

Mi-VGuard

Smart Plantation Monitoring

A modular perimeter surveillance system for remote and distributed sites. Powered by radar sensing, smart cameras, and edge computing on Raspberry Pi 5, it delivers real-time detection, verification, and alerts. Optimised for solar-powered deployment, Mi-VGuard scales easily from a single pole to a network of units, each with built-in sensing, processing, and communication.

Technology Overview

Mi-VGuard, (Mi-Virtual Guard), its modular design enables flexible scalability, making it suitable for both small and large deployment areas. A single unit can operate independently, while multiple units can be networked to form an integrated perimeter defense system. Each unit is equipped with built-in sensing, edge processing, and secure communication, ensuring reliable performance without heavy reliance on centralised infrastructure.

By being optimised for solar-powered deployment, Mi-VGuard is capable of operating in off-grid, remote, or rural locations with minimal maintenance, offering a cost-effective and sustainable surveillance solution for diverse applications such as plantations, border control, and critical infrastructure protection.

Technology Benefits

- **Real-Time Intrusion Detection:** AI-assisted validation reduces false alarms and enables immediate response to unauthorised access.
- **Visual Evidence Collection:** Captures images for situational awareness and reliable incident verification.
- **Scalable Deployment:** Flexible design supports installation from single units to large plantation networks.
- **Enhanced Remote Security:** Solar-optimised and autonomous, ideal for areas where manual patrols are impractical.

Key Features

- **Radar/Motion Sensing:** Continuously scans for movement within its coverage area (based on radar model specifications) and streams motion data to the Detection Engine for processing.
- **Detection Engine:** Deployed on Raspberry Pi 5, the system filters background noise to detect meaningful activity, performs motion classification and human presence detection, and logs events with time, pole ID, and location.
- **Camera/Vision Sensor:** The system captures real-time images for visual confirmation upon radar detection.

- **Alerts & Connectivity:** Detection events are transmitted via the network interface, with alerts aggregated at the main pole and relayed to designated groups. The system integrates with messaging platforms for streamlined communication and delivers structured notifications directly to users in near real time.
- **System Platform:** Compact embedded hardware with optimised power management, designed to be solar-ready for off-grid deployment and housed in a protective enclosure for harsh outdoor environments.

Applications

- **Security & Surveillance:** Applied for perimeter protection, restricted area monitoring, and intrusion detection.
- **Agriculture & Plantation:** Used to enhance plantation security and minimise theft or unauthorised access.
- **Remote or Unmanned Sites:** Deployed for autonomous surveillance where manual monitoring is not feasible.
- **Asset Protection Zones:** Applied to safeguard critical assets with real-time alerts.
- **Temporary Installations:** Suitable for construction zones or event sites requiring rapid deployment.

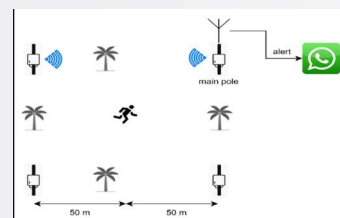


Figure 1:
Mi-VGuard System
External Architecture

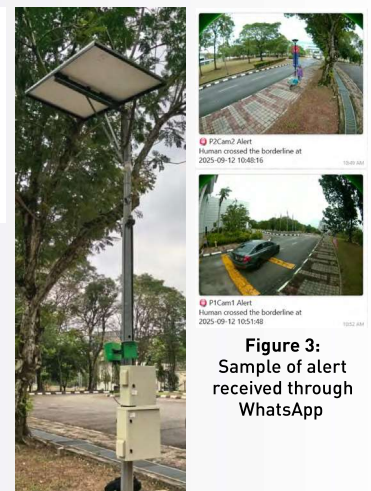


Figure 2:
Mi-VGuard device
POC



Figure 3:
Sample of alert
received through
WhatsApp

