iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** IX **Month of publication:** September 2026

DOI: https://doi.org/10.22214/ijraset.2026.84988

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue IX Sep 2026- Available at www.ijraset.com

ResQTrack: AI-Driven Crisis Detector and Geo-Mapping

B. Vamshi[1], J. Ashritha[2], M. Roshitha[3], M. Lasya[4]
[1]*Assistant Professor, CSE, GNITS, Hyderabad, India*
[2, 3, 4]*Student, CSE, GNITS, Hyderabad, India*

Abstract: ***Disaster monitoring plays a critical role in reducing the impact of natural disasters and man-made disasters, but we know how the traditional methods work. Though the information is significant, it gets delayed after the disaster has occurred. This doesn't save lives and earnings. In contrast with that, we know that on social media, the information is shared faster than news channels and other government official websites; However, the information is unstructured, inconsistent, and difficult to analyse directly. The ResQTrack system is developed to address the challenge by integrating real-time data from the social media platform X (Twitter) in addition to the help of APIs such as USGS and GDACS, processing it to identify relevant events, and extracting location details even when precise coordinates are not available.***

The data is processed and analysed, and then it is displayed through an interactive dashboard and on a global map. Our system also provides analytical insights and severity distribution of the regions, and it also shows the graphical representation of the data and disaster frequency trends. ResQTrack converts the raw data into structured and meaningful analytics. ResQTrack improves situational awareness and supports faster decision-making. The system demonstrates how real-time data and simple analytical techniques can be effectively used.

Index Terms: Disaster Monitoring, Data Visualisation, RealTime Systems, Geo-Mapping, AI.

I. INTRODUCTION

The increasing frequency and intensity of disasters in recent years have made monitoring more crucial than ever, the disasters such as earthquakes, floods, wildfires, cyclones and even conflict-related incidents, man-made disasters, wars and other disasters can all cause significant damage within a very short period of time. In such situations, access to timely and accurate information about the disaster through traditional methods, such as news channels or government official sources, this process may take a long time. Even though the information is accurate, access to timely information becomes essential for both authorities and the general public.

Quick awareness can help in taking immediate action, reducing risk and improving overall response efforts. We know that traditional disaster monitoring systems mainly depend on official websites and centralised databases, and all the reliable ones often take time to update. Now, this may create a lot of gap between the general public and the authorities.

At the same time, during emergencies, people tend to post and update immediately, sharing what they see and their experience in real-time. These updates include descriptions, images and videos from the affected areas, making them a valuable source of early information. This advantage comes with its own challenges. Data shared on the platform can be highly unstructured, and we may not be sure how certain that information is, and it includes a large amount of noisy and irrelevant content. Sometimes, going through thousands of posts is not realistic.

Especially when quick decisions are required, this makes it difficult to extract the meaningful available data, so our ResQTrack is developed to address this exact problem by acting as a bridge between raw data and useful information. Here, the social media platform that we're using is X(Twitter), through X's API, we will be collecting the post data, processing and analysing the data and including in our dashboard with graphical representations, our system is designed to collect real time disaster related data from multiple sources not only from X but we also have a backup information from USGS and GDACS. From multiple source data, the processing makes it easier to understand instead of presenting users with the large amount of unfiltered data. The system is focused to use AI and process it and give the exact information in an organised way to display the information in a dashboard is a global map, it has points of severity and analytics representation. Overall aim of our ResQTrack is to improve the situational awareness support, it gives the information quicker for decision making during critical events making our disaster monitoring more efficient and accessible.

©IJRASET: All Rights are Reserved

ResQTrack links unprocessed, unrelevant disaster data with comprehensive information by using data from X, USGS, and GDACS. With its own data collection and the for mentioned data sources, ResQTrack is able to collate disaster data by type, location, scale and source. Users can visualize and analyze data via online maps and dashboards where they can analyze and gain insights into international disasters.

