LORA MESH: Resilient Communication for Remote and Disaster Zones

A technical presentation for HackTU7.0 by Team Devoholicks
Exploring long-range, low-power communication systems designed for emergency situations.

Devo-holicks

Problem Statement

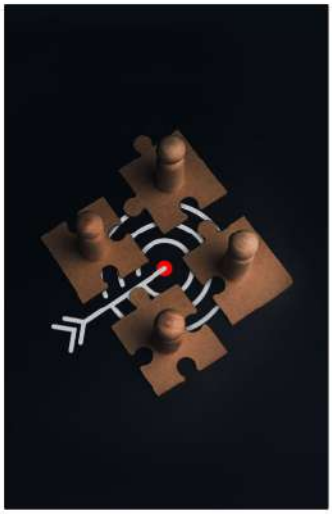
Identifying critical communication gaps in remote and disaster-prone environments

Proposed Solution

Our project introduces a LoRa-based mesh communication device that uses LoRa (ORA/LoRa device) for long-range, low-power communication and integrates GPS coordinates for real-time location sharing without internet.

System Overview

A high-level view of how LoRa nodes interact to form a resilient communication fabric



LoRa nodes forming a mesh network

Each node acts as transmitter + receiver

GPS module (**NEO-6M G+**) provides latitude and longitude

Data is relayed across nodes to reach the base station

Hardware Components

The core technical assembly enabling low-power long-range performance

Working Principle

Step-by-step data acquisition and transmission process across the mesh

1

Coordinate Fetch

GPS module fetches real-time coordinates including latitude and longitude.

2

LoRa Transmission

Coordinates are transmitted using the LoRa module for long-range reach.

3

Mesh Forwarding

The mesh network forwards data node-to-node until it reaches the destination.

4

Data Display

The final receiver displays the location data for monitoring and tracking.

Architecture Diagram

Visualizing the components from data source to final receiver

GPS Input

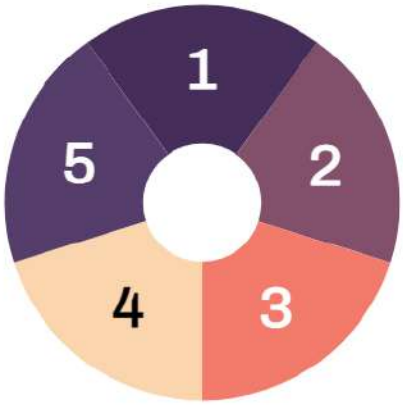
Initial data acquisition of real-time location coordinates.

Receiver

Base station output displaying final location results.

Mesh Network

Extended coverage through node-to-node data hopping.



Microcontroller

Processes coordinates and manages LoRa transmission logic.

LoRa Node

Handles the long-range radio signal for the local node.

Key Features

Unlocking communication where traditional networks fail

1 **Works without internet or cellular network**

2 **Long-range communication (up to several kilometers)**

3 **Low power consumption**

4 **Mesh networking for extended coverage**

5 **Real-time GPS tracking**

1

Disaster rescue operations

2

Military and border surveillance

3

Wildlife tracking

4

Trekking and remote expeditions

5

Rural and remote area monitoring

Use Cases

Deployment opportunities across emergency and remote sectors

Advantages

Why LoRa Mesh is the superior choice for resilient communication

Reliable in no-network zones

Scalable mesh network

Cost-effective solution

Energy efficient

Future Enhancements

Roadmap for evolving the LoRa Mesh ecosystem

Conclusion

Enabling global safety through decentralized communication networks.
Innovative LoRa mesh communication solution enables GPS tracking without internet, ideal for emergency and remote-area applications.