

# ShopIntel: Autonomous AI for Shoplifting Detection

A Project-Based Learning initiative by

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# Introducing ShopIntel

ShopIntel is a Streamlit-based Python system that uses real-time computer vision to identify suspicious actions inside retail stores. It's a modern AI solution for retail safety and theft prevention.

# How ShopIntel Works



## Real-time Detection

Uses YOLO, pose estimation, and object tracking to detect item hiding, unusual hand movements, and shelf-to-body interactions.



## Instant Alerts

Captures frames, logs timestamps, and emails alerts with suspect snapshots to store security when high-risk events occur.



## Agentic Guidance

Powered by Google Gemini, it guides staff on appropriate actions, ensuring faster and smarter decision-making.

# The Retail Security Challenge

Despite existing measures, retail stores face significant challenges in preventing shoplifting.



## Unnoticed Behaviors

Suspicious actions often go unnoticed due to staff workload or blind spots.



## Inconsistent Monitoring

Manual surveillance is prone to human error and lacks consistency.



## Delayed Intervention

Security teams often receive alerts too late for effective intervention.



# Addressing Key Pain Points

## Automated Evidence

Lack of automated evidence collection like timestamps, snapshots, and incident logs.

## No Intelligent Assistant

Absence of guidance for staff on appropriate responses in different risk scenarios.



# Our Solution: Autonomous, Agentic AI

"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?"

# Methodology: A Three-Pillar Approach



## Real-Time Vision Detection

YOLO-based vision pipeline analyzes CCTV footage for suspicious behaviors.



## Automated Alert & Evidence Capture

High-risk events trigger instant frame capture, timestamping, and email alerts.



## Agentic Assistant (Gemini)

Gemini provides real-time guidance to staff based on event severity.

# Technology Stack Powering ShopIntel



## Frontend/UI

Streamlit (Python-based interactive dashboard)



