SMART INDIA HACKATHON 2025

TITLE PAGE

- **Problem Statement ID – *25002***
- **Problem Statement Title- *Smart Tourist Safety Monitoring & Incident Response System using AI, Geo-Fencing, and Digital ID***
- **Theme- *Travel & Tourism***
- **PS Category- *Software***
- **Team ID-**
- **Team Name: *System 404***

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IDEA TITLE

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Proposed Solution: TourGuard360

Solution Overview :

A comprehensive safety ecosystem combining AI-driven risk detection, privacy-preserving monitoring, mesh networking for offline reliability, and context-aware emergency response tailored for North Eastern Region tourism.

Essential Safety Features :

1. SOS & Silent SOS - One-tap emergency + covert distress signals.
2. Dynamic Geo-Fencing - Real-time safe/danger zone mapping.
3. AI Risk Detection - Movement anomaly and incident classification.
4. Digital ID Verification - Secure tourist authentication.
5. Emergency Response Chain - Automated authority notification.
6. Offline Functionality - Works without internet connectivity.

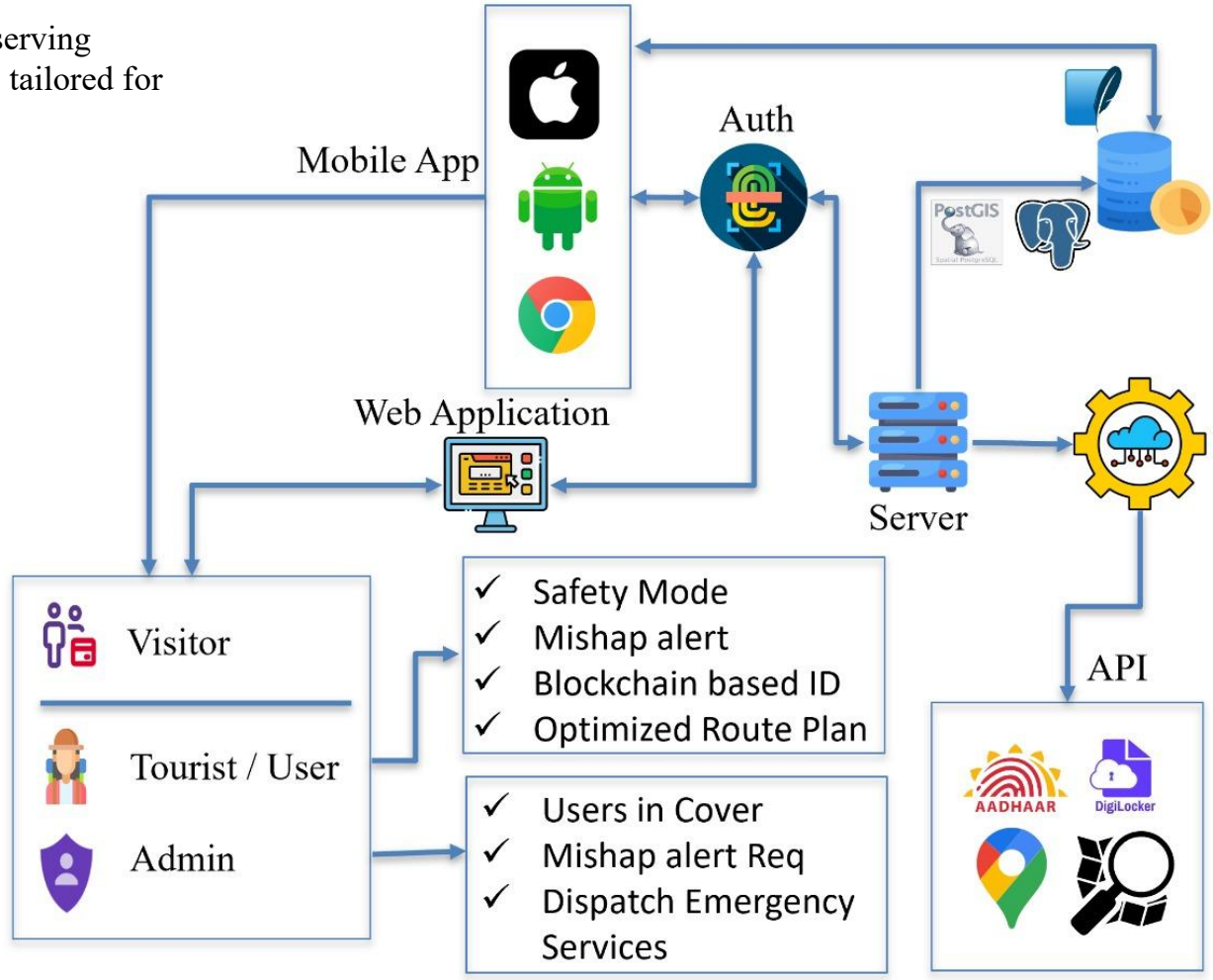
Advanced Monitoring Features :

