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REAL-TIME DISASTER MANAGEMENT SYSTEM

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ABSTRACT : The Real-Time Disaster Management system is designed to improve emergency response efficiency through automated processing of disaster-related information. Traditional disaster management systems rely on manual communication and delayed decision-making, which often result in slow response and increased damage. The proposed system uses rule-based artificial intelligence techniques to analyze emergency messages, determine severity levels, assign priority, and generate alerts in real time [5]. The system also detects duplicate messages to avoid repeated alerts and maintains structured records in a centralized database [7]. An admin dashboard enables monitoring of emergency messages, alert delivery status, and disaster history. The system reduces response time, improves coordination, and enhances disaster preparedness and management effectiveness.

KEYWORDS : Real-Time Disaster Management , Emergency Response , Artificial Intelligence, Rule-Based System ,Severity Analysis , Priority Assignment , Automated Alerts, Duplicate Detection , Centralized Database , Disaster Preparedness

INTRODUCTION

Disasters such as floods, fires, earthquakes, and industrial accidents pose serious threats to human life and infrastructure. Effective disaster management requires timely communication accurate assessment, and rapid response. Traditional systems depend on manual reporting methods such as phone calls and written complaints, which lead to delays and inefficient prioritization. With the advancement of information technology, automated real-time systems can significantly improve disaster response. The proposed Real-Time Disaster The management system processes emergency messages instantly and analyzes severity using predefined rules, assigns priority, and generates alerts automatically [5]. A centralized monitoring dashboard supports efficient coordination and decision-making.

REVIEW OF LITERATURE

Previous studies emphasize the importance of intelligent systems in disaster management [1]. Research indicates that automated alert systems reduce response time and improve coordination during emergencies. Artificial intelligence techniques, including rule-based systems and classification algorithms have been used to categorize disaster severity and prioritize response actions [5]. Many existing systems focus either on prediction or alert dissemination, but lack integrated

real-time processing and duplicate detection mechanisms. These studies highlight the need for a comprehensive system that combines automated analysis and centralized monitoring.

METHODOLOGY

Data Collection

Emergency messages are collected.from users through the system interface. Similar real-time monitoring and communication approaches have been discussed in disaster management research.

Data Preprocessing

Cleaning text data, keyword extraction, and structured storage are essential for intelligent disaster response systems [5]. Database storage and management are implemented using MySQL [7], and system processing issupported using Python technologies [6].

Severity Analysis

Keywords such as “fire,”“explosion,”“collapse,” and “flood” are identified using rule-based logic to Classify severity into low, medium, high, or critical [5].

Priority Assignment

Priority levels are assigned based on severity classification to ensure urgent cases are handled first, aligning with emergency management principles discussed.

Alert Generation & Delivery

Alerts are generated automatically.and sent via SMS or notification services, similar to SMS-based emergency systems described in [4]. Real-time system architecture concepts are supported by [3].

DATASET DESCRIPTION

The dataset consists of structuredemergency records used for system validation and testing purposes. Structured Disaster data handling aligns with emergency management frameworks discussed.

ALGORITHM EXPLANATION

1. **Rule-Based Artificial Intelligence (RB-AI)**

   Rule-Based Artificial Intelligence is a decision-making approach that uses predefined logical rules and conditions to analyze input data. In this system, disaster-related keywords are identified from emergency messages, and severity levels are assigned based on predefined rules without using machine learning models.

2. **Severity Classification Algorithm**

   The severity classification algorithm analyzes extracted keywords from emergency messages and categorizes disasters into levels such as low, medium, high, or Critical. The classification is based on the intensity and type of disaster-related terms found in the message.

3. **Duplicate Detection Algorithm**

   The duplicate detection algorithm compares new emergency messages with recent database records based on location and time. If similar messages are found Within a specific time frame, the system prevents repeated alert generation toAvoid redundancy.

4. **Priority Assignment Algorithm**

   The priority assignment algorithm assigns urgency levels to emergencies based on the classified severity. Critical and high-severity cases are given higherpriority to ensure faster response and alert delivery.

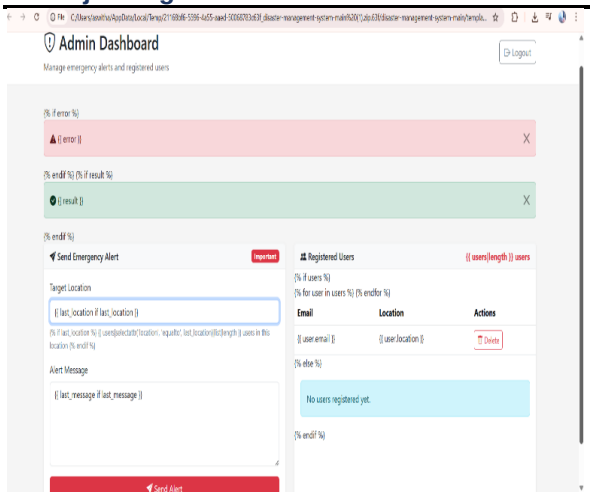
EXPERIMENTAL RESULTS

1.HOME PAGE

The Home Page is the main interface.of the system that provides navigation to login, registration, and emergency reporting features. It allows users and administrators to access the system easily and ensures smooth redirection to other modules.

