NATURAL DISASTER INTENSITY ANALYSIS AND CLASSIFICATION USING ARTIFICIAL INTELLIGENCE

Project Report

Submitted by

TEAM ID: PNT2022TMID10433

TEAM LEADER: SIKHA G JAYAN

TEAM MEMBER: SHILPA K P

TEAM MEMBER: SHINAS

TEAM MEMBER: VAISHNAV P

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 Project Overview

Natural disasters not only disturb the human ecological system but also destroy the properties and critical infrastructures of human societies and even lead to permanent change in the ecosystem. Disaster can be caused by naturally occurring events such as earthquakes, cyclones, floods, and wildfires. To tackle this problem, we developed a multilayered deep convolutional neural network model that classifies the natural disaster and tells the intensity of disaster of natural The model uses an integrated webcam to capture the video frame and the video frame is compared with the Pre- trained model and the type of disaster is identified and showcased on the OpenCV window.

1.2 Purpose

The purpose of this project to detect the natural disaster and reduce, or avoid, the potential losses from hazards, assure prompt and appropriate assistance to victims of disaster, and achieve rapid and effective recovery.

CHAPTER 2

LITERATURE SURVEY

1.Natural Disasters Intensity Analysis and Classification Based on Multispectral Images Using Multi-Layered Deep Convolutional Neural Network

Natural hazards pose significant risks throughout the world. They are among the deadliest disasters. These events cause significant economic damage as well, with losses from a large tropical cyclone impacting a developed nation approaching or, at times, exceeding U.S. $100 billion. Risk analysis is, in broad terms, a systematic process aimed at understanding the nature of risk in a given situation and expressing the risk together with the underlying knowledge base. The primary focus is on artificial intelligence, machine learning, and statistical methods. The proposed model works in two blocks: Block-I convolutional neural network (B-I CNN), for detection and occurrence of disasters, and Block convolutional neural network (B-II CNN), for classification of natural disaster intensity types with different filters and parameters.

2.Tropical Cyclone Intensity Estimation Using Multidimensional Convolutional Neural Network

From Multichannel Satellite Imagery

Tropical Cyclone is a severe storm that occurs over the tropical ocean. TC intensity is one of the key parameters for TC prediction and disaster prevention. Accurate estimation of TC intensity is important to theoretical research studies and practical applications.

Inspired by the success of deep learning technology in various fields, recent attempts for TC intensity estimation focus on designing effective convolutional neural network (CNN). We design a deep learning model, called 3DAttentionTCNet, which is inspired by Alex Net. Unlike Alex net, as the pooling layer compresses some important information resulting in the loss of some intensity features, we remove the pooling layers. In addition, we remove the dropout layer, the reason why we make this adjustment is that dropout regularization technology randomly removes some neurons during the training process. It has been confirmed that removing the dropout layer will cause negative deviations.

3.Designing Deep-Based Learning Flood Forecast Model With ConvLSTM Hybrid Algorithm

Early detection of natural disasters such as floods can greatly assist humans in reducing the extent of the damage caused by such events. In the Fiji Islands, where this study is focused, recent flood events resulted in major damages amounting to millions of dollars. The loss of at least 225 lives during the 1931 flood event in Fiji was primarily due to the unavailability of efficient flood warning systems. One simple, yet a robust mathematical tool used to determine the flood state at a particular time for a given area is the Flood Index (IF). A model is developed Develop multi-step predictive model using ConvLSTM, as an objective model, with alternative methods of LSTM, CNN-LSTM and SVR that can also determine the flood state.

4.A Conformal Regressor With Random Forests for Tropical Cyclone Intensity Estimation

Tropical Cyclone is an intense vortex system that originates over the tropical ocean and is one of the most destructive natural disasters. TC intensity usually refers to the maximum wind speed near the TC centre. TC intensity is an important indicator to quantify the destruction potential. The basic idea of using satellite data to estimate the intensity is that the cloud pattern strongly correlates with the TC Intensity in the image. It is considered an excellent way to extract features from satellite images to estimate TC intensity. The most common technique is the Dvorak technique. The Dvorak technique tried to estimate the TC intensity using visible or infrared images based on the cloud structure. Various machine learning models have also been applied to TC intensity estimation. Among them, the most widely used was the linear regression model. A multiple linear regression (MLR) model was constructed based on the extraction of the most significant signals and parameters from satellite infrared images

2.1 Problem Statement Definition

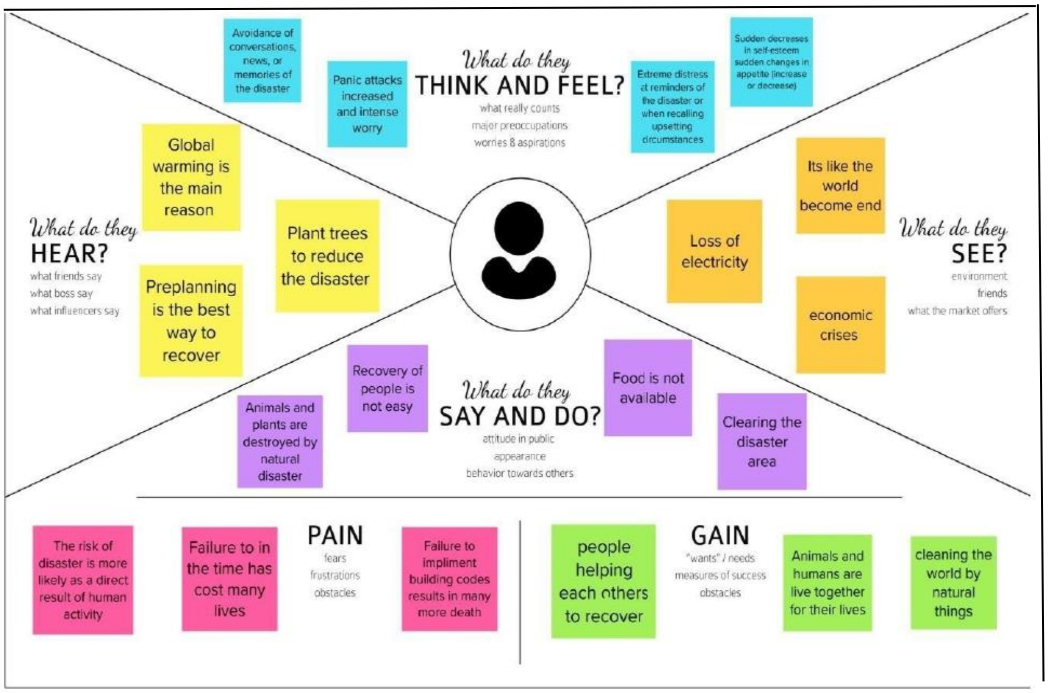
People needs a way to classify and analyse the natural disaster so that they can prevent themselves from losses due to the disaster and millions of lives.

People and animals are facing so many issues like loss of life, property, resources and deterioration of the air quality due to the natural disaster. So we need to analyse and detect natural disaster and protect them from such disaster.

