SYNOPSIS

on

ShopIntel: Autonomous Agentic AI for Shoplifting & Suspicious Behavior Detection

Project Based Learning -V (Minor-Project)

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1. INTRODUCTION

ShopIntel is a Streamlit-based Python system that uses real-time computer vision to identify suspicious actions inside retail stores. The system automatically detects behaviors such as item hiding, unusual hand movements, and shelf-to-body interactions using YOLO, pose estimation, and object tracking. When a high-risk event occurs, ShopIntel instantly captures the frame, logs the timestamp, and emails the alert with the suspect's snapshot to store security. The agentic layer—powered by Google Gemini—guides the staff on what action to take in each situation, ensuring faster and smarter decision-making. Designed for loss prevention, ShopIntel operates autonomously, delivering continuous monitoring, intelligent risk scoring, and real-time notifications. This makes it a powerful, modern AI solution for retail safety and theft prevention.

2. PROBLEM FORMULATION

Despite widespread CCTV installation and trained staff, retail stores still face several critical challenges in preventing shoplifting:

- Suspicious behaviors often go unnoticed due to staff workload or blind spots.
- Manual monitoring is inconsistent and prone to human error.
- Stores lack automated evidence collection such as timestamps, snapshots, and incident logs.
- Security teams receive alerts too late to intervene effectively.
- There is no intelligent assistant to guide staff on the appropriate response in different risk scenarios.

"How can we develop an autonomous, agentic AI system that can accurately detect shoplifting-related suspicious behavior, capture real-time evidence, and guide store staff with timely alerts—reducing losses while improving retail security?"

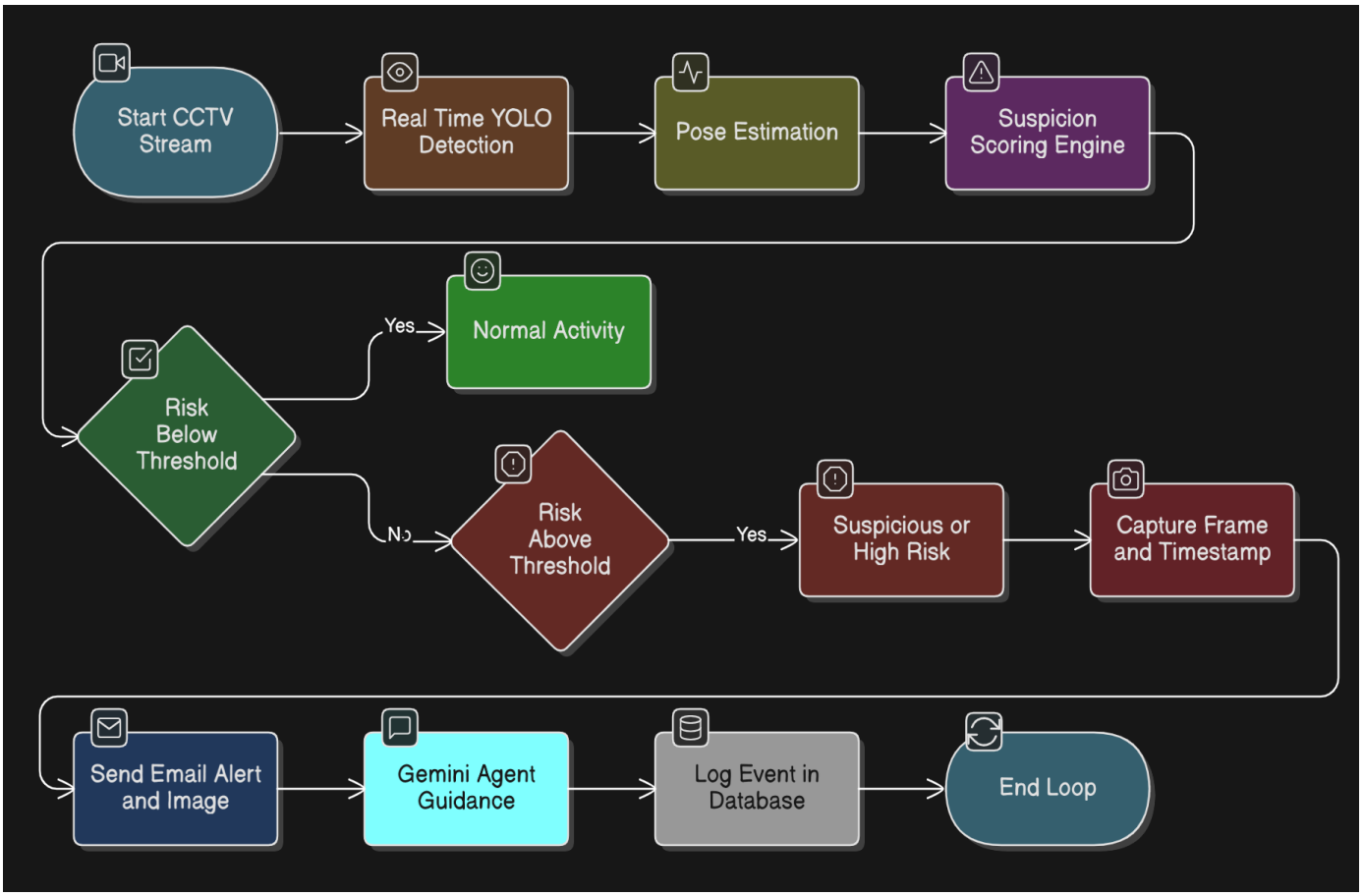
3. METHODOLOGY

- **Real-Time Vision Detection:** YOLO-based vision pipeline analyzes CCTV footage to detect item hiding, unusual hand movements, and suspicious body interactions.
- **Automated Alert & Evidence Capture:** High-risk events trigger instant frame capture, timestamping, and email alerts to the security team.
- **Agentic Assistant (Gemini):** Gemini provides real-time guidance to staff on appropriate actions based on event severity.

Technology Stack:

- **Frontend/UI:** Streamlit (Python-based interactive dashboard)
- **Computer Vision:** YOLOv8/YOLOv10
- **Agentic AI Layer:** Gemini API for guidance & decision assistance
- **Storage:** Local directory/SQLite for event logs & captured frames
- **Email Alerts:** Gmail API for automated real-time notifications

4. FLOWCHART



5. REFERENCES

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