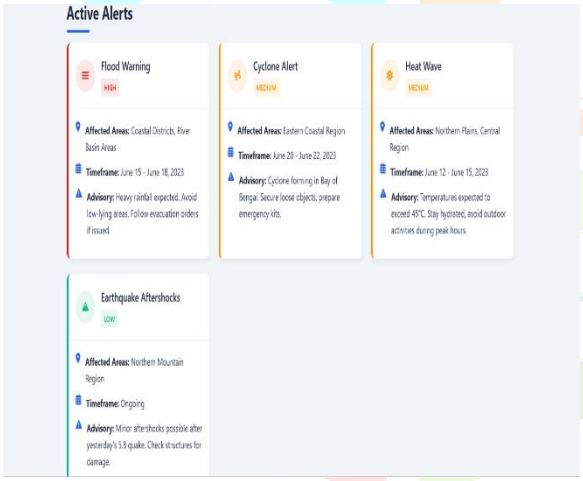
2.ADMIN LOGIN MODULE

The Admin Login Module authenticates the administrator using valid credentials stored in the database. It ensures that only authorized users can access the admin dashboard. After successful verification of username and password, the administrator is grantedaccess to monitor emergency messages, alerts, and system activities securely.



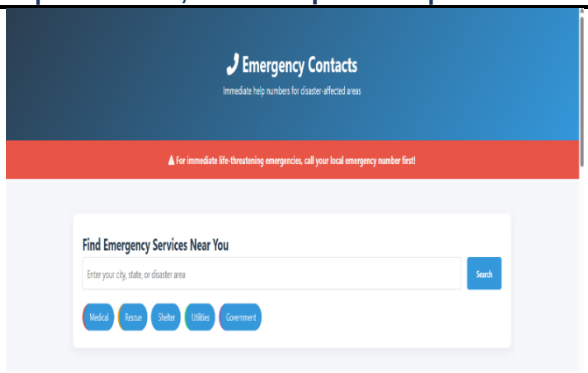
3.ACTIVE ALERTS

The Active Alerts section displaysall currently active emergency alerts generated by the system. It shows details. such as disaster type, location, severity level, and alert status. This module helps administrators monitor ongoing emergencies and take necessary action promptly.



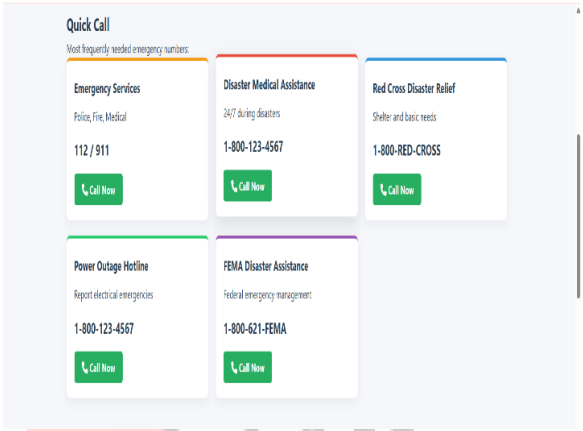
4.EMERGENCY CONTACTS

The Emergency Contacts sectionstores important contact details of rescue teams, hospitals, fire services, and other emergency authorities. It allows quick access to essential contacts during disaster situations, ensuring faster communication and coordination.



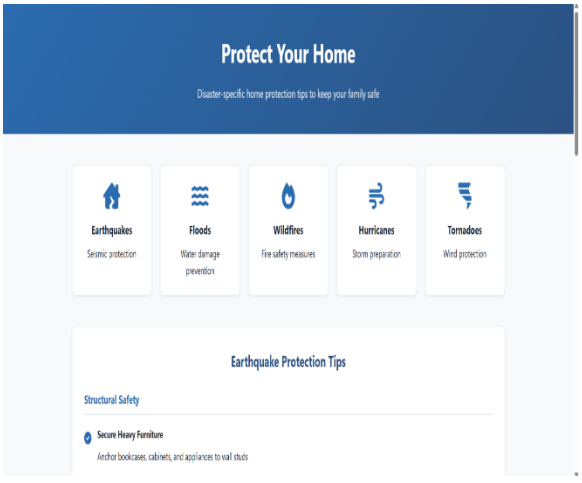
5.QUICK CALL

The Quick Call feature allows usersor administrators to instantly contact emergency services directly from the system. It provides fast access to important emergency numbers, ensuringimmediate communication during critical situations.