1. Privacy-Safe Wellness Checks - Face expression + stress level detection (on-device).
2. Crowd Density Analysis - Real-time isolation vs crowded area detection.
3. Mesh Emergency Relay - Tourist-to-tourist message passing until online.
4. Safe Corridor Navigation - Optimal routing through verified safe paths.
5. Context-Triggered Activation - Auto-enable high-power mode in danger zones.

Cultural & Regional Features :

1. NER Specific Integration - Tribal protocols, local guide networks.
2. Environmental Intelligence - Landslide, flood, weather risk alerts.
3. Multilingual Support - Local NER languages + voice guidance.
4. Safe Haven Network - 24/7 verified shops, police posts, clinics.
5. Cultural Compliance - Restricted area respect with educational context.

System Architecture



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TECHNICAL APPROACH

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Mobile Application Stack
React Native, Redux Toolkit + React Redux , AsyncStorage, SQLite , React Navigation, React Native Maps ,OpenStreetMap offline

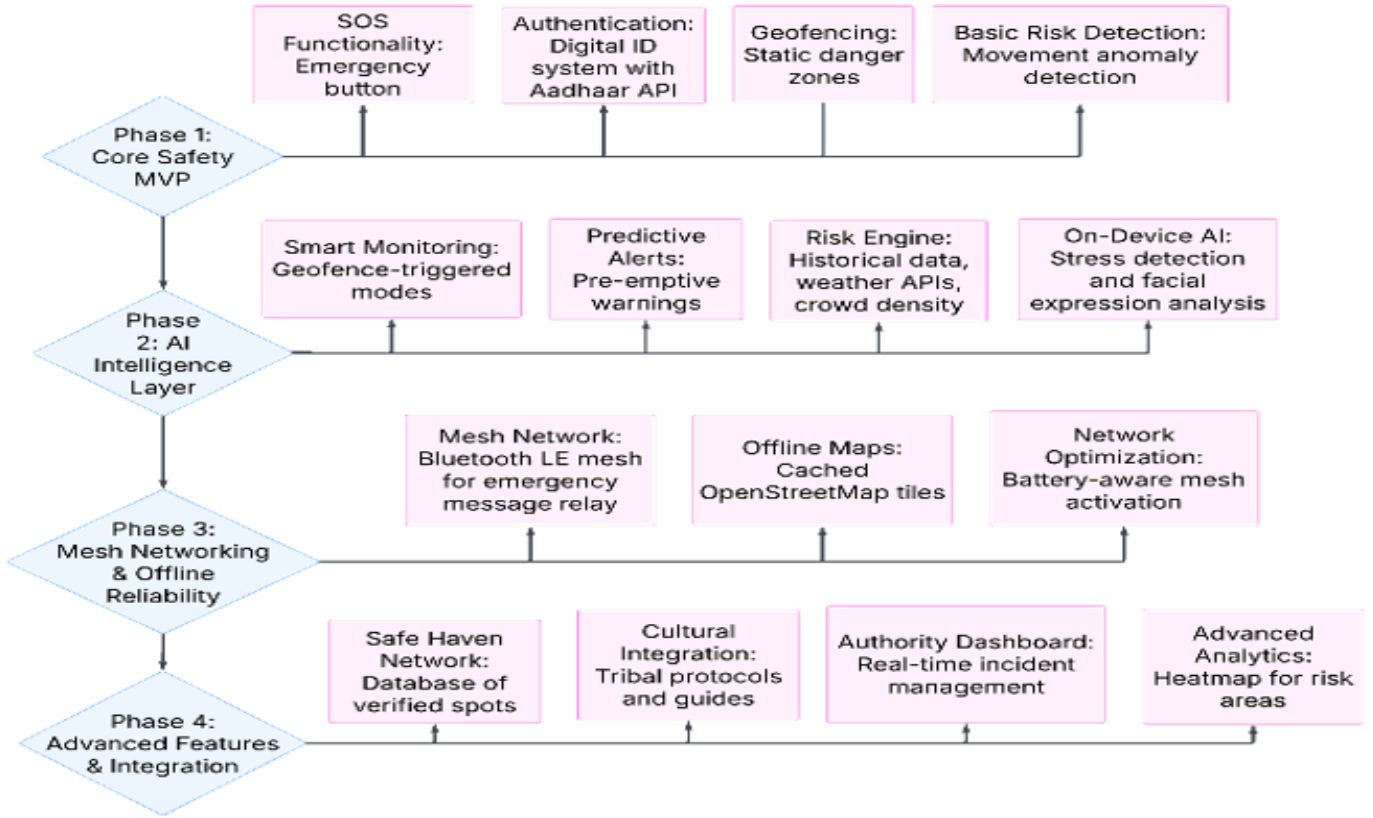
Backend Infrastructure
Kong, Node.js, Express.js, PostgreSQL, PostGIS, Redis, Apache Kafka, Fast Api, AWS

