

NATURAL DISASTERS INTENSITY ANALYSIS AND CLASSIFICATION USING ARTIFICIAL INTELLIGENCE

FUNCTIONAL AND NON FUNCTIONAL REQUIREMENTS

Functional Requirements

Upload Images

In this module, we can upload the image or videos dataset to the system. The CCTV footage is used to capture the natural disaster image, but it has an increasing range of time resolution and space. Additionally, the information is kept in a database for later use. The dataset includes symptoms of disaster such as Cyclone, Earthquake, Tsunami, Fire Accidents, and Flood. These disasters symptoms are preserved as image or video and acquired from the Kaggle website.

Noise Filtering

By using filter techniques to minimise noise in image or video frames, it is possible to identify the signs of a natural disaster. The filter's objective is to eliminate noise, which degrades the appearance of images. This claim is supported by statistics. The usual frequency response of a filter is built. To remove "salt and pepper" noise, image processing often uses the nonlinear approach of filtering. A median filter is preferred than convolution when edge preservation and noise reduction are the primary considerations. Similar to photo binarization practise, document picture binarization is a technique used in the pre-processing phase of document analysis to distinguish the text in the foreground from the background of the document. A speedy and accurate binarization strategy is needed for the following document image processing activities.

Classification

Classification is the process of dividing data into various categories. The method starts by determining the class of the given data points. Classification is achievable for both structured and unstructured data. The terms target, label, and classes are occasionally used to describe the classes. The frames captured by the CCTV footage will be compared to the trained dataset in the system database for the features obtained in the feature extraction stage in the classification process. The specific image will be recognised once the ideal match is discovered based on the symptoms matched. The detected disaster name with its type will be

displayed over the image. Here, a convolution neural network approach is employed to classify data.

Disaster Detection

The classification is the final step of the system. After analyzing the structure, each section individually evaluated for the probability of true positives. The CNN varies in how the convolutional and max pooling layers are realized and how the nets are trained. Finally classify the image regions using deep learning algorithm and improve the accuracy in classification. In this module, the system receives the image after the model has identified the disaster and extracts its types. And the responsive team will receive a warning message to protect the surrounding and alert people.

Alert System

The rapid growth of increasing the population and urbanization has led to the outbreak of disaster. Disaster is a natural hazard to the environment and the interference of the atmosphere system; the environment affects living organisms. In this module, send alert to the authority in terms of SMS at the time of fire detection. It can be useful to provide earlier detection.

Non - Functional Requirements

Usability

The system shall allow the users to access the system with pc using web application. The system uses a web application as an interface. The system is user friendly which makes the system easy

Availability

The system is available 100% for the user and is used 24 hrs a day and 365 days a year. The system shall be operational 24 hours a day and 7 days a week.

Scalability

Scalability is the measure of a system's ability to increase or decrease in performance and cost in response to changes in application and system processing demands.

Security

A security requirement is a statement of needed security functionality that ensures one of many different security properties of software is being satisfied.

Performance

The information is refreshed depending upon whether some updates have occurred or not in the application. The system shall respond to the member in not less than two seconds from the time of the request submittal. The system shall be allowed to take more time when doing large processing jobs. Responses to view information shall take no longer than 5 seconds to appear on the screen.

Reliability

The system has to be 100% reliable due to the importance of data and the damages that can be caused by incorrect or incomplete data. The system will run 7 days a week. 24 hours a day.