



HAYAT AĞI

A Continuous Localized Communication System for Post-Earthquake Recovery

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Project Support

Supported by **TÜBİTAK** under the **2209-A** University Students Research Projects Support Program, **Hayat Ağı** is designed to provide communication after **major earthquakes** through an **AI-powered LoRa mesh network** for rescue teams and citizens in high-risk areas.



Subject and Purpose of the Project

The Problem: Major earthquakes can disable communication networks, leaving victims isolated and rescue teams without reliable information.

The Importance: The first 72 hours are critical for survival and require rapid victim detection and effective coordination.

The Gap: Victims often cannot send help requests, while rescue teams receive limited or unorganized information.

The Solution: Hayat Ağı provides communication without cellular networks using BLE and LoRa technologies. It enables location-based SOS messages, AI-supported emergency prioritization, and automated status updates for psychological reassurance.

Software & AI

Mobile App: Flutter app with continuous BLE connectivity, an emergency UI, and automated status updates for victims.

AI Triage: Custom BERTurk model for classifying distress messages by urgency and category.

Incident Mapping: GIS dashboard visualizing real-time ESP32 nodes, help request clusters, and AI-prioritized emergencies.

Hardware & Network Architecture

Mesh Nodes: ESP32 and LoRa (SX1262) based communication nodes with custom AODV routing.

Resilient Network: Decentralized multi-hop mesh topology ensuring message delivery during node failures.

Seismic Monitoring: MPU-6050 sensors integrated into gateway nodes for seismic data collection.

BLE Connectivity: Bluetooth Low Energy (BLE) enables smartphone access to the mesh network.

Results

The project demonstrated a 3-node mesh network, AI-based emergency message classification, and end-to-end integration from BLE smartphone access to a live GIS dashboard.

