A
Project Synopsis
On
Offline Mesh-Based Emergency Alert Systems Using BLE Networking

by
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A – 06
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Synopsis

- **Project Title :- Offline Mesh-Based Emergency Alert Systems Using BLE Networking**
- **Guide :- Prof. S. V. Nikam**
- **Area / Domain of Project :- Android Development , IoT, BLE Mesh Networking**

(1) Introduction :-

India faces frequent natural and industrial disasters such as floods, cyclones, and earthquakes. In such crises, traditional communication systems like cellular networks or landlines often fail due to damage or overload. A robust emergency alert system that functions offline is crucial. Bluetooth Low Energy (BLE) Mesh technology provides resilient many-to-many wireless communication, capable of maintaining network integrity through self-healing, decentralized message forwarding, and offline functionality.

(2) Motivation :-

Traditional communication methods break down during disasters, delaying rescue and alerts. This project is motivated by the need for a resilient system that works without internet or cellular support, using BLE Mesh to ensure offline and reliable emergency alerts across a wide area, especially in high-risk or infrastructure-deficient zones.

(3) Existing System :-

The current communication system in India relies on cellular networks, landlines, and government-led initiatives like the Integrated Alert System (SACHET) and Cell Broadcast (CB). The national framework also includes space-based communication through ISRO's satellite capabilities.

(4) Drawbacks/limitations/challenges in Existing System :-

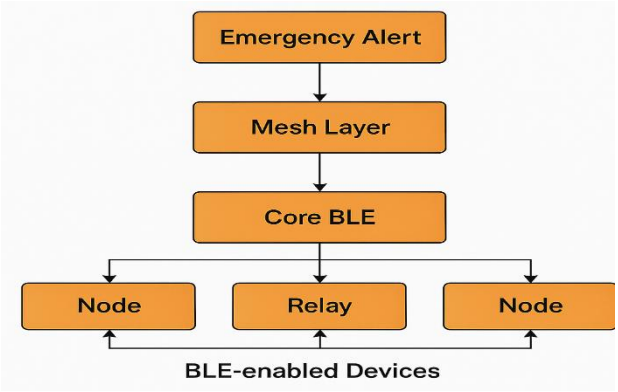
- Vulnerability to infrastructure damage
- Network overload during disasters
- Ineffective in hyper-local and indoor scenarios
- No offline operational capability

(5) Problem Statement :-

During disasters, traditional networks often fail. Existing systems lack offline, decentralized alerts. A BLE Mesh-based IoT solution enables resilient, many-to-many emergency communication without relying on cellular or internet infrastructure.

(6) Proposed Work :-

(1) Block Diagram :



(2) Modules :

- Core BLE Module
- Mesh Layer Module
- Emergency Alert Module
- Security Module

(7) Development Environment :- OS: Windows/Linux, Tools: BLE Simulators, Android Studio.

(1) Software Requirements :

- BLE Simulation tools
- Android/iOS apps
- Documentation tools

(2) Hardware Requirements :

- BLE-enabled nodes
- Relay devices
- Smartphones

(8) Deployment Environment :- Offline BLE mesh test environment for disaster simulation.

(1) Software Requirements :

- Preloaded BLE Mesh mobile application.

(2) Hardware Requirements :

- BLE Nodes, Relay Nodes, Battery/Power Supply.

(9) References :-

i. **Journal/Conference Papers**

- [103] Offline Mesh-Based Emergency Alert Systems Using BLE Networking in India: A Comprehensive Analysis

ii. **Web References**

- ISRO disaster communication page
- Bluetooth SIG documentation

iii. **Book References**

- IoT Fundamentals by David Hanes
- Wireless Communications by Theodore Rappaport

Prof. S. V. Nikam	Prof. T. H. Patil	Dr. R. B. Patil
Project Guide	**FYP, Coordinator**	**HoD, CSE**