## Computer Vision

YOLOv8/YOLOv10 for detection



## Agentic AI Layer

Gemini API for guidance & decision assistance



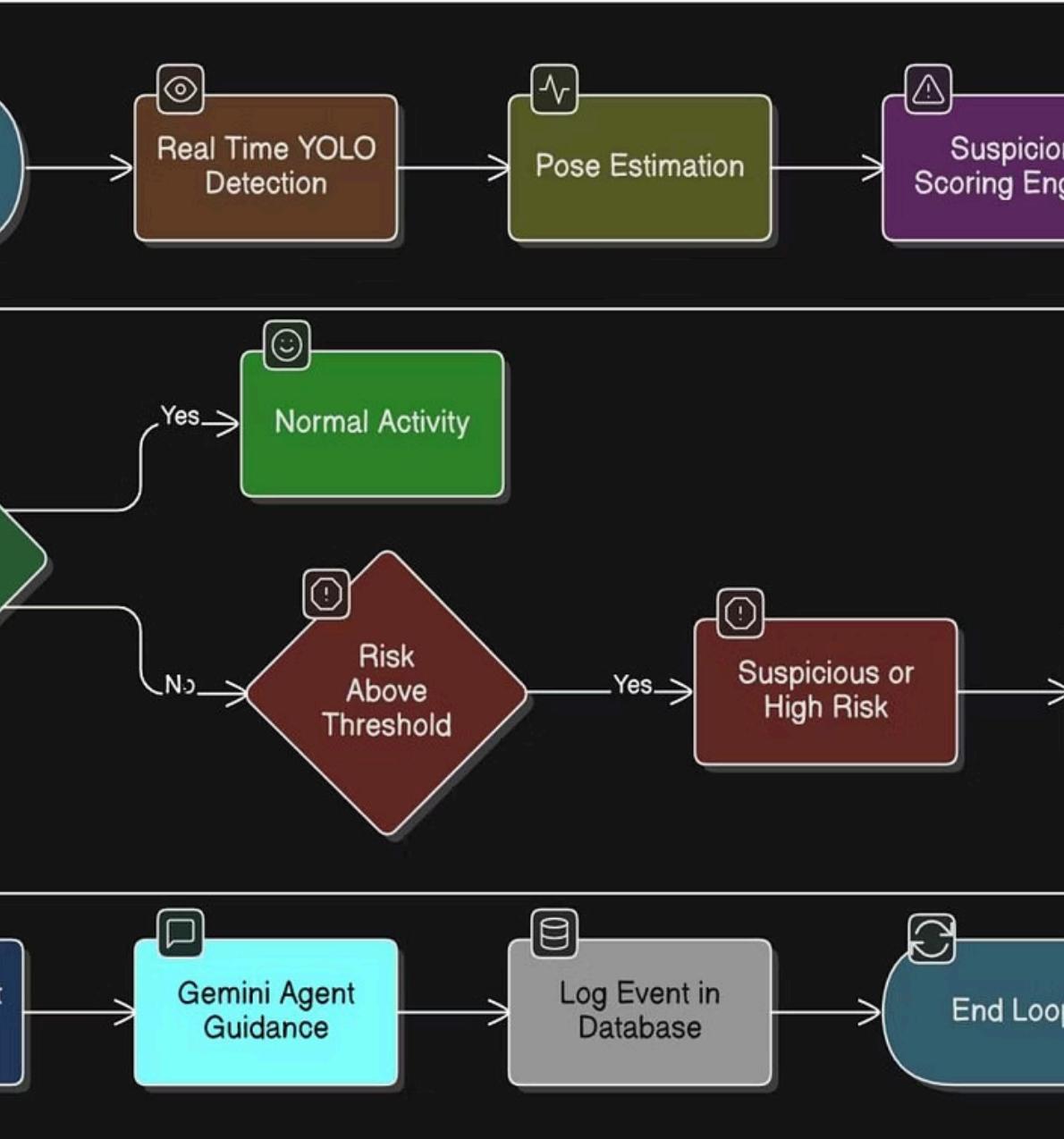
## Storage

Local directory/SQLite for event logs & captured frames



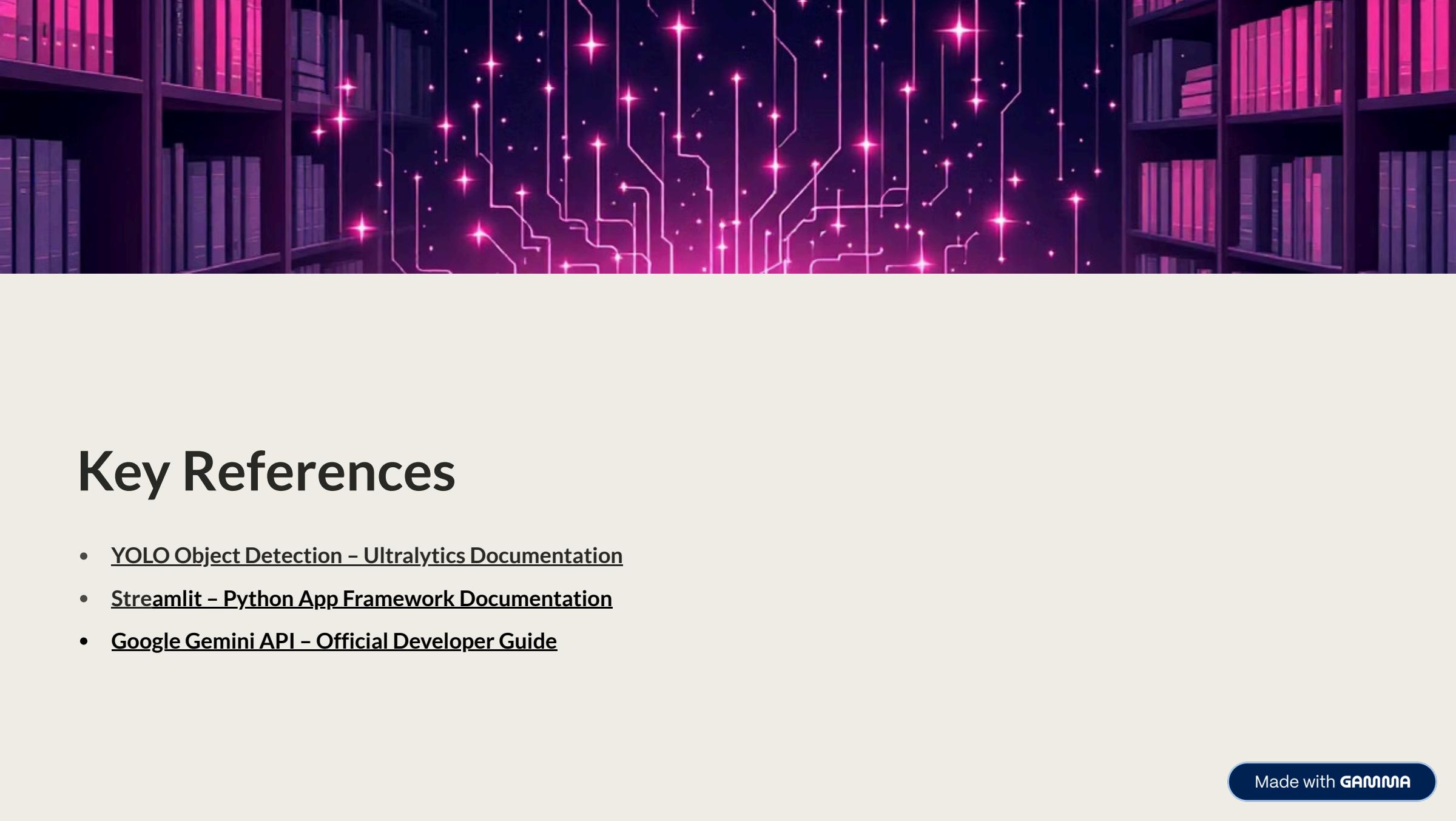
## Email Alerts

Gmail API for automated real-time notifications



# ShopIntel System Flow

The flowchart illustrates the seamless integration of real-time vision, automated alerts, and intelligent guidance within the ShopIntel system.



# Key References

- [YOLO Object Detection – Ultralytics Documentation](#)
- [Streamlit – Python App Framework Documentation](#)
- [Google Gemini API – Official Developer Guide](#)