II. LITERATURE REVIEW

Recent research in disaster monitoring and early warning systems has become important in recent years because both natural and man-made disasters are growing. Many existing systems try to use social media data and machine learning techniques to detect disasters and understand what is happening in real time. Social media is useful because people share updates instantly, but the data is often unstructured and difficult to analyse directly. [1]. Some systems focus mainly on analysing text data from social media posts. These systems can identify disaster-related information and understand what people are talking about during an event. They are useful for detecting early signals, but they mostly depend only on text and do not combine multiple data sources such as official disaster APIs or geospatial data. [2]. Other approaches study how information spreads on social media during disasters. These systems help in understanding how quickly information reaches people and how awareness is built. While this is useful for analysing communication patterns, these approaches do not provide a complete solution for detecting and monitoring disasters in real time. [3]. There are also systems that use machine learning models to improve the accuracy of disaster detection. These models can identify patterns in large datasets and classify disaster-related information more effectively. However, they often require large amounts of training data and high computational power, which makes them difficult to use in real-time situations. [4]. Some research focuses on analysing the sentiment of social media posts to understand how people feel during disasters. This can help in estimating the severity of an event based on public reaction. But relying only on sentiment is not enough, as it does not always provide accurate information about the actual disasters. [5]. Other approaches try to improve data quality by detecting and removing false or misleading information, such as bot-generated content. This is important because incorrect data can affect the reliability of disaster monitoring systems. However, these methods mainly focus on filtering data and do not provide complete disaster analysis. [6]. Some research has integrated damage detection with cost estimation using rule-based methods, where severity levels are mapped to predefined repair costs. While these systems provide practical outputs, they lack adaptability to dynamic real-world repair costs [7]. There are also methods that use clustering and data mining techniques to group similar events together. These approaches help in identifying patterns and reducing duplicate information. However, they often lack proper visualization and do not provide a clear interface for users to understand the data easily. [8]. From the existing work, it can be observed that most systems focus on only one aspect, such as text analysis, sentiment analysis, or data filtering. Very few systems combine multiple features like real-time data collection, location mapping, event grouping, and visualization in a single platform. This shows the need for a more complete system that can handle all these aspects together and provide clear and useful information for disaster monitoring.

III. PROPOSED SYSTEM

The overall design of ResQTrack system is simple yet effective. The data passes through multiple stages before reaching the final output. Instead of processing everything at once, the system divides the process into 5 distinct steps, making it easier to manage and understand the clear purpose. These steps together form a complete pipeline that converts raw data into useful information. The process begins with data collection where the system gathers information from external sources such as APIs and the online disaster feeds happening across the world since the data format is often unstructured and may contain unnecessary details, it cannot be used directly. Therefore, a preprocessing stage where we take only the required content from the given image, post or the source

In the preprocessing stage, the system cleans the data by removing irrelevant content, duplicate entries and noisy images, this step is critical because raw data often contains extra information that does not contribute to identifying disasters. By filtering and organising the data, the system ensures that only meaningful information is retained for further analysis. Once the data is cleaned, our system removes all the noise and irrelevant information, and the system then moves to analysis stage where the disaster related information is identified and it is classified into natural disasters like earthquakes, floods and any other emergency events, while man-made disasters cover incidents like gas leaks, chemical hazards, industrial accidents and war conflicts. This also checks the severity levels that are categorised as high, medium and low at this stage. The system also focuses on extracting the location details.

Another important feature of ResQtrack is it's ability to extract the location details and convert the location data into the exact geographic coordinates, even when the information is missing. After the processing and the data analysis is finished, the final step is visualization. The processed data is now displayed through our dashboard which consists of a map-based interface, where users can

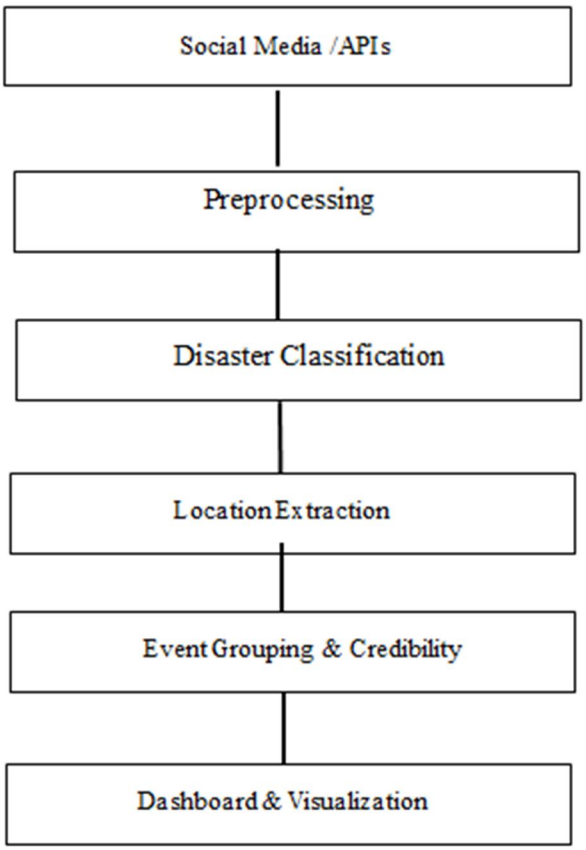
©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

easily view where the disasters are occurring, the number of incidents in specific regions and their severity levels. The system also presents how events are distributed across different regions, providing clear and flexible overview.