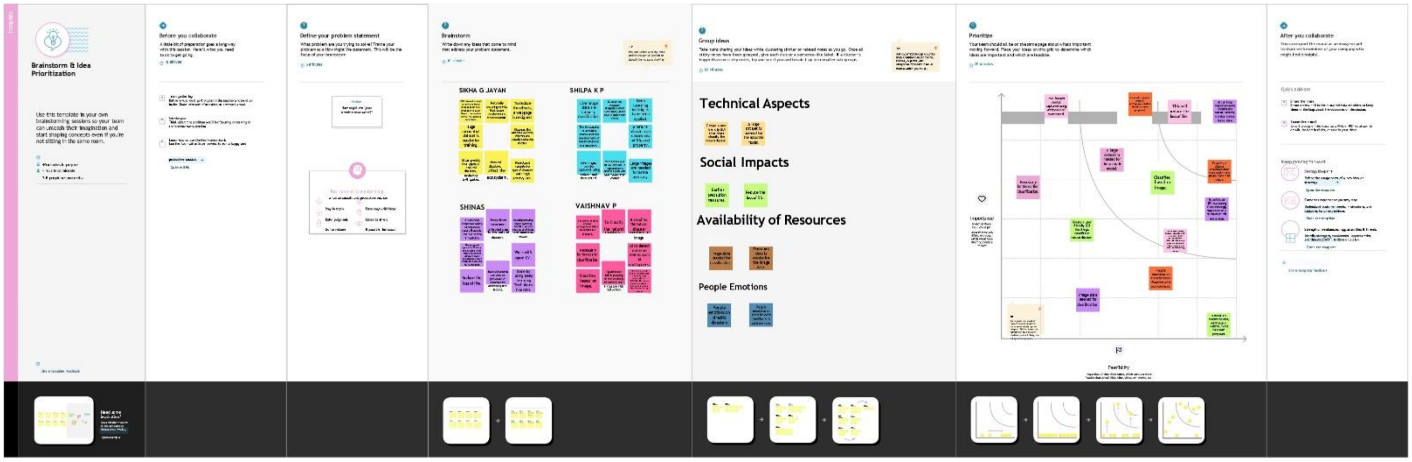
CHAPTER 3

IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas


Avoidance of conversations, news, or memories of the disaster
Panic attacks increased and intense worry
What do they THINK AND FEEL?
what really counts
major preoccupations
worries & aspirations
Extreme distress at reminders of the disaster or when recalling upsetting circumstances
Sudden decreases in self-esteem sudden changes in appetite (increase or decrease)
Global warming is the main reason
What do they HEAR?
what friends say
what boss say
what influencers say
Plant trees to reduce the disaster
Preplanning is the best way to recover
Its like the world become end
Loss of electricity
What do they SEE?
environment
friends
what the market offers
economic crises
Recovery of people is not easy
Animals and plants are destroyed by natural disaster
What do they SAY AND DO?
attitude in public
appearance
behavior towards others
Food is not available
Clearing the disaster area
The risk of disaster is more likely as a direct result of human activity
Failure to in the time has cost many lives
PAIN
fears
frustrations
obstacles
Failure to impliment building codes results in many more death
people helping each others to recover
GAIN
"wants" / needs
measures of success
obstacles
Animals and humans are live together for their lives
cleaning the world by natural things

3.2 Ideation & Brainstorming



Brainstorm & Idea Prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

Brainstorm

Write down any ideas that come to mind that address your problem statement.

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

Importance
Feasibility
This will reduce the loss of life.
Classifies based on image.
Image data needed for classification

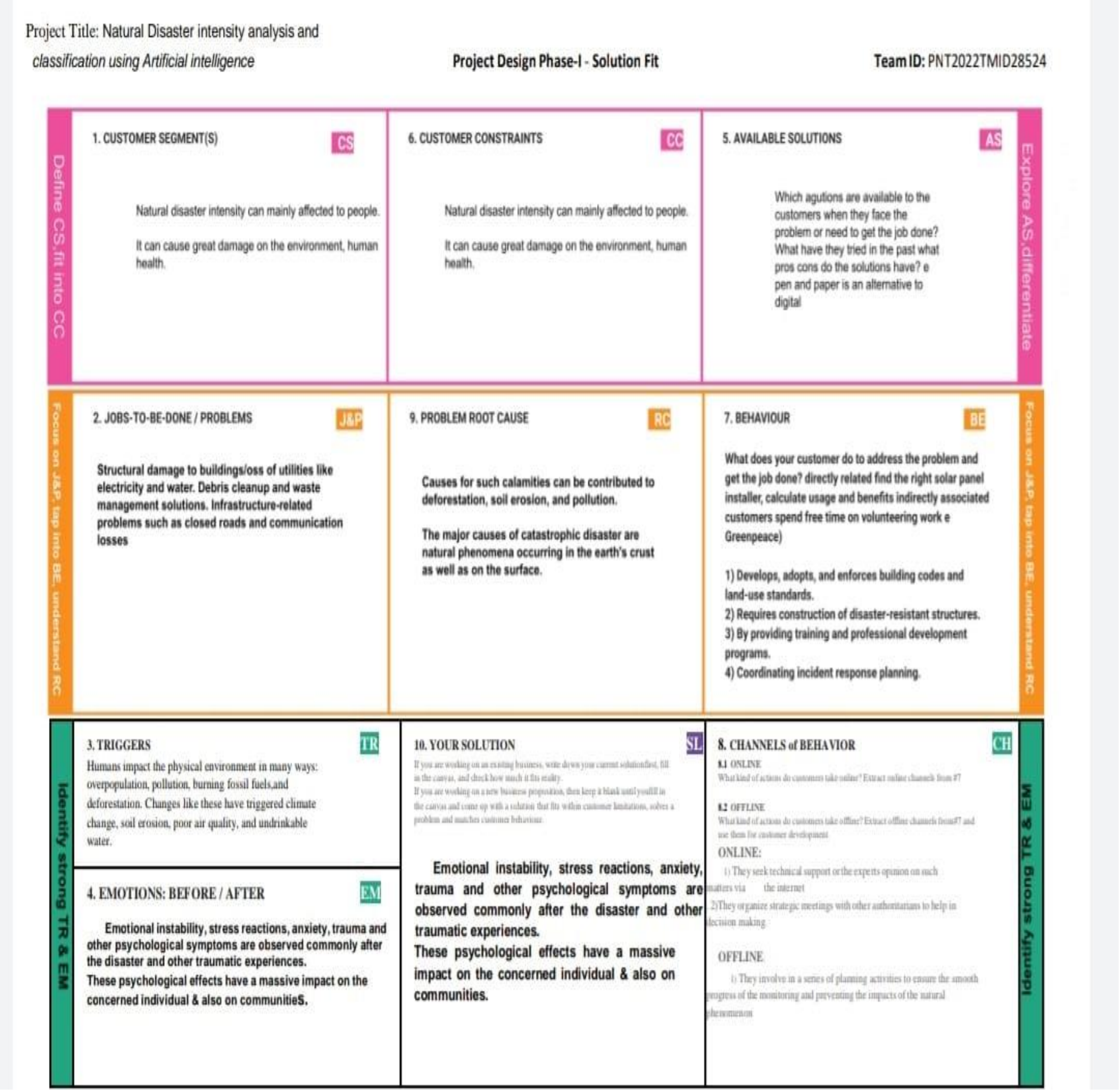
After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

3.3 Proposed solution

S. No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	People needs a way to classify and analyse the Disaster priorly so that they can protect themselves from losses due to the Disaster and Millions of Lives.,
2.	Idea/Solution description	This project uses Multi-layered Deep Convolutional Neural Network (pre-trained) model to classify Natural Disaster and calculate the intensity of the Disaster.
3.	Novelty/Uniqueness	To reduce the issues due to imbalance structure of images, the model uses an integrated webcam to capture the video frame and test data is compared with pretrained data.
4.	Social impact/Customer Satisfaction	By the Application, economic damage caused by Disaster can be reduced. Detection of Natural Disaster will become easier while using videos in Deep CNN instead of images.
5.	Business Model (Revenue Model)	Multi-layered Deep Convolutional Neural Network Model.
6.	Scalability of the Solution	Highly expandible, dependable, reliable, scalable and has robustness.

3.4 Problem Solution Fit



Project Title: Natural Disaster intensity analysis and *classification using Artificial intelligence*

Project Design Phase-I - Solution Fit

Team ID: PNT2022TMID28524

Define CS, fit into CC

1. CUSTOMER SEGMENT(S) CS

Natural disaster intensity can mainly affected to people.

It can cause great damage on the environment, human health.

6. CUSTOMER CONSTRAINTS CC

Natural disaster intensity can mainly affected to people.

It can cause great damage on the environment, human health.

