Supermarket crowd analyser

Project Name: Supermarket Crowd Analyser
Team Name: Code Piece

Team Lead:

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Theme: Urban Infrastructure
Track: 2D Model

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1. Idea Brief

The **Supermarket Crowd Analyser** is an IoT + AI solution designed to monitor **real-time crowd density** in supermarket sections such as snacks, beverages, and fruits.

- The **ESP32-CAM** captures live video frames of each section.
- A **lightweight CNN-based people detection model** created using **Edge Impulse / TinyML** detects and counts individuals.
- The results are sent to the **ThingSpeak cloud** for storage and visualization.
- A **web dashboard**, deployed via **GitHub Pages**, displays live counts, density metrics, and alerts for high-crowd areas.

This system helps store managers **optimize staff allocation, manage queues, and improve customer experience**.

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2. Software & AI/ML Used

Component	Technology / Tool	Purpose
Frontend	HTML + CSS + JS	Display live dashboard, charts, and alerts
Backend	ThingSpeak Cloud	Receive and visualize data from ESP32-CAM
AI / ML	TinyML / Edge Impulse (CNN-based people detection)	Count people and estimate crowd density
Dataset	Predefined people detection dataset	Model training and evaluation
Deployment	GitHub Pages	Hosting live dashboard

Notes:

- AI model trained on a **predefined people detection dataset**.
- Exported as **TFLite**, enabling **edge inference** for real-time performance.
- Dashboard updates live using **ThingSpeak** cloud data.

3. Feasibility

- **Deployment:** ESP32-CAM modules can be mounted in key supermarket sections.
- **Power:** Continuous operation via 5V adapter or rechargeable batteries.
- **Data Transmission:** WiFi connectivity allows data to be sent to ThingSpeak cloud and updated on the web dashboard.
- **Cost & Scalability:** Low-cost, scalable, and requires minimal maintenance.
- **Impact:** Provides actionable insights to improve crowd flow, reduce bottlenecks, and ensure safety compliance during peak hours.

4. Budget

Item	Quantity	Approx. Cost (INR)	Status
ESP32-CAM Module	1	₹600	Completed
Micro SD Card (8GB+)	1	₹250	Completed
FTDI Programmer	1	₹300	Completed
5V Rechargeable Battery	2	–	Not Completed

Item	Quantity	Approx. Cost (INR)	Status
TP4056 Charging Module	1	₹55	Not Completed

Total Required: ₹1200–1400

Status: Hardware setup completed