

# Real Time Disaster Information Aggregation Software

## Abstract:

Natural disasters such as earthquakes, floods, cyclones, landslides, and wildfires pose significant threats to human lives, infrastructure, and environmental stability. Timely access to accurate information during disaster events is essential for minimizing damage and improving emergency response efforts. Traditional disaster monitoring systems primarily depend on official reports released by government agencies or emergency services. While these sources provide reliable information, the dissemination of updates may be delayed due to verification processes and communication limitations.

With the rapid growth of social media platforms and online communication networks, individuals often report disaster events immediately after they occur. Platforms such as Twitter and video-sharing platforms like YouTube provide valuable real-time information from eyewitnesses and local communities. However, extracting meaningful disaster-related information from these sources is challenging due to the massive volume of data and the presence of misinformation or irrelevant content.

This research proposes a Real-Time Disaster Information Aggregation Software that collects disaster-related information from multiple online sources using open APIs. The system applies keyword filtering, location extraction, and natural language processing techniques to identify relevant disaster events. Aggregated information is processed and delivered to users via SMS alerts using the Twilio API. The proposed system aims to improve situational awareness and enhance disaster response by providing accurate and timely alerts to both the public and emergency responders.

## Introduction:

Natural disasters are unpredictable events that can cause extensive destruction within a short period of time. Earthquakes, floods, hurricanes, and landslides are some of the most common disasters that affect communities worldwide. These events often occur suddenly, leaving limited time for people to prepare or evacuate. As a result, rapid dissemination of disaster-related information is critical for saving lives and reducing damage.

In many countries, disaster information is primarily communicated through official channels such as government agencies, meteorological departments, and emergency response organizations. While these sources provide accurate and verified information, they may not always deliver updates in real time during the early stages of a disaster. Delays in information dissemination can lead to confusion, panic, and slower emergency response efforts.

The rise of digital communication platforms has significantly changed the way people share information. Social media platforms allow individuals to instantly share updates, images, and videos of events occurring around them. During disasters, these platforms often contain valuable eyewitness information that can help authorities understand the situation more quickly.

However, the challenge lies in identifying relevant disaster-related information among the vast amount of data generated online every minute. Many posts may contain unrelated content, rumors, or inaccurate information. Therefore, automated systems are needed to filter and analyze online data efficiently.

This research introduces a Real-Time Disaster Information Aggregation Software that collects disaster-related information from multiple online platforms and processes it to generate timely alerts. The system integrates social media analysis, keyword filtering, and location extraction techniques to provide accurate and relevant information to users.

## **Background and Motivation:**

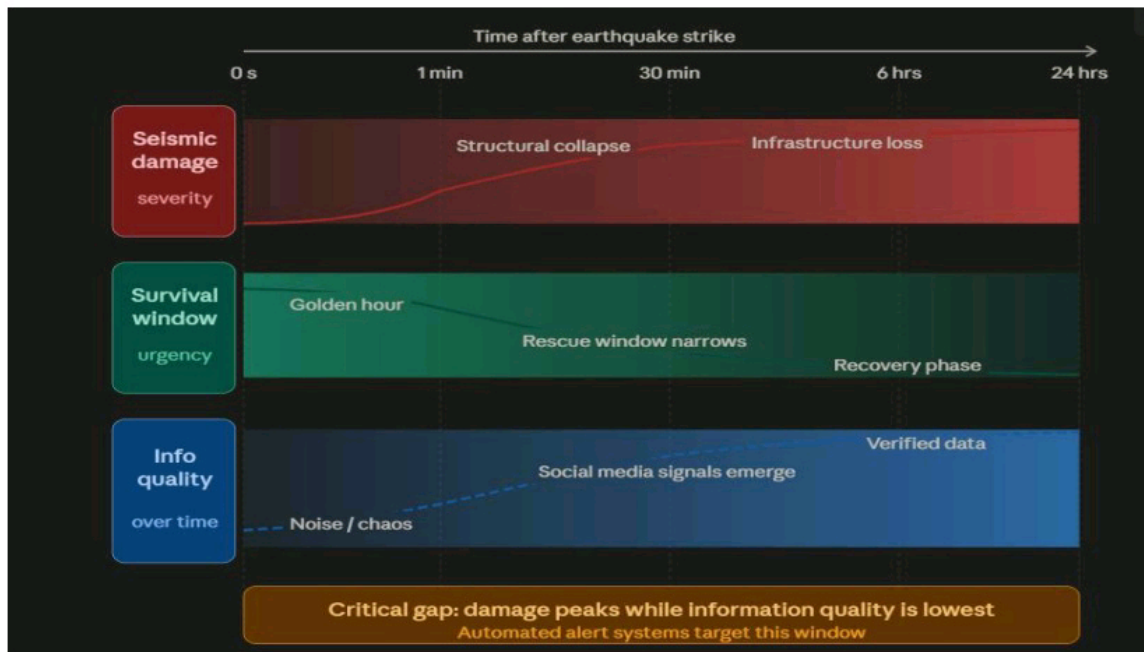
The increasing frequency of natural disasters has highlighted the need for advanced disaster monitoring systems. Climate change, population growth, and urbanization have contributed to the rising impact of disasters on communities around the world.