5. AVAILABLE SOLUTIONS AS

Which agutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past what pros cons do the solutions have? e pen and paper is an alternative to digital

Explore AS, differentiate

Focus on J&P, tap into BE, understand RC

2. JOBS-TO-BE-DONE / PROBLEMS J&P

Structural damage to buildings/oss of utilities like electricity and water. Debris cleanup and waste management solutions. Infrastructure-related problems such as closed roads and communication losses

9. PROBLEM ROOT CAUSE RC

Causes for such calamities can be contributed to deforestation, soil erosion, and pollution.

The major causes of catastrophic disaster are natural phenomena occurring in the earth's crust as well as on the surface.

7. BEHAVIOUR BE

What does your customer do to address the problem and get the job done? directly related find the right solar panel installer, calculate usage and benefits indirectly associated customers spend free time on volunteering work e Greenpeace)

1) Develops, adopts, and enforces building codes and land-use standards.
2) Requires construction of disaster-resistant structures.
3) By providing training and professional development programs.
4) Coordinating incident response planning.

Focus on J&P, tap into BE, understand RC

Identify strong TR & EM

3. TRIGGERS TR

Humans impact the physical environment in many ways: overpopulation, pollution, burning fossil fuels,and deforestation. Changes like these have triggered climate change, soil erosion, poor air quality, and undrinkable water.

4. EMOTIONS: BEFORE / AFTER EM

Emotional instability, stress reactions, anxiety, trauma and other psychological symptoms are observed commonly after the disaster and other traumatic experiences.
These psychological effects have a massive impact on the concerned individual & also on communitieS.

10. YOUR SOLUTION SL

If you are working on an existing business, write down your current solutionfirst, fill in the canvas, and check how much it fits reality.
If you are working on a new business proposition, then keep it blank until youfill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.

Emotional instability, stress reactions, anxiety, trauma and other psychological symptoms are observed commonly after the disaster and other traumatic experiences.
These psychological effects have a massive impact on the concerned individual & also on communities.

8. CHANNELS of BEHAVIOR CH

8.1 ONLINE
What kind of actions do customers take online? Extract online channels from #7

8.2 OFFLINE
What kind of actions do customers take offline? Extract offline channels from#7 and use them for customer development

ONLINE:

1) They seek technical support or the experts opinion on such matters via the internet
2)They organize strategic meetings with other authoritarians to help in decision making

OFFLINE

1) They involve in a series of planning activities to ensure the smooth progress of the monitoring and preventing the impacts of the natural phenomenon

Identify strong TR & EM

CHAPTER 4

REQUIREMENT ANALYSIS

4.1 Functional Requirement

FR No.	**Functional Requirement(Epic)**	**Sub Requirement (Story / Sub-Task)**
FR-1	Request Permission	Access permission from web camera.
FR-2	Disaster Detection	Based on the webcam image, natural disaster isclassified.
FR-3	Accuracy	Since the training and testing images are huge, theaccuracy is higher.
FR-4	Speed	The generation of results from the input imagesare faster.
FR-5	Resolution	The resolution of the integrated web camerashould be high enoughto capture the video frames.
FR-6	User Interface	Maximizing the interaction in Web DesigningService.

4.2 Non-Functional Requirement

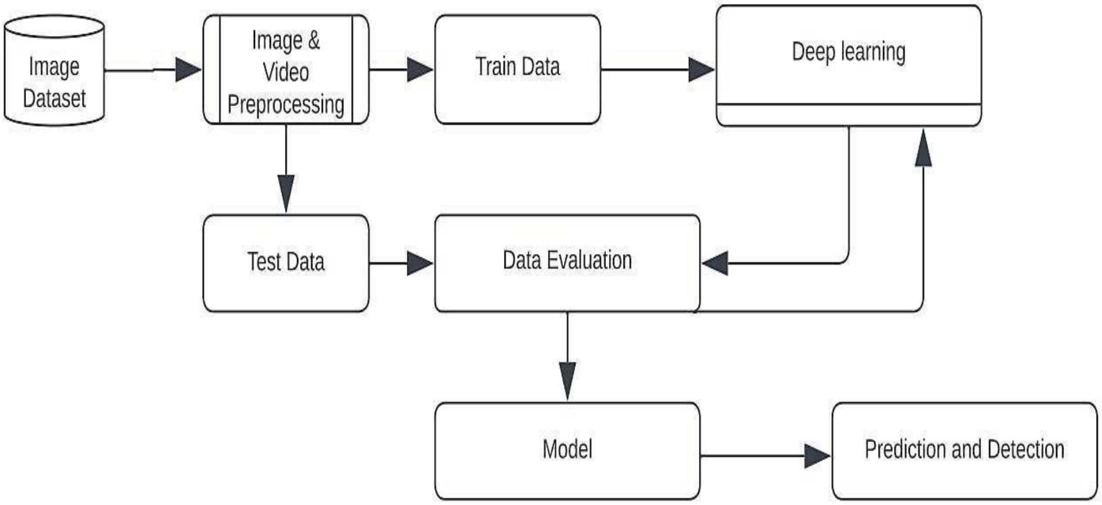
NFR. No.	Non-Functional Requirement	Description
NFR-1	Usability	User friendly and classify the disaster easily.
NFR-2	Security	The modelis secure due to the cloud deploymentmodels and also thereis no login issue.
NFR-3	Reliability	Accurate prediction of the natural disaster and thewebsite can also be fault tolerant.
NFR-4	Performance	It is shown thatthe model givesalmost 95 percentaccuracy after continuous training.
NFR-5	Availability	The website will be made available for 24 hours.
NFR-6	Scalability	The website can run on web browsers like Googlechrome, Microsoft edge and also it can be extended to the NDRFand customers.

CHAPTER 5

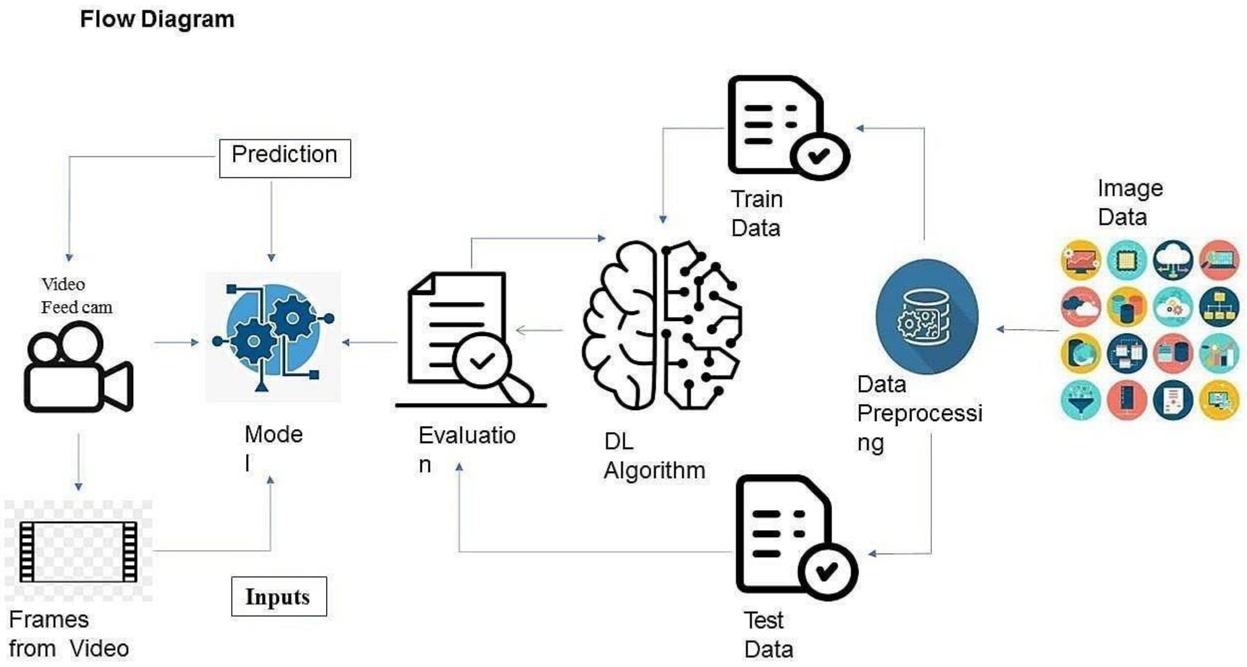
PROJECT DESIGN

5.2 Data Flow Diagrams

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data to be enter and leaves the system, what changes the information, and where data is stored.