AI/ML Technology Stack
TensorFlow.js, React Native TensorFlow, React Native Vision Camera, ML Kit, Prophet, GeoPandas, PyTorch Lightning

Emerging Technologies Integration
Hyperledger Indy, IPFS, Zero-Knowledge Proofs (zk-SNARKs), React Native BLE PLX, 5G Integration

Government & Authentication APIs
Aadhaar Authentication API, DigiLocker API, UMANG API, GeM Portal API

Geospatial & Navigation APIs
Google Maps, OpenStreetMap Nominatim, Here Maps API, MapBox Navigation SDK



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FEASIBILITY AND VIABILITY

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Feasibility:

- **Technology Stack:** Uses existing, proven tech stack.
- **SDKs:** Leverages established React Native (RN)
- **Architecture:** Built with layered microservices and an API gateway.
- **Deployment:** Allows for a phased rollout of features
- **Offline Capability:** Uses a delay-tolerant, store-and-forward BLE mesh network.
- **Syncing:** Provides offline coverage by syncing data when any node connects to the internet.

Viability:

- **B2B Dashboards:** For authorities like police and disaster response.
- **Enterprise SLAs:** Service-level agreements for corporate safety.
- **Target Audience:** Large addressable market including state tourism boards, police, disaster response, and private tour operators.
- **Niche Focus:** Specifically targets regions with low connectivity.
- **Integration:** Aims to become part of clients' standard operating procedures.
- **Deployment:** Mobile-first approach reduces initial costs.
- **Infrastructure:** Uses managed SDKs and scalable cloud services to minimize upfront investment.

Problems faced:

- Background execution limits (Doze/App Standby on Android; strict iOS policies).
- Battery drain from continuous GPS/BLE scanning and frequent updates.
- Offline delivery uncertainty and variable hop latency in sparse meshes.
- Geofence accuracy and high-volume geofence management performance.
- App killing by OEMs and inconsistent background behavior across devices.

