

Proposal: SafeBox

IoT-Powered Smart Package Tracking & Protection System

1. Introduction

Courier and logistics services are widely used, but customers face issues such as damaged goods, theft, and tampering. Current tracking systems only provide location data, creating a trust gap in package delivery.

SafeBox is proposed as an IoT-powered “blackbox” for parcels that records shocks, tampering, and unauthorized openings while ensuring secure global tracking.

2. Objectives

- Develop a portable IoT device for package monitoring.
 - Detect shocks, openings, and tampering.
 - Enable secure, transparent web-based access to logs.
 - Ensure aviation compliance through flight-safe mode.
 - Explore scalability for individuals and logistics companies.
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3. Methodology

- Hardware: ESP32, cellular modem + GNSS, accelerometer, reed switch, light sensor, tamper buzzer, secure QR-code disarm.
 - Software & Cloud: Periodic uploads (2 hrs), instant tamper alerts, BLE verification, flight-safe logging, web portal for visualization.
 - Evaluation: Prototype tested under simulated courier conditions, usability studies, pilot deployment.
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4. Expected Outcomes

- A working prototype with shock/tamper detection.
- Cloud-based logging & visualization portal.

- Evidence-based accountability in courier handling.
 - Improved transparency & customer trust.
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5. Future Scope

- Miniaturization into lightweight tags.
 - Blockchain for immutable event logs.
 - Temperature/humidity monitoring for sensitive goods.
 - Industry adoption for global logistics.
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6. Significance

SafeBox contributes academically and industrially by:

- Applying IoT & sensor fusion to real-world logistics challenges.
 - Extending package tracking beyond location-only data.
 - Providing a foundation for research in secure supply chain monitoring.
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7. Conclusion

SafeBox offers an academic exploration of how IoT can transform global logistics. By combining sensors, secure cloud logging, and flight-safe IoT design, SafeBox sets the foundation for safer, more reliable, and transparent courier services.