The visual representation improves decision-making and situational awarness. Additionally, the system is designed to be scalable and flexible, allowing future enhancements and integration of advanced techniques.

The results are displayed to the user through the interface, providing a clear and structured output.

Overall, ResQTrack mainly consists of five steps: data collection, data preprocessing, data analysis, location extraction, and data representation. These steps permit the conversion of disjointed, unstructured information associated with a disaster to logically flowed and detailed representation of the information. The outcomes of the steps are integrated into an interactive dashboard. The dashboard supports graphical and spatial representations. Consequently, the dashboard users can determine the location and the magnitude of the disaster of interest.



IV. IMPLEMENTATION

The ResQTrack system relies on web and real-time data technologies to create a system where information can be easily and quickly input, processed, stored, and output. ResQTrack focuses on creating a system in which information can be collected and processed through various sources and made available via an easily understandable and interactive output dashboard. Information pertaining to international disasters and alerts is acquired from USDGS and GDACS. Respectively, these agencies provide data on earthquakes and other geophysical events and international disasters and alerts. Once information is acquired, it is sent to the backend for further processing. The backend is written in Node.js and Express.js. It connects to various data sources, manages the database, and interacts with the frontend. In the backend, data is extracted based on the field names and organized in a structured format. Thus, data is processed in a standardized format, and the frontend is freed from the burden of processing and organizing data in various formats. Using the standardized format, the frontend makes requests for data through the backend and displays it on the dashboard.

MongoDB is used for storing disater management information like the type and Magnitude of disaster, when and where it happened, the source of information and the level of severity. The database facilitates retrieval and storage of information in a persistent manner. The information is collected by disaster management systems for further analysis and dissemination. The systems are able to capture and manage several disater events and present information on various channels.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

The frontend displays processed disaster information and is built using HTML, CSS and Javascript. Information is presented in the form of interactive maps. Each disaster event is represented by a marker. The visual representation of an event is done using different colors and sizes. Information presented to the user is based on the marker selected. Event information may include, but is not limited to, the event type and disaster severity. This system provides a better and organized way of presenting disaster information in comparison to other systems that use unstructured information and present raw API responses.

The representation of disaster events is further enhanced by the system's capabilities in location handling and event grouping. The system captures location information included in the input data and generates events in geographical locations. Event grouping is useful to show related events and avoids duplicate events. Disaster events are typically widespread and understanding their distribution helps response and prevention measures. With event grouping, the system can reduce the quantity of information presented to users and improve the relevance and adequacy of the information.

Based on user-generated input from social media, the system performs additional checks to verify the credibility of reports. User activity duration, and the number of incident reports made by a user are some of the additional checks performed to assess the level of trust in user-generated disaster incident reports. Overall, this enhancement provides means to handle user-generated content of varying levels of trust. This means that, in the final version, the system can be broken down into modular units of data collection and pre-processing, backend processing and storage, and data presentation. The modular design allows customization of various modules of the system. The designer can integrate modules for processing and storing other disaster data for various elements and extend the system for other disasters.

Table 1.1 External Data Sources

Source	Type of data	Purpose
USGS API	Earthquake data	Real-time seismic events
GDACS	Global disasters	Flood, cyclones, alerts

V. RESULTS AND DISCUSSION

ResQTrack was evaluated using actual disaster data streams. Real-time disaster data streams were used to build ResQTrack and were viewed in a variety of dashboards. Using the various dashboards, the system automatically identified and mapped disaster events including location, type, and severity of the disaster, time of the event and the data source. The results indicate that ResQTrack is capable of synthesizing data from a variety of sources, and placing the data into a structured format in order for disaster management personnel to understand the current status of international disasters.

Analytical representations of disaster events allow for identification of high disaster incident areas and varying levels of disaster incident severity. Use of the ResQTrack system removes the necessity to analyze unstructured and often voluminous disaster data. The system structures disaster data and retains the data in that format. ResQTrack supports disaster management and response personnel by providing situational awareness and pertinent information about a disaster.

