## Synopsis

## **Shoplifting Detection System Using YOLO**

## # Description

## **The Shoplifting Detection System is an innovative application that leverages deep learning techniques, specifically the YOLO (You Only Look Once) object detection model, to identify potential shoplifting incidents. This system uses image datasets from surveillance cameras to detect suspicious activities in retail environments, aiming to enhance security, reduce theft, and increase operational efficiency.**

## **Initially, the model is trained to detect shoplifting behavior from static images captured from various angles in stores. Over time, the system will evolve to work with video feeds, allowing for real-time shoplifting detection and alerting. By focusing on behavioral patterns, the system can assist store personnel in taking preemptive actions, thereby preventing losses.**

## # Key Features

## **Image Data Collection: Processes surveillance images to detect suspicious activities in real-time.**

## **Data Preprocessing: Resizes, augments, and normalizes images to improve model accuracy, using Roboflow for image annotation and model training/validation.**

## **YOLO Model Integration: Uses YOLO (v8, v10) to refine detection of objects and shoplifting activities.**

## **Model Training and Evaluation: Trained on labeled datasets and evaluated for precision, recall, and F1-score.**

## **Future Video Detection Capability: Plans to process video streams for real-time detection and alerts.**

## **User-Friendly Interface: Provides an easy interface for uploading images, viewing results, and generating reports**

## # Technologies Used

## **Python: For building and training machine learning models and developing the system backend.**

## **Google Colab: For deep learning model development and implementation of YOLO-based detection algorithms.**

## **OpenCV: For image processing tasks such as frame extraction, image manipulation, and video handling.**

## **YOLOv7/v8/v9/v10: State-of-the-art object detection algorithms used for recognizing potential shoplifting behavior in images.**

## # Installation and Usage

## **Clone the repository: git clone** [**https://github.com/pcseai25/MP3-Shop-Guard**](https://github.com/pcseai25/MP3-Shop-Guard)

## **Install the required dependencies: pip install -r requirements.txt**

## # Future Enhancements

## **Real-Time Video Processing: Expanding the system's capability to process live video streams from surveillance cameras for real-time shoplifting detection.**

## **Advanced Behavioral Recognition: Enhancing the model to detect more complex behavioral patterns and abnormal activities that may indicate theft.**

## **Machine Learning Optimization: Further optimization of YOLO models for faster inference and higher detection accuracy.**

## # Acknowledgements

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