Flow Diagram



5.2 Solution & Technical Architecture

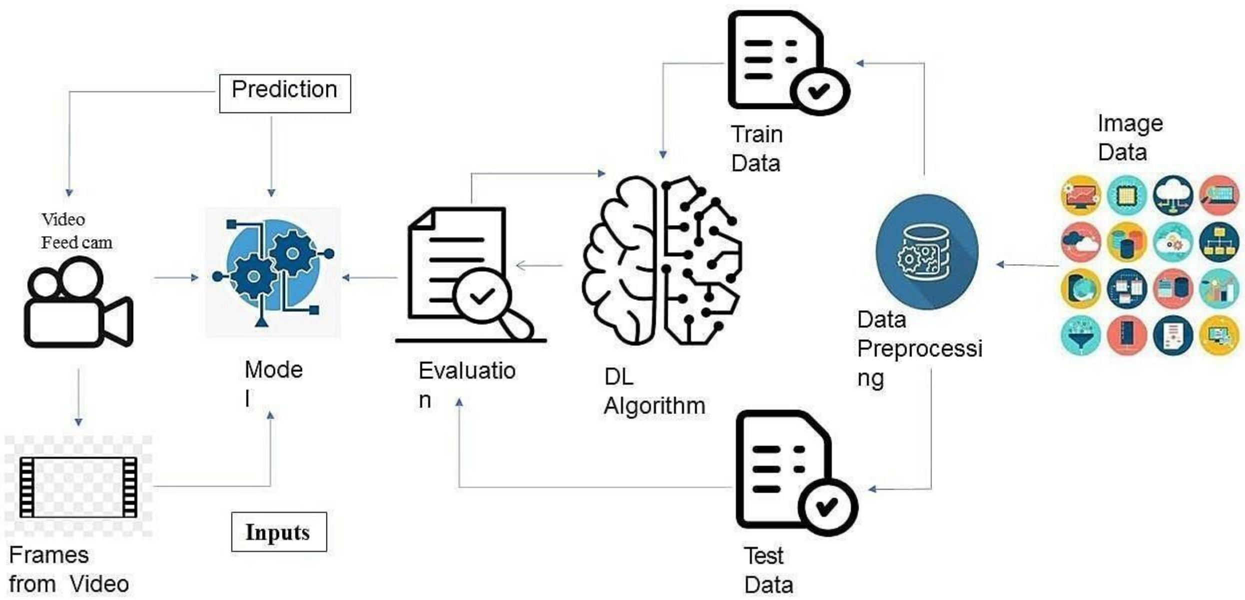
Solution Architecture

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

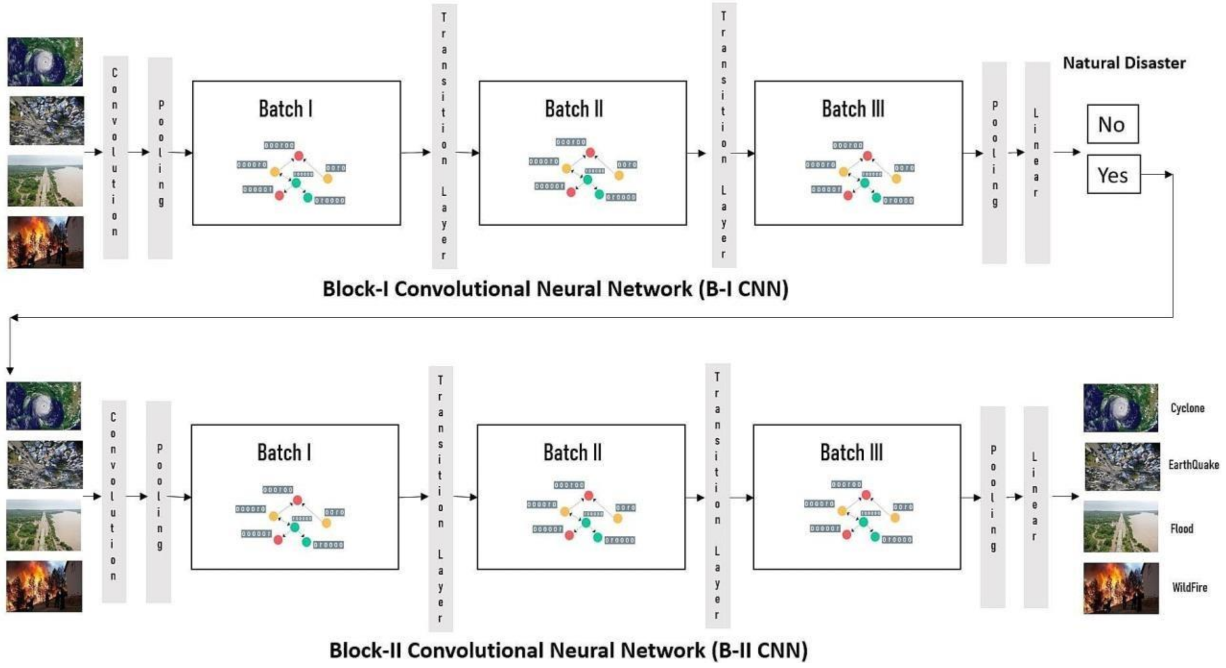
- Find the best tech solution to solve existing business problems.
- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.
- Define features, development phases, and solution requirements.
- Provide specifications according to which the solution is defined, managed, and delivered.

Solution Architecture Diagram

Flow Diagram



Technical Architecture



Components &Technologies:

S.No	Component	Description	Technology
1.	User Interface	User interacts with application for the detection of any Natural disaster’s intensity and classifywhich happened just before.	HTML, CSS, JavaScript, Django, Python.
3.	Disaster Detection	This functionis used to detect, outcomesfrom the new trained data to performnew tasks andsolve new problems.	Decision trees,Regression, Convolutional Neural networks.
4.	Evaluation system	It monitors that how Algorithm performs on data as well as during training.	Chi-Square, Confusion Matrix, etc.
5.	Input data	To interactwith our model and give it problems to solve.Usually this takesthe form of an API, auserinterface, or a command-line interface.	Application programming interface, etc.

6.	Data collectionunit	Data is only usefulif it’s accessible, so it needsto be stored ideally in a consistent structureand conveniently in one place.	IBM Cloud,SQL Server.
7.	Database management system	An organized collection of data stored in database,so that it can be easily accessed and managed.	MySQL, DynamoDB etc.

Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	An open source framework is a template for software development that is designed by a social network of software developers. These frameworks are free for public use and provide the foundation for building a software application.	Keras, Tensorflow.
2.	Authentication	This keepsour models secureand makes sureonly those who have permission can use them.	Encryption and Decryption (OTP).

3.	Application interface	User uses mobile application and web applicationto interact withmodel	Web Development (HTML,CSS)
4.	Availability (both Online and Offline work)	Its include both online and offline work. As goodinternet connection is need for online work to explore the software perfectly. Offline work includes thesaved data to explore for later time.	Caching, backend server.
5.	Regular Updates	Thetruly excellent software product needs a continuous processof improvements and updates. Maintain your server andmake sure thatyour content is always up-to-date. Regularly update an app and enrich it with new features.	Waterfall Approach, Incremental Approach, Spiral Approach
6.	Personalization	Software has features like flexible fonts, backgrounds, settings, colour themes, etc. whichmake a software interface looks good and functional.	• CSS

5.3 User Stories

Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria
Collection of dataset	USN-1	As a user, I can collect the dataset for monitoring and analyzing.	Enough data collected for training Model.
Home Page	USN-2	As a user, I want to know to about the basics of frequently occurring Disasters.	I can get the idea about the Application.
Intro page	USN-3	As a user, I want to about the introduction of Disaster in particular areas.	I can get idea about the disaster and where it occurs.
Open webcam	USN-4	As a user, I adapt with the webcam to analyze and classify the Disaster from video capturing	I can capture a video or image of particular disaster to analyze and classify.
Analysis of required phenomenon	USN-5	As a user, I can regulate certain factors influencing the action and report on past event analysis.	Model should be easy to use & working fine from the web app.