In recent years, researchers have explored the use of digital technologies to improve disaster management. Technologies such as the Internet of Things (IoT), big data analytics, and artificial intelligence have enabled the development of systems capable of monitoring environmental conditions and detecting disaster events.

Social media platforms have also emerged as valuable sources of information during emergencies. During disasters, people often post updates about affected areas, infrastructure damage, and rescue operations. These posts can provide real-time insights into the situation on the ground.

Despite the potential benefits of social media data, manually analyzing large volumes of posts is not feasible. Automated systems are required to collect and process data from multiple sources in real time.

The motivation behind this research is to develop a scalable software system capable of aggregating disaster-related information from multiple platforms and delivering timely alerts to users.



## Problem Statement:

Existing disaster monitoring systems face several challenges that limit their effectiveness. Many systems rely on centralized reporting mechanisms that may not capture real-time updates from affected communities. Additionally, official reports may take time to verify before being released to the public.

At the same time, social media platforms generate vast amounts of information during disaster events. While this data contains valuable insights, it also includes irrelevant content, rumors, and misinformation.

The key challenges addressed in this research include:

- Identifying relevant disaster-related information from large volumes of online data
- Extracting accurate location information from social media posts
- Reducing false alarms caused by misleading or unrelated content
- Delivering timely alerts to users during emergency situations

The proposed system aims to address these challenges by integrating multiple data sources and applying automated filtering techniques.

## Proposed System:

The proposed Real-Time Disaster Information Aggregation Software is designed to collect and analyze disaster-related data from online platforms. The system retrieves data from social media platforms and video-sharing websites using open APIs.

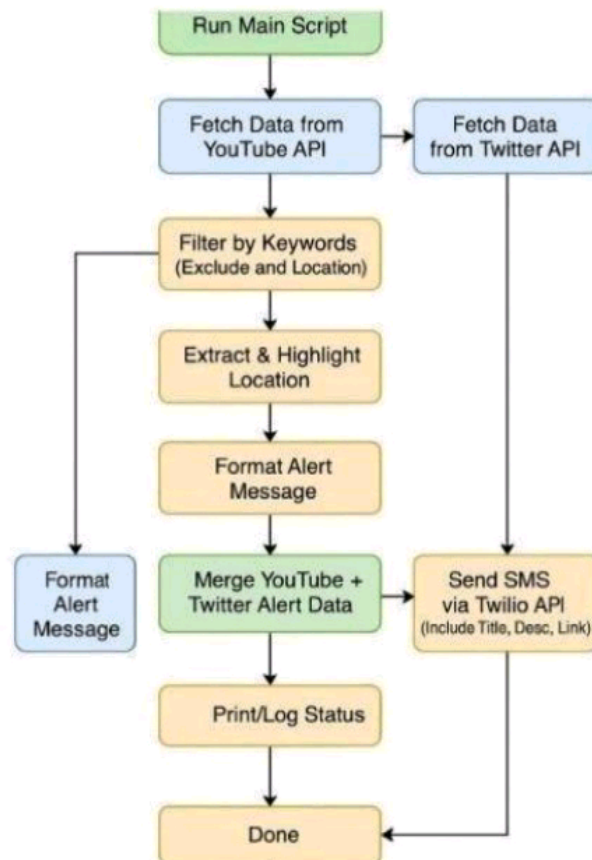
Once the data is collected, it is processed using keyword filtering techniques to identify posts related to disasters. Natural language processing techniques are then applied to extract location information from the text.