While testing, it was observed that some regions with frequent seismic activity tend to show repeated disaster events. These patterns are clearly visible on the map and in the charts, helping to identify areas that are more prone to disasters, and precautions will be given. The system also groups similar events based on location and time, which prevents duplication of information and maintains data cleanliness.

Figure 5.1 Real-time global disaster map with live markers.

Figure 5.1 shows the global disaster map created by the ResQTrack system. Disaster maps, like any other type of map, show the spatial distribution of features. In this case, the map shows the locations of various types of disasters. Each disaster is represented by a symbol placed on the map at its location. This type of representation is helpful to rapidly identify the locations of various types of disasters. Higher disaster impact events are generally easier to identify when many events occur on a map. The type of representation used in the system being discussed allows identification of locations of a large number of events on a map. This type of representation is helpful in depicting the presence of numerous events in a particular geographic location.

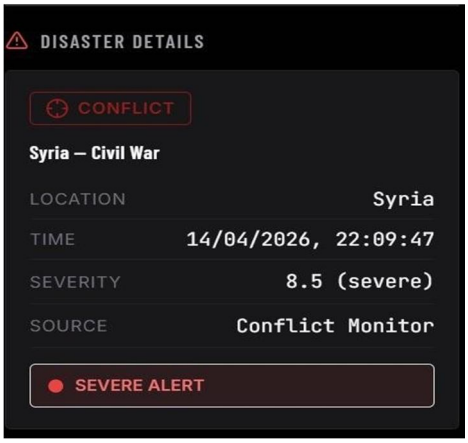


Figure 5.2: Disaster panel with type, location, time, severity, and source.

Figure 5.2 shows the information provided for a single disaster event. A variety of features for a particular disaster are integrated and provided in a single, unified view. The integrated features shown generally allow the user to understand major features of a disaster without looking at the raw data. The integrated view also allows users to understand the source of information for a particular disaster. Thus, features shown for a single disaster complement the geographic features shown on the world map.

Figure 5.3: Disaster charts for type, severity, and magnitude.

Figure 5.3. Charts in this representation summarize data collected on different disaster events, and facilitate comparisons based on type, severity, and magnitude. The represented data is Graphical, and as such, presents a comparison of an abundance of disaster events in a manner that is easier than representing each event separately. The representation of type of disaster provides a comparison of events of various disaster categories, while that of severity and magnitude represent the level of violence and intensity of events respectively. Some hidden trends in the represented dataset can be deduced by these visual representations. Though some datasets may be large to the extent that not all incidents can be displayed in a single representation, graphs facilitate presentation of incident data in a summarized format.

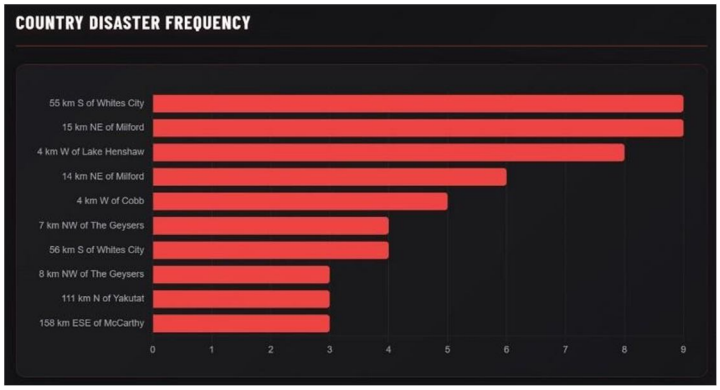


Figure 5.4 Country-wise disaster frequency map highlighting high-risk regions.

Figure 5.4 provides representation of disaster events recorded in different regions of the world. The focus of the representation is to provide a comparative picture of regions of the world where incident data is recorded the most. A representation of this nature facilitates analysis of data in a format different from that of the global incident map. It can assist in identifying regions in need of special focus.

Table 1.2 Disaster Severity Classification

Severity Level	Criteria	Example
Mild	Low impact, small area	Minor flood
Moderate	Medium impact	Cyclone warning
Severe	High damage	Earthquake 7+

Currently, the prototype performs consistently and demonstrates that it can be useful in practical scenarios. Overall, the result confirms that the system is capable of converting the live data into meaningful and easy-tounderstand information

The system updates continuously as new data is received from APIs. This ensures that the dashboard always reflects the latest situation, which is very important for realtime monitoring. Even though the system is currently a prototype, it performs consistently and shows strong potential for real-world applications.