Algorithm selection	USN-6	As a user, I can choose the required algorithm for specific analysis.	Selection must give the better accuracy and better output.
Training and Testing	USN-7	As a user, I can train and test the model using the algorithm.	Training the model to classify and analyze the intensity
Detection and analysis of data	USN-8	As a user, I can detect and visualize the data effectively.	I can capture a video or image of particular disaster to analyze and detect.
Model building	USN-9	As a user I can build with the web application	Model should be predicting occurrence of the disaster and intensity level of disaster.
Integrate the web app with the AI Model	USN-10	As a user, I can use Flask app to use model easily through web app.	Model should be easy touse and working fine from the web app.
Model deployment	USN-11	As an administrator, I can deploy the AI model in IBM Cloud.	Model’s prediction should be available for users to make decision.

CHAPTER 6

PROJECT PLANNING & SCHEDULING

6.1 Sprint planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points
Sprint-1	Collection of Dataset	USN-1	As a user, I can collect the dataset for monitoring and analysing.	5
Sprint-1	Home page	USN-2	As a user, I want to know to about the basics of frequently occurring Disasters.	5
Sprint-1	Intro page	USN-3	As a user, I want to about the introduction of Disaster in particular areas.	5
Sprint-1	Open webcam	USN-4	As a user, I adapt with the webcam to analyse and classify the Disaster from video capturing.	5
Sprint-2	Analysis of required phenomenon	USN-5	As a user, I can regulate certain factors influencing the action and report on past event analysis.	5

Sprint-2	Algorithm selection	USN-6	As a user, I can choose the required Algorithm for specific analysis.	5
Sprint-2	Training and Testing	USN-7	As a user, I can train and test the model using the algorithm.	10
Sprint-3	Detection and analysis of data	USN-8	As a user, I can detect and visualise the data effectively.	10
Sprint-3	Model building	USN-9	As a user, I can build with the web application.	10
Sprint-4	Integrate the web app with the AI model	USN-11	As a user, I can use Flask app to use model easily through web app.	10
Sprint-4	Model deployment	USN-12	As an administrator, I can deploy the AI model in IBM Cloud.	10

6.2 Sprint Delivery schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	20	19 Nov 2022

6.3 Reports from Jira

Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let’s calculate the team’s average velocity (AV) per iteration unit (story points per day)

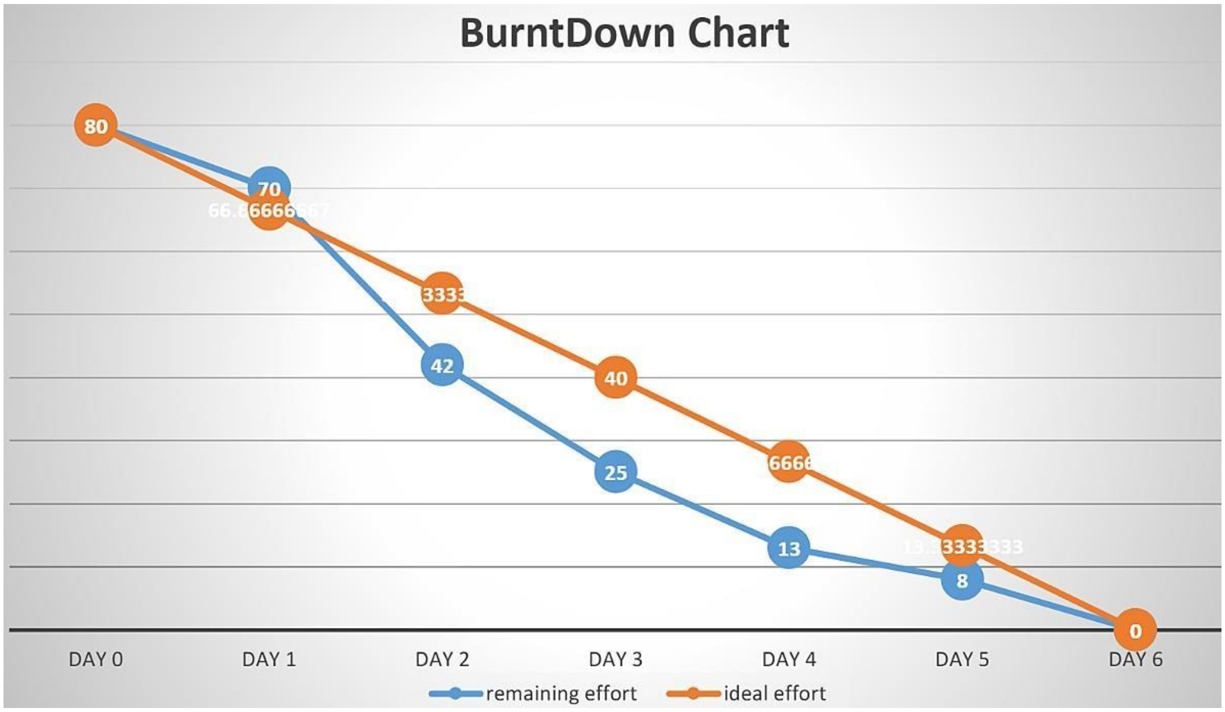
Average velocity = Sprint duration / velocity

=20/6

=3

Burndown Chart:

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.



CHAPTER 7

CODING & SOLUTIONING

7.1 Feature 1

The project focuses on the analysis of intensity of Disaster for giving precautionary measures for the people living in the Danger zone.

It focuses on classifying the type of Disaster which oftenly occurs in that particular zone.

7.2 Feature 2

The accuracy of the project is improved more better than the previously submitted models.

The accuracy is improved by training and testing more images in the dataset.

CHAPTER 8
TESTING

8.1 Test cases

Test Case ID	Component	Test Scenario	Expected Result	Actual Result	Status
TC_001	Home Page	Verify user is able to see the Home page	Home page should display	Working as expected	Pass
TC_002	Home Page	Verify the UI elements in Home page	Application should show below UI elements: Home page button Intro page button Open webcam button	Working as expected	Pass
TC_003	Home Page	Verify user is able to see the cards about Disaster	Application should show the cards about Disaster.	Working as expected	Pass
TC_004	Home Page	Verify user is able to navigate to the required page	Application should navigate to the Intro page	Working as expected	Pass
TC_005	Intro Page	Verify user is able to see the Intro page	Intro page should display	Working as expected	Pass
TC_006	Intro Page	Verify the UI elementsin Intro page	Application should show below UI elements: Home page Intro page Open webcam button	Working as expected	Pass

TC_007	Intro Page	Verify the user is able to see the introduction of the Disaster	Application should show the sentences about the Disaster	Working as expected	Pass
TC_008	Intro Page	Verify user is able to navigate to the required page	Application should navigate to the Open webcam page	Working as expected	Pass
TC_009	Webcam page	Verify user is able to see the webcam page	Webcam page is displayed	Working as expected	Pass
TC_010	Webcam page	Verify the Emergency pull button is visible while the webcam is not connected	Application should show below UI elements: a. Emergency pull button	Working as expected	Pass
TC_011	Webcam page	Verify user is able to see the outputwindow	Application should detect the type of Disaster from the real time video	Working as expected	Pass

8.2 User Acceptance Testing

It is to briefly explain the test coverage and open issues of the natural disasters intensity analysis and classification using artificial intelligence project at the time of the release to User Acceptance Testing (UAT).

