risk of biased or inaccurate results.Real-time warnings are optimized by integrating faster processing algorithms with more reliable network infrastructure for faster response times.

V. BLOCK DIAGRAM

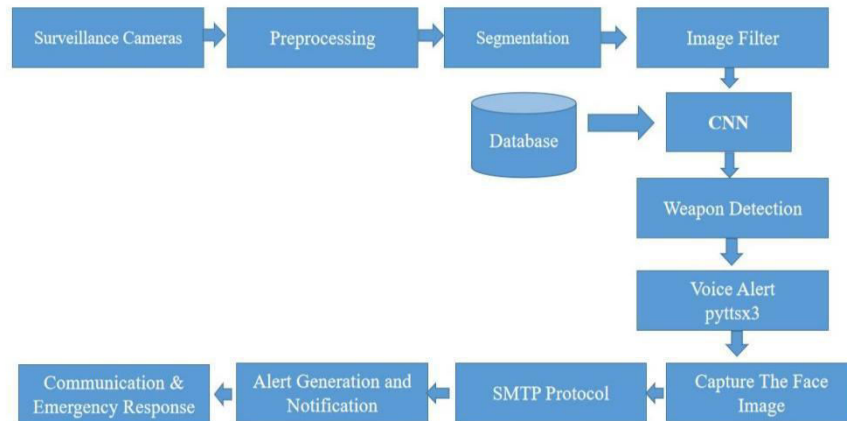


Fig No : 1 Block Diagram

VI. MODULE DESCRIPTION

- Data Collection & Preprocessing Module
- Object Detection Module
- Image Recognition & Feature Extraction Module
- Alert Module
- Output Module

1. Data Collection & Preprocessing Module:

The core components is responsible for preparing data records where the AI model is trained and determined. Collect photo and video data from various weapons in real time from CCTV film materials, as well as public data records (common objects in context) such as COCO. The collected data is properly marked to classify weapon types and prepare steps such as resizing, normalization, and data expansion. These preprocessing techniques improve the quality and diversity of data records, improving the performance and accuracy of AI models in training and real-world applications.

2.Object Detection Module:

The object detection module uses the Yolo algorithm (see only once). This is suitable for real-time recognition tasks. Yolo handles video frames of surveillance cameras in a single path, efficiently identifying and identifying objects, such as objects. Custom-made Yolo models are optimized to recognize certain threat objects, such as handguns and knives, to accurately recognize suspicious objects with minimal delay. This means that the system is suitable for security and banking environments.

3.Image Recognition & Feature Extraction Module:

The Image Recognition module utilizes convolution neural network (CNN) to perform deeper analysis of recognized objects, extracting key features like shape, edge contours, and textures to confirm object classification and reduce false positives. This is sometimes referred to here as a "collapsing fish network" to perform a deeper analysis of recognized objects. As soon as Yolo characterizes a potential weapon, CNN extracts key features such as shape, edge contours, and textures to confirm the classification of the object. This additional step reduces the false positive aspect by improving the identification process and giving greater confidence in the distinction between actual weapons and harmless objects.

4.Alert Module:

If the weapon or suspicious object succeeds, this module triggers the alarm system. Use the SMTP protocol to automatically send real-time notifications via email to certified employees, including security personnel and local law enforcement agencies. The warnings contain important information such as the time, location, and snapshots of

recognized threats. This immediate communication skill ensures that your responses are quick and your security team acts before potential threats escalate.

5.Output Module:

The User Interface (UI) for Security Officers is an important part of your security system and provides security personnel on a user-friendly, intuitive platform for monitoring, controlling and responding to real-time alerts. The main goal of the user interface is to simplify interactions between security personnel and systems, while at the same time ensuring that critical information is presented clearly and efficiently. The interface is configured to provide an organized, easily navigable dashboard where security personnel can view live monitoring regulations, access alarm details, and make real-time discovered decisions.

