Smart Banking Security System using Laser Tripwire

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Problem Statement:

Physical intrusion in banks and ATMs is still a huge risk. Traditional CCTV systems are reactive and passive. This system provides real-time laser-based intrusion detection with automatic evidence capture

Key Features:

- Laser Tripwire with LDR Sensor: Detects any physical interruption.
- ESP32-CAM Module: Instantly captures and processes an image.
- Wireless Alerts: Sends photo to authorized personnel/device.
- Intrusion Logs: Maintains log with timestamps for future audit.
- Standalone Operation: No reliance on heavy networking.

My Contributions:

- Designed and implemented Laser + LDR intrusion circuit.
- Programmed the ESP32-CAM to detect beam breaks and auto-capture images.
- Set up cloud-based Firebase DB for logging intrusion events.
- Calibrated hardware for stable light sensitivity under variable lighting.
- Developed Android viewing app using MIT App Inventor.

Technologies Used:

- ESP32-CAM (Microcontroller with camera)
- Laser Module
- LDR Sensor
- Firebase Realtime Database
- MIT App Inventor (Mobile App)
- IoT Security Architecture

Challenges & Learnings:

- Aligning laser beam accurately across long distances.
- Filtering out false positives from ambient daylight.

- Ensuring image transmission in low-signal environments.
- Balancing power efficiency and reliability.