Defect Analysis:

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	**Severity 1**	**Severity 2**	**Severity 3**	**Severity 4**	**Subtotal**
By Design	1	0	0	2	3
Duplicate	1	0	0	0	1
External	0	0	0	0	0
Fixed	1	0	0	2	3
Not Reproduce	0	0	0	0	0
Skipped	0	0	0	1	1
Won't Fix	0	0	0	0	0
Totals	3	0	0	5	8

Test Case Analysis:

This report shows the number of test cases that have passed, failed, and untested.

Section	Test Cases	Not Tested	Fail	Pass
Home Page	4	0	0	4
Intro Page	4	0	0	4
Open Webcam	3	0	0	3

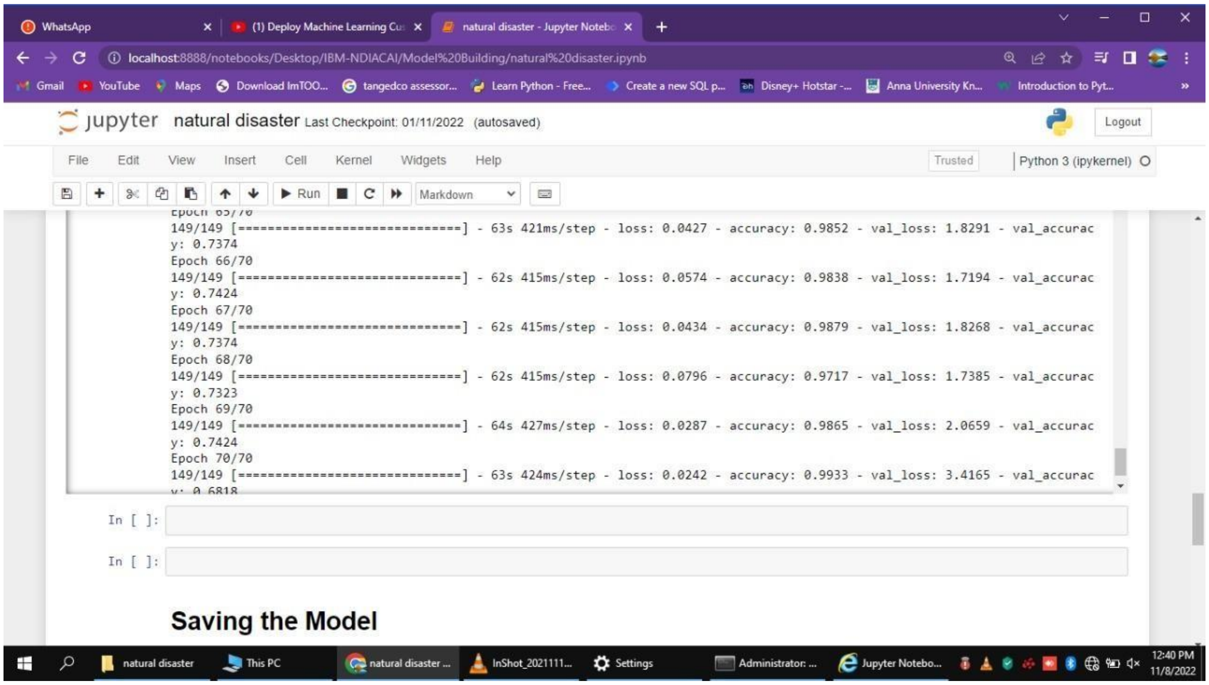
CHAPTER 9

RESULTS

9.1 Performance Metrics

The nature disaster intensity analysis and classification with test data and train data has been executed successfully. The model has been trained over 1000+ images and the model have an accuracy of nearly 99% and the model has been testedwiththe data which is separate from the trained data and has predicted the data well.

Output of application

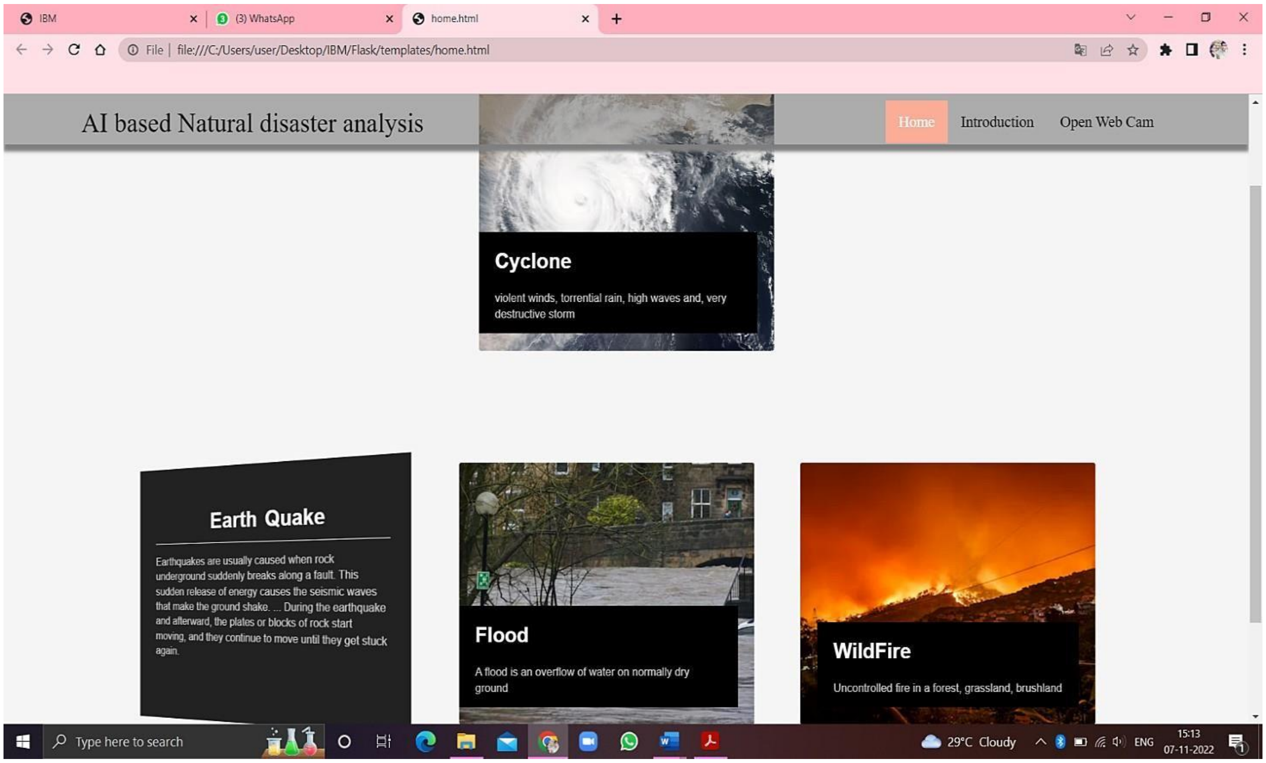


```
149/149 [==============================] - 63s 421ms/step - loss: 0.0427 - accuracy: 0.9852 - val_loss: 1.8291 - val_accurac
y: 0.7374
Epoch 66/70
149/149 [==============================] - 62s 415ms/step - loss: 0.0574 - accuracy: 0.9838 - val_loss: 1.7194 - val_accurac
y: 0.7424
Epoch 67/70
149/149 [==============================] - 62s 415ms/step - loss: 0.0434 - accuracy: 0.9879 - val_loss: 1.8268 - val_accurac
y: 0.7374
Epoch 68/70
149/149 [==============================] - 62s 415ms/step - loss: 0.0796 - accuracy: 0.9717 - val_loss: 1.7385 - val_accurac
y: 0.7323
Epoch 69/70
149/149 [==============================] - 64s 427ms/step - loss: 0.0287 - accuracy: 0.9865 - val_loss: 2.0659 - val_accurac
y: 0.7424
Epoch 70/70
149/149 [==============================] - 63s 424ms/step - loss: 0.0242 - accuracy: 0.9933 - val_loss: 3.4165 - val_accurac
y: 0.6818
```

```
In [ ]:

In [ ]:
```

Saving the Model

HOME PAGE


IBM
(3) WhatsApp
home.html
File | file:///C:/Users/user/Desktop/IBM/Flask/templates/home.html
AI based Natural disaster analysis
Home
Introduction
Open Web Cam
Type here to search
29°C Cloudy
ENG
15:13
07-11-2022

Cyclone

violent winds, torrential rain, high waves and, very destructive storm

Earth Quake

Earthquakes are usually caused when rock underground suddenly breaks along a fault. This sudden release of energy causes the seismic waves that make the ground shake. ... During the earthquake and afterward, the plates or blocks of rock start moving, and they continue to move until they get stuck again.