Solutions to problems

- Use production-grade RN Background Geolocation with motion-activity sensors, foreground services, and vendor-documented configurations.
- Duty-cycle GPS/BLE with context triggers (geofence enter/dwell, motion changes) and adaptive sampling to balance accuracy and power.
- Mesh as delay-tolerant: small encrypted packets, optimistic caching, multi-path forwarding, and immediate cloud sync upon any connectivity.
- Geofencing at scale via SDKs supporting thousands of fences with server-side rule pruning and Redis caching around current region.
- Device hardening playbook: request “unrestricted” battery, persistent notifications, and fallback timers consistent with platform guidance.

Supporting Facts for Feasibility and Viability:

- Bluetooth mesh networks demonstrate ***80% message delivery success*** in academic studies
- ***25% mortality reduction*** possible with "Golden Hour" emergency response
- 109.2 crime rate per 1,000 people in Northeast India indicates ***strong market need***
- 95 million tourist arrivals in NER show ***25% CAGR growth trend***
- ***68% GPS positioning accuracy*** confidence level maintained in production apps

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IMPACT AND BENEFITS

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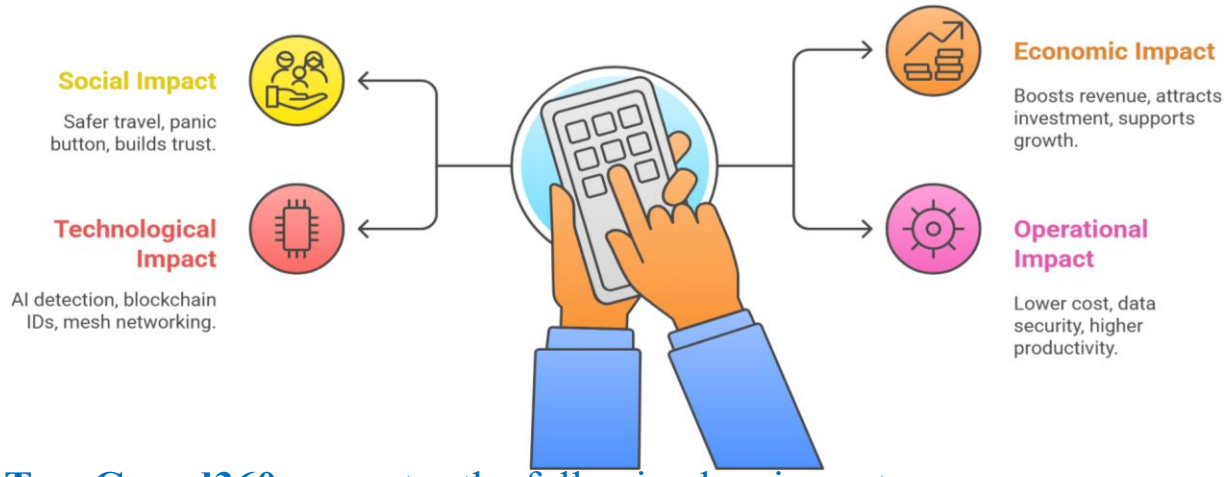

TourGuard360 generates the following key impacts:

1. Social Impact
- Strengthens tourist safety and trust with real-time alerts.
- Multilingual and inclusive features improve accessibility.
- Encourages travel to remote and high-risk regions.

2. Economic Impact
- Increases tourism revenue by **15–20%** through higher inflow.
- Minimizes losses from accidents and missing cases.
- Creates jobs and drives regional development.

3. Technological & Operational Impact
- AI, blockchain, and predictive safety systems.
- Mesh networking ensures connectivity in remote areas.
- Improves efficiency of police and tourism authorities.

The TourGuard360 delivers the following benefits:

1. Enhanced Safety & Real-Time Response
- Self-healing mesh networks ensure uninterrupted connectivity.
- AI-powered monitoring detects anomalies instantly.
- Rapid emergency alerts in remote and disaster-prone areas.
- Women's Safety Enhancement: Dedicated women-only safe zones, female escort networks, and gender-sensitive emergency protocols.
- Civic Safety Integration: Extends protection to local communities through shared safety infrastructure and crowdsourced safety reporting.