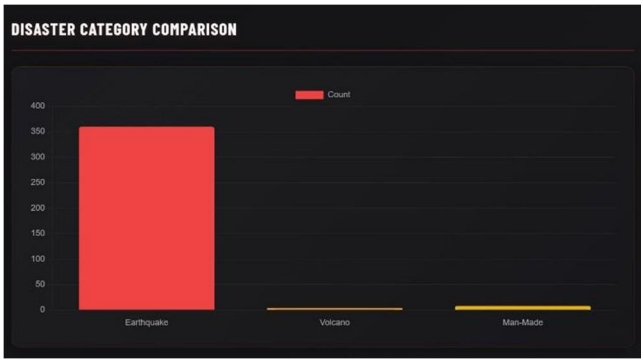


Figure 5.5: Comparison chart showing earthquakes dominating other disaster types.

Figure 5.5 illustrates how various types of disasters appear in the available data set. From this type of visualization, one can determine the relative sizes of various disaster types. For example, the chart may demonstrate that events caused by earthquakes comprise the largest portion of the data set. This type of visualization, coupled with the geographical representation, illustrates the type and frequency of events in a given area. It may also serve to reveal gaps in data.

Overall, ResQTrack, as designed, has the potential to synthesize information related to various events and transform it into structured data that can be represented visually for analysis. The global map offers geographic analysis. Event detail, at an analysis level, may be found in the ‘details pane’. Statistical analysis is available in the analytical charts. The integration of these tools adds flexibility in the analysis and presentation of data in a format beyond that of a traditional single representation. As designed, the software offers an analysis of potential events and integrates geographic representation to assist in the situational awareness of disaster-related data.

VI. CONSTRAINTS

The current version of ResQTrack is built around several external data providers, including X, USGS, and GDACS. Using these data providers limits the collection of real time information in a number of ways, for example, the availability of their APIs, their rate limiting, the data provider's authentication schemes, and changes to the service. The system also is only as good as the data provided by the sources. There are also constraints related to social media data. As with X posts, information provided by social media can be redundant, irrelevant, or contain incomplete, incorrect information. ResQTrack does preprocessing and ranking to organize available information.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

However, ResQTrack can not warrant the accuracy of user generated information. And, if the information does not contain location information, or the location information is imprecise, then situation situation mapping may also be inaccurate.

The current version of the system also constrains classification and evaluation of the severity of various types of disaster situations. Likewise, processing large volumes of situation reports may require additional, and different, computational resources. Although the system limits the volume of reports, it can process reports at real time. Enhancements to the system are expected to address the constraints and limitations of the current version.

VII. CONCLUSION

ResQTrack offers real-time disaster monitoring by showing raw data, computers analysing that data, and graphical representations of that analysis. This helps determine the location, type, and severity of discrete aspects of a disaster. Users can see disaster events by looking through structured data rather than searching unstructured data.

Turning disperse and unstructured data into structured data and visual representations is the primary goal of ResQTrack. One primary visualization component is an interactive map. Along with that, the visual representations help show what regions are affected by what kind of disasters. These components helps achieve the goal of the system.

