

Disaster Warning Device

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Abstract

Core Background

Natural disasters such as floods, cyclones, earthquakes, and tsunamis create significant threats to communities and infrastructure. Early warning systems help reduce impact and improve response efforts. This project applies digital logic techniques to classify potential hazards using threshold-based environmental indicators. By converting real-world measurements into binary levels, the system identifies the most probable disaster event.

Project Working

The device receives four environmental inputs—Rainfall, Seismic activity, Wind speed, and Sea Level. Each encoded into 2-bit levels ranging from Low to Very High.

- Logical circuits assess Flood, Cyclone, Earthquake, and Tsunami conditions
- A priority encoder selects the highest-priority disaster when multiple occur
- Mode control supports Unique-Disaster and Multi-Disaster interpretation
- Final decoding activates one LED corresponding to the detected hazard

Applications & Educational Value

- LEDs act as clear indicators for disaster conditions
- Compact digital design suitable for early warning prototypes
- Can be integrated into basic monitoring modules for hazard classification
- Illustrates the use of encoders, comparators, and decision logic in detection systems

References

1. Digital Electronics by Morris Mano
2. Magnitude Comparator in Digital Logic – GeeksforGeeks
3. Encoders and Decoders in Digital Logic – GeeksforGeeks
4. Disaster parameter limits Sources: Flood Limits, Cyclone Limits, Earthquake Limits, Tsunami Limits