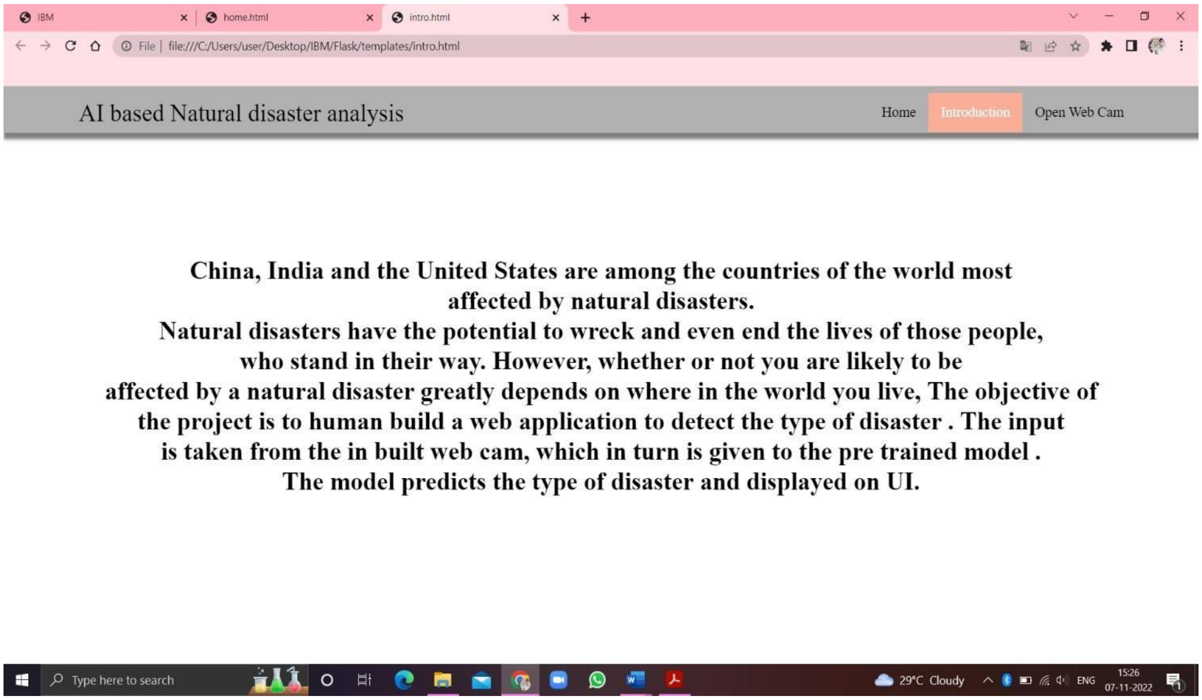
Flood

A flood is an overflow of water on normally dry ground

WildFire

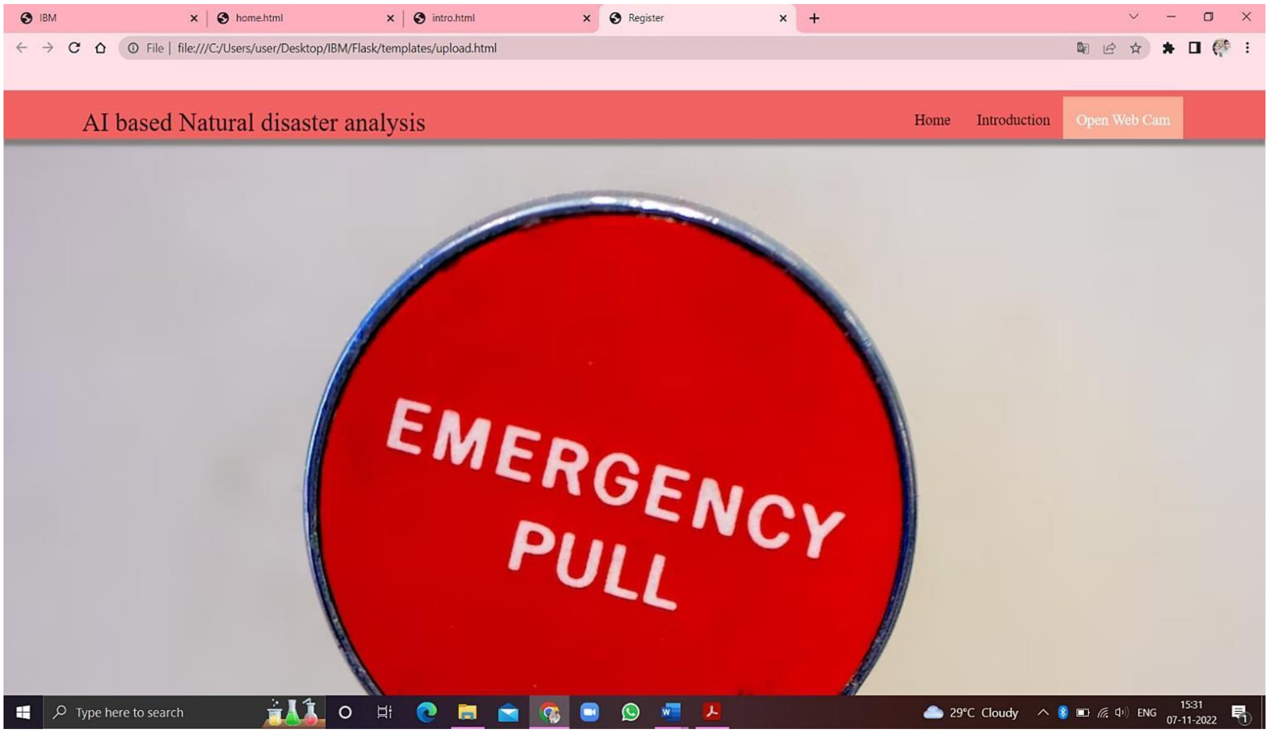
Uncontrolled fire in a forest, grassland, brushland