The relevant data is aggregated to create alerts containing important details such as the type of disaster, location, and time of occurrence. These alerts are sent to users via SMS using the Twilio API.

The system architecture is modular, allowing additional data sources to be integrated in the future.

### System Flow:

The system follows a structured workflow to process disaster-related data.



## Methodology:

The methodology used in this research involves collecting and analyzing data from online platforms. The system first gathers raw data from APIs. The collected data is then processed using filtering algorithms.

Keyword filtering helps identify posts containing disaster-related terms such as earthquake, flood, cyclone, or landslide. Natural language processing techniques are used to extract important information from the text.

Location extraction plays a crucial role in identifying affected areas. The extracted information is used to generate alerts that are sent to users.

## Implementation:

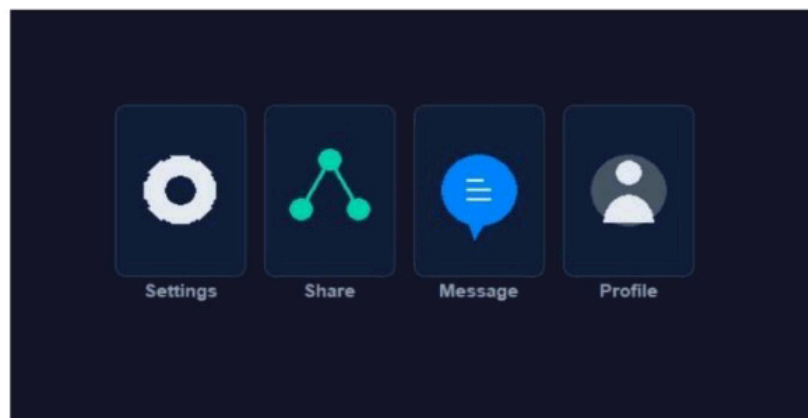
The system is implemented using modern software development tools. The programming language used for development is Python due to its strong support for data analysis and API integration.

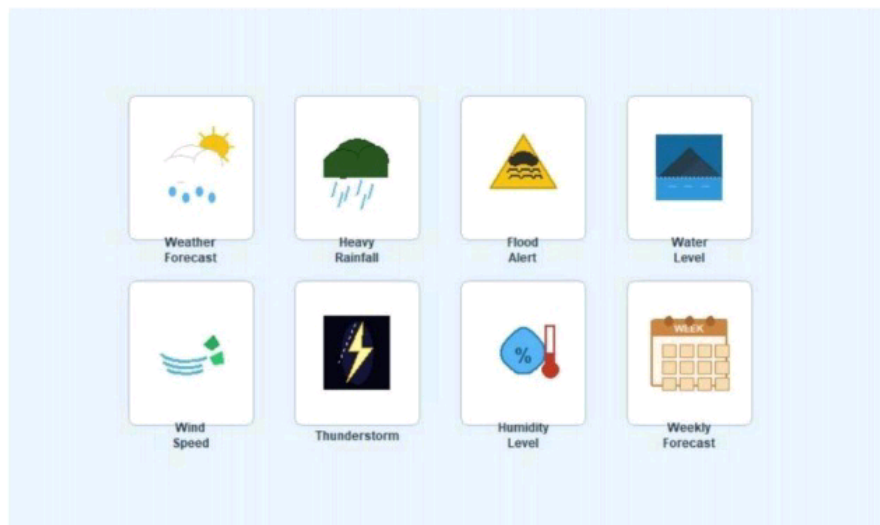
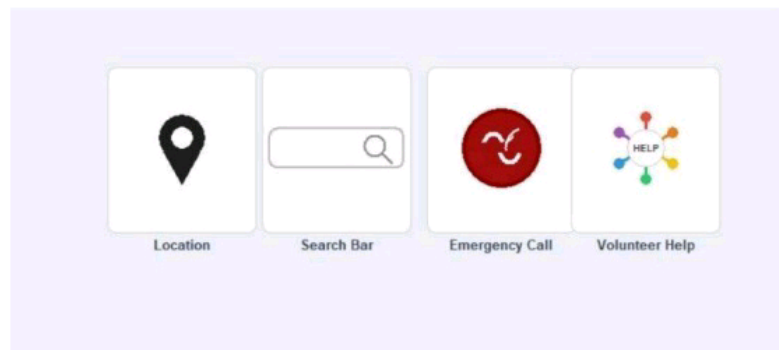
The Twitter API and YouTube API are used to retrieve data from online platforms. Natural language processing libraries are used to analyze textual data and extract relevant information.