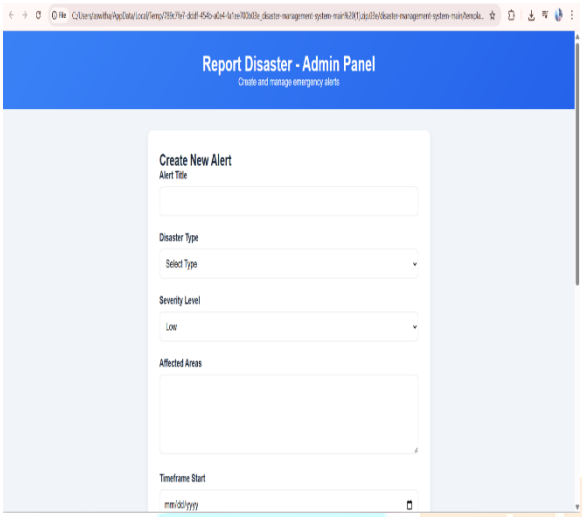
6.PROTECT YOUR HOME

The Protect Your Home sectionprovides safety guidelines and preventive measures to reduce damage during disasters. It offers important instructions and preparedness tips to help users.Protect their homes and stay safe during emergency situations.



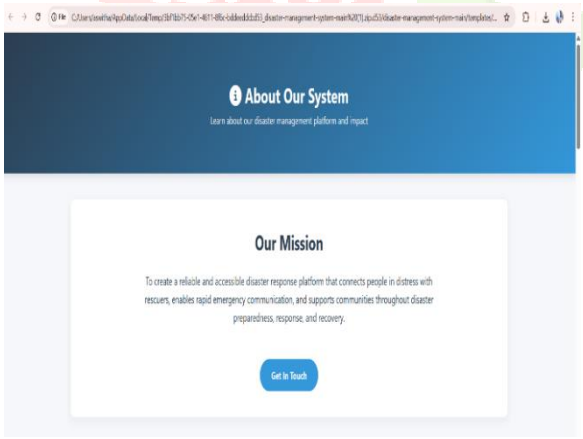
7.REPORT DISASTER-ADMIN PANEL

The Report Disaster section in theadmin panel allows the administrator to view, manage, and verify reported emergency messages. It helps in monitoring disaster details, confirming severity levels, and initiating alert generation for effective response.



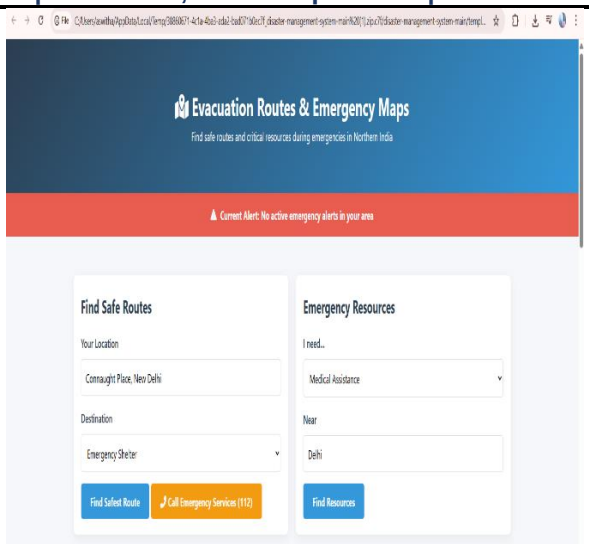
8.ABOUT OUR SYSTEM

The About Our System sectionprovides an overview of the Real-Time Disaster Management System. It explains the purpose, key features, and functionality of the system, highlighting how it helps in real-time emergency processing and alert generation.



9.EVACUATION ROUTES & EMERGENCY MAPS

The Evacuation Routes and EmergencyThe maps section provides information about safe exit paths and nearby emergency facilities during disaster situations. It helps users identify the safest routes and reach secure locations quickly to ensure safety.



CONCLUSION

The Real-Time Disaster ManagementThe system provides an efficient and automated approach for handling emergencies situations. By integrating rule-based AI techniques, the system successfully analyzes disaster messages, assigns priority, generates alerts, and enables centralized monitoring. The implementation reduces response time and enhances coordination, consistent with principles discussed in disaster management literature. Future enhancements may include integration of advanced AI models and scalable deployment strategies as suggested in recent technological studies.

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