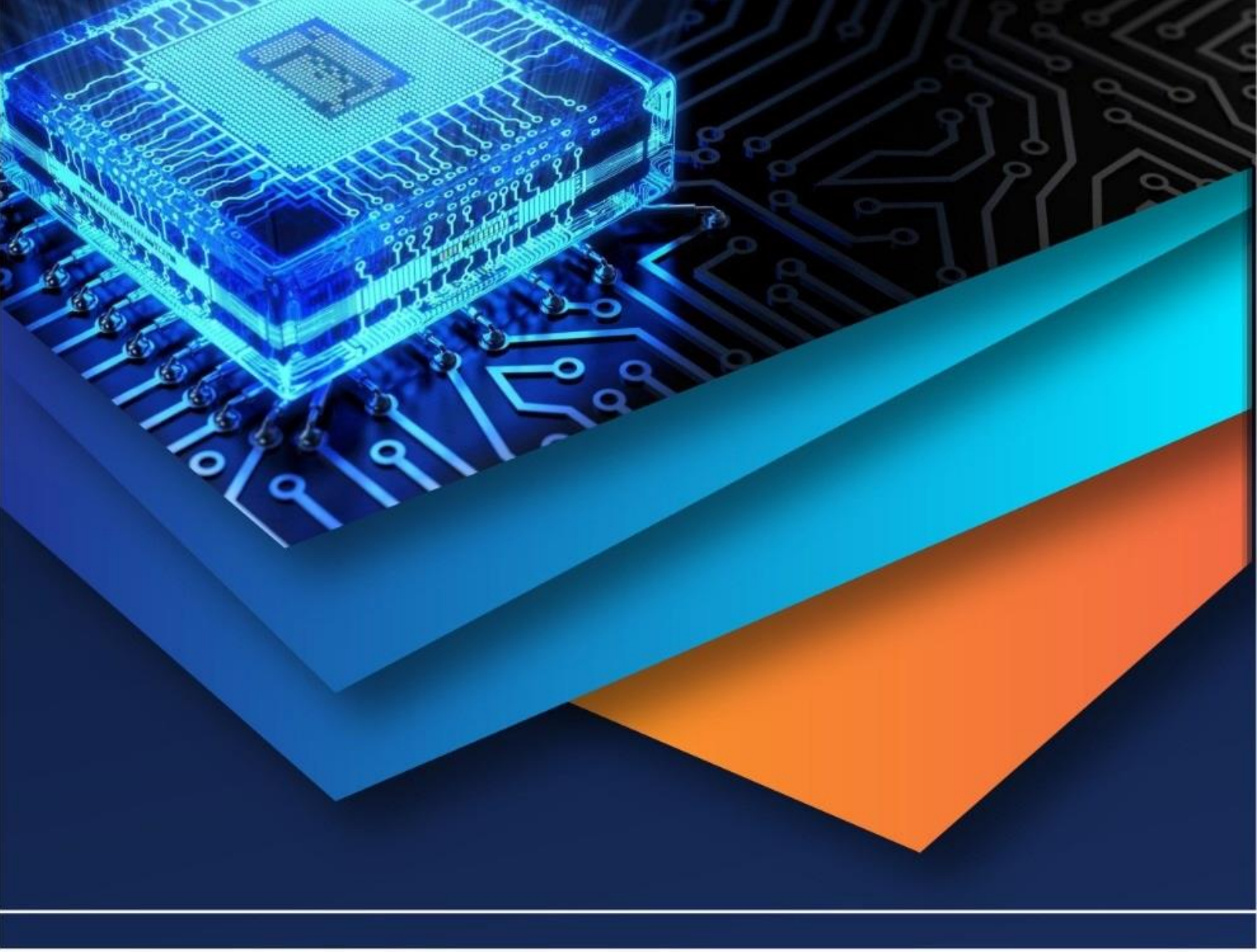
The core components and systems of ResQTrack can be altered and improved to provide different types of alerts (SMS for example), incorporate different artificial intelligence and machine learning (analysis systems), and gain data from different systems. Ultimately, ResQTrack is a system that has potential to integrate different visualized and structured data to help with disaster monitoring and situational awareness.

Overall, ResQTrack demonstrates the potential of integrating real-time disaster data with structured processing and visualization for improved situational awareness. With future enhancements such as advanced AI analysis and real-time alert mechanisms, the system can be further developed into a more comprehensive disaster-monitoring platform.

REFERENCES

[1] Awajan, I., Mohamad, M., and Al-Quran, A., Sentiment Analysis Technique and Neutrosophic Set Theory for Mining and Ranking Big Data from Online Reviews, 2021.
[2] GDACS, Global Disaster Alert and Coordination System, Available: https://www.gdacs.org
[3] Ilias, L., Kazelidis, I. M., and Askounis, D., Multimodal Detection of Bots on X (Twitter) Using Transformers, IEEE Access, 2024.
[4] Leaflet, Leaflet.js Interactive Maps Documentation, Available: https://leafletjs.com
[5] Momin, K. A., Sadri, A.M., Olofsson, K., Muraleetharan, K. K., and Hugh, Information Switching Patterns of Risk Communication in Social Media During Disasters, 2025.
[6] MongoDB Inc., MongoDB Documentation, Available: https://www.mongodb.com
[7] Node.js Foundation, Node.js Documentation, Available: https://nodejs.org
[8] OpenStreetMap Contributors, OpenStreetMap Data, Available: https://www.openstreetmap.org
[9] Sufi, F. K., and Khalil, I., Automated Disaster Monitoring from Social Media Posts Using AI-Based Location Intelligence and Sentiment Analysis, IEEE, 2024.
[10] USGS, United States Geological Survey Earthquake API, Available: https://earthquake.usgs.gov
[11] Vwarakanath, L., Kamsin, A., Rasheed, R. A., Anandhan, A., and Shuib, L., Automated Machine Learning Approaches for Emergency Response and Coordination via Social Media in the Aftermath of a Disaster: A Review, 2021

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)