The Twilio API is integrated into the system to send SMS alerts to registered users.

## Results and Discussion:

The system was tested using real-time data collected from social media platforms.





### **Advantages:**

The proposed system offers several advantages including:

- Real-time monitoring of disaster-related information
- Integration of multiple online data sources
- Improved situational awareness
- Faster emergency response
- Scalable and modular system architecture

## **Limitations:**

Although the system provides many benefits, it also has certain limitations. Social media data may contain inaccurate information or rumors. The system relies on keyword filtering, which may not capture all disaster-related posts.

Future improvements can address these limitations by incorporating machine learning algorithms for better data classification.

## **Future Work:**

Future enhancements may include integrating additional data sources such as satellite imagery, government emergency feeds, and IoT sensors. Machine learning techniques can also be implemented to improve the accuracy of disaster detection.

A mobile application could also be developed to provide a user-friendly interface for receiving alerts and monitoring disaster events.

## **Conclusion:**

This research presented a **Real-Time Disaster Information Aggregation Software** designed to improve disaster awareness and support emergency response efforts. Natural disasters such as earthquakes, floods, and landslides often occur suddenly and cause severe damage to human life and infrastructure. In such situations, the availability of timely and accurate information plays a critical role in minimizing losses and enabling efficient rescue operations. The proposed system collects disaster-related data from multiple online platforms such as social media and video-sharing websites using open APIs. By applying keyword filtering and natural language processing techniques, the system is able to identify relevant disaster-related information from large volumes of online data.

The system also incorporates location extraction and data aggregation techniques to improve the reliability and usefulness of the collected information. By combining alerts from multiple sources, the system reduces the chances of false alarms and provides more accurate situational insights. The integration of SMS notification services enables the delivery of real-time alerts to users, ensuring that critical information can reach affected individuals even in situations where internet connectivity is limited. This approach helps bridge the gap between disaster occurrence and the availability of verified information, which is crucial during the early stages of an emergency.

Overall, the proposed system demonstrates how modern technologies such as social media analytics, natural language processing, and real-time data aggregation can enhance disaster monitoring systems. The modular architecture of the system also allows future expansion through the integration of additional data sources and advanced machine learning algorithms. With further improvements, the system has the potential to become a valuable tool for disaster management authorities, emergency responders, and communities by providing timely, accurate, and actionable disaster information.

## Developed by :



Linga Prabha M  
2<sup>nd</sup> year AI & DS  
JACSICE



Varsha R  
2<sup>nd</sup> year AI & DS  
JACSICE



Muthu Priya S  
2<sup>nd</sup> year AI & DS  
JACSICE



Rekha S  
2<sup>nd</sup> year AI & DS  
JACSICE

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