2. Robust & Reliable Infrastructure
- Mesh networking removes coverage gaps in hilly/rural regions.
- Strong encryption (e.g., WPA3) ensures data security.
- Decentralized setup prevents single-point system failures.

3. Operational Efficiency & Cost Savings
- Scalable design lowers downtime and infrastructure costs.
- Flexible expansion with minimal overhead.
- Automation reduces manual workload and improves productivity.

4. Social & Economic Growth
- Builds traveler trust and confidence in safety measures.
- Increases tourist inflow, enhancing regional footfall.
- Boosts revenue by **15–20%**, driving sustainable growth.

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RESEARCH AND REFERENCES

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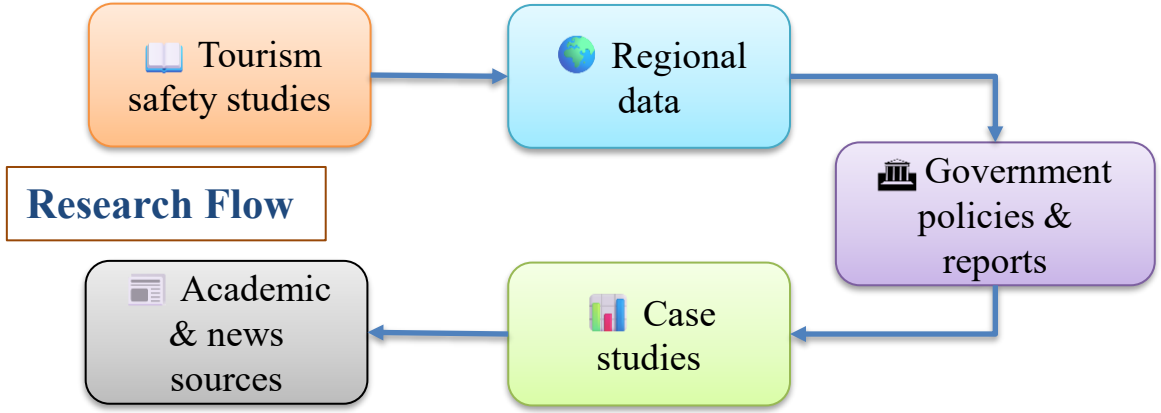
Other Apps :

- bSafe : https://www.getbsafe.com
- Red Panic Button : https://www.redpanicbutton.com
- Life360 : https://www.life360.com

Feasibility Facts :

- Safe Tourism Problem in North East Region
- Bluetooth Mesh Architecture
- Emergency Response time data
- Tourism data in North East India



Live Demo : https://system-404.xyz

Feature / App	TourGuard360	bSafe	Red Panic Button	Life360
Core Safety (SOS, Alerts)	✅ One-tap SOS + Silent SOS + automated authority notification	✅ SOS & live streaming	✅ SOS panic button	✅ SOS alerts to family
Geo-Fencing	✅ Dynamic real-time safe/danger zone mapping with cultural awareness	❌ No advanced geofencing	❌ Basic GPS location only	✅ Location sharing + geofencing
AI Risk Detection	✅ On-device anomaly detection, stress level & facial expression analysis	❌ Limited	❌ None	❌ None
Digital ID Verification	✅ Aadhaar/DigiLocker integration, self-sovereign ID (Hyperledger Indy)	❌ No ID	❌ No ID	❌ No ID
Environmental Intelligence	✅ Landslide, flood, weather integration	❌ No	❌ No	❌ No
Safe Haven Network	✅ Verified shops, police posts, clinics with real-time status	❌ No	❌ No	❌ No
Cultural & Regional Integration	✅ Local tribal protocols, multilingual NER support, verified guides	❌ Generic global app	❌ Generic	❌ Generic
Emergency Response Chain	✅ Multi-channel alerts (guardians, authorities, nearby tourists)	✅ Alerts to contacts	✅ Alert to one contact	✅ Family circle alerts