VII. RESULT

AI-based automatic theft recognition system effectively identifies weapons such as knives and weapons in real-time video feeds using Yolo Algorithms and folding networks (CNNs). As soon as a potential weapon is recognized, the system immediately sends warnings via SMTP-Email to certified employees, including security personnel and local governments, and quickly evaluates images of the scene. This integration of AI-Aibliated detection and real-time communication improves bank security by ensuring quick responses to weapons accidents. The system contributes to a safer environment by improving recognition accuracy, streamlining security protocols, preventing theft and violent incidents, and ultimately protecting the safety of bank assets and customers.



Fig No : 2 Gun Detection

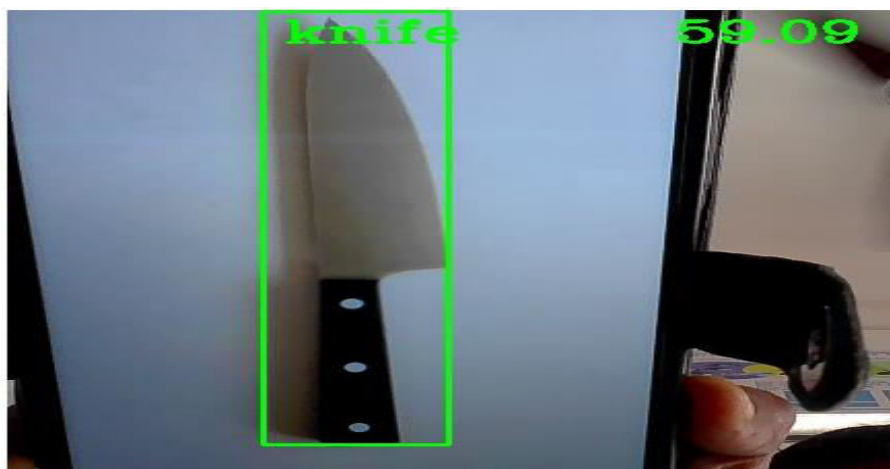


Fig No : 3 Knife Detection



Fig No : 4 Gun Detection Notification Send to Email

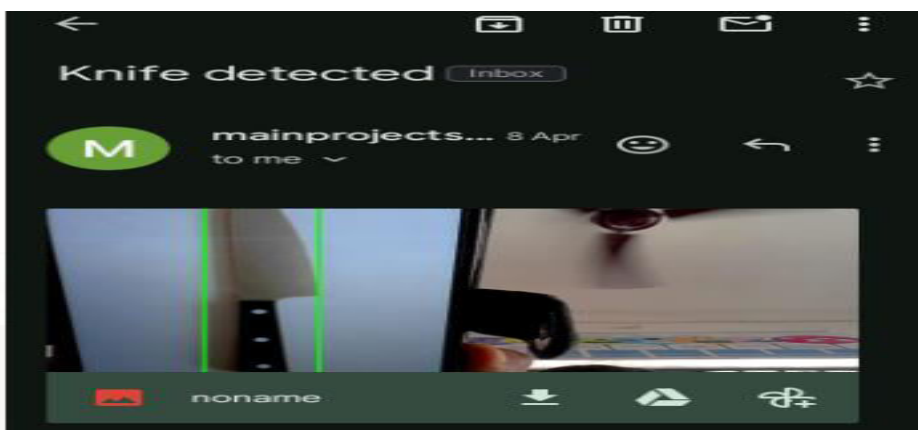


Fig No : 5 Knife Detection Notification Send to Email

VIII. CONCLUSION

AI-based automatic theft recognition system effectively identifies weapons such as knives and weapons in real-time video feeds using Yolo Algorithms and folding networks (CNNs). As soon as a potential weapon is recognized, the system immediately sends warnings via SMTP-Email to certified employees, including security personnel and local governments, and quickly evaluates images of the scene. This integration of AI-Aibliated detection and real-time communication improves bank security by ensuring quick responses to weapons accidents. The system contributes to a safer environment by improving recognition accuracy, streamlining security protocols, preventing theft and violent incidents, and ultimately protecting the safety of bank assets and customers.

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