INTRODUCTION PAGE

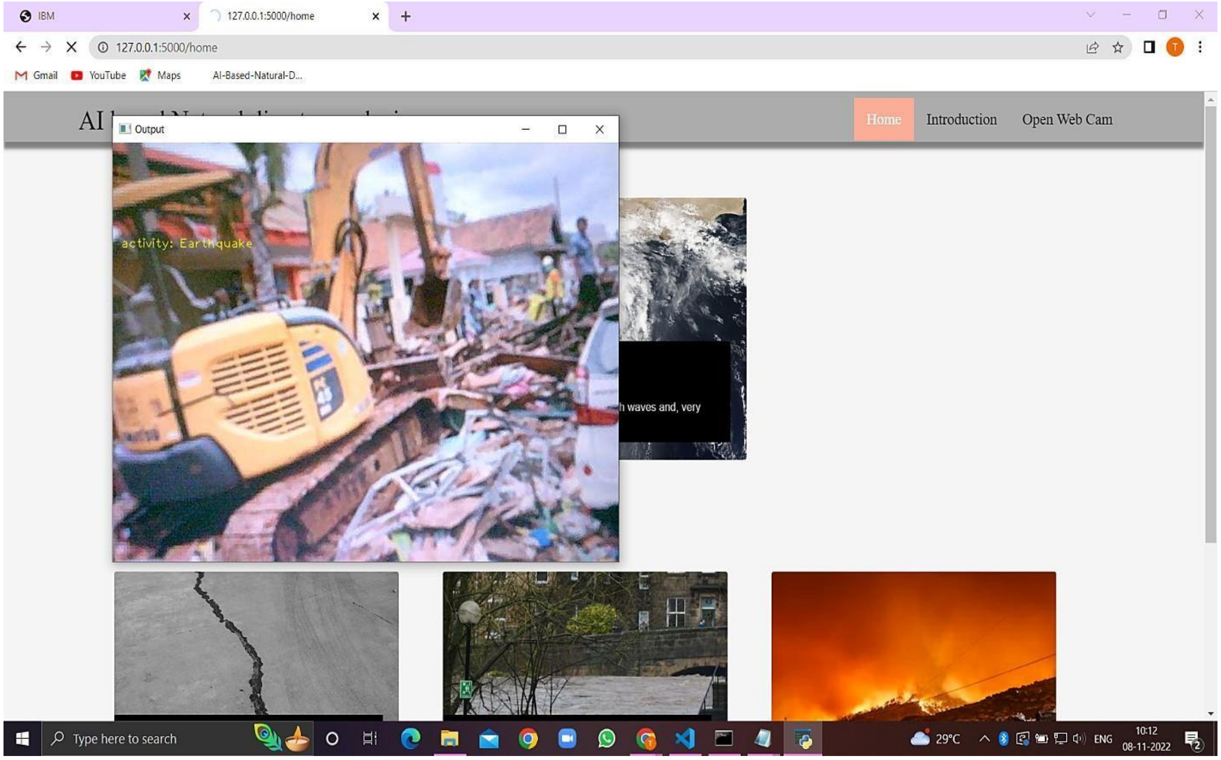

IBM
home.html
intro.html
File | file:///C:/Users/user/Desktop/IBM/Flask/templates/intro.html
AI based Natural disaster analysis
Home
Introduction
Open Web Cam
Type here to search
29°C Cloudy
ENG
15:26
07-11-2022

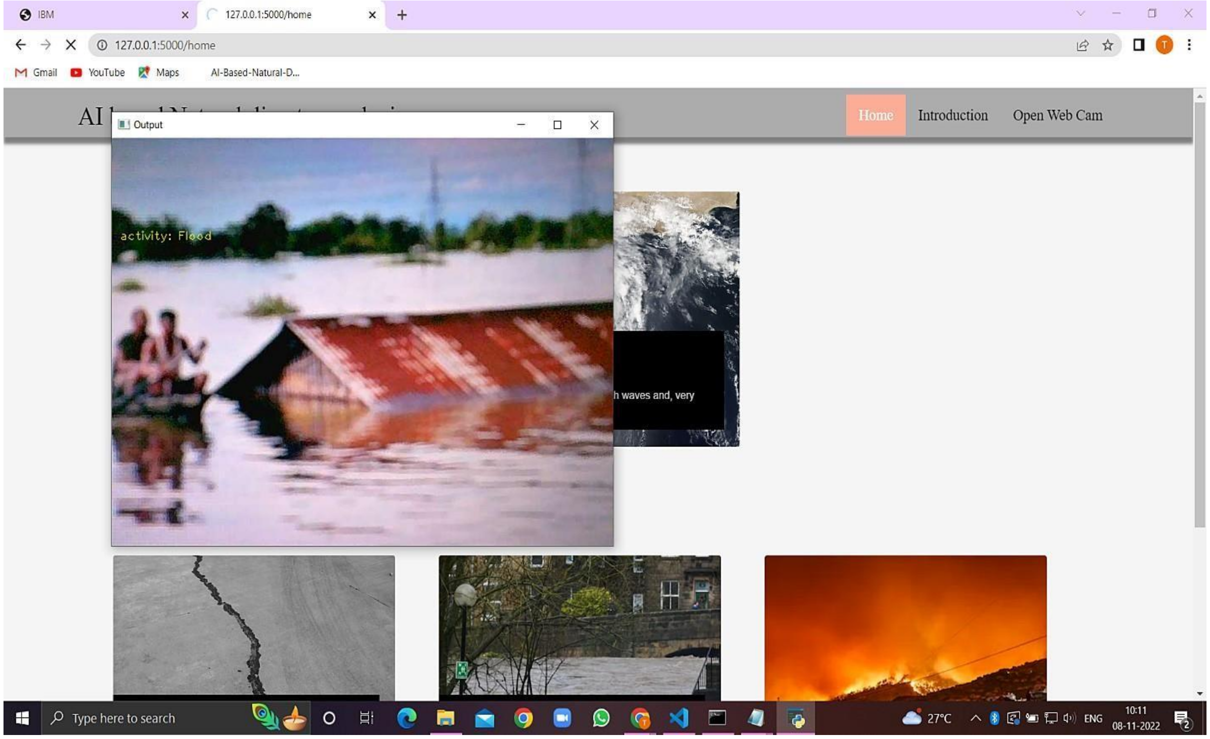
China, India and the United States are among the countries of the world most affected by natural disasters.
Natural disasters have the potential to wreck and even end the lives of those people, who stand in their way. However, whether or not you are likely to be affected by a natural disaster greatly depends on where in the world you live, The objective of the project is to human build a web application to detect the type of disaster . The input is taken from the in built web cam, which in turn is given to the pre trained model . The model predicts the type of disaster and displayed on UI.

WEB CAM



DETECTION OF NATURE DISASTER





```
activity: Flood
```

CHAPTER 10

ADVANTAGES & DISADVANTAGES

ADVANTAGES

1. The proposed model will be used as a real time natural disaster detection model and provide some upcoming predictions for future disasters.
2. The model is to detect and classify the type of disaster and The model have a high accuracy rate (99.33).
3. The model was used to prevent natural disasters in the future and model can be used to predict future disasters and take some action against heavy loss of human ecological systems and property.
4. The proposed system helps to reduce the impact of hazards occur during natural disaster. This provides an efficient way to warn and educate people about disaster prone areas.
5. It will help us be prepared in times of disaster

DISADVANTAGES

1. The resultant model unable to validate the model performance under uncontrolled conditions.
2. The model cannot be used for various natural disaster

CHAPTER 11

CONCLUSION

It focused how image from given dataset (trained dataset) in field and past data set used predict the pattern of different nature disaster using CNN model. In the system had applied different type of CNN compared the accuracy. The natural disaster in Indonesia frequently happened, due to the geographical position of the country. Thus, natural disasters mostly occurred as an impact of the natural condition. However, the weather and climate condition has also influenced and triggered the disasters.

CHAPTER 12

FUTURE SCOPE

In the future, the research will be continued to obtain the data from all over the country, not only west java province, and with the use of more complete analysis, so that the government or related institution could make a better anticipation work as a mitigation effort.

CHAPTER 13

APPENDIX

Source Code

home.html:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Home Page</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">
  <link href="https://fonts.googleapis.com/css?family=Montserrat" rel="stylesheet" type="text/css">
  <link href="https://fonts.googleapis.com/css?family=Lato" rel="stylesheet" type="text/css">
  <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.5.1/jquery.min.js"></script>
  <script src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/js/bootstrap.min.js"></script>


  <style>
  body {
    font: 400 15px Lato, sans-serif;
    line-height:          1.8;
    color: #818181;
  }
  h2
  {
    font-size: 24px;
    text-transform:          uppercase;
    color: #303030;
    font-weight:       600;       margin-
    bottom: 30px;
  }
  h4
  {
    font-size: 19px;
    line-height:          1.375em;
    color: #303030;
    font-weight:       400;       margin-
  bottom: 30px;
}
.jumbotron   {   background-
  color: #f4511e; color: #fff;
  font-family: Montserrat, sans-serif;
}
.container-fluid              {
  padding: 60px 50px;
}
.bg-grey     {     background-
  color: #f6f6f6;
}
.logo-small     {
  color:
  #f4511e;  font-
  size: 50px;
}
.logo    {    color:
  #f4511e;    font-
  size: 200px;
}
.thumbnail {
  padding: 0 0 15px 0;
  border: none; border-
  radius: 0;
}
.thumbnail img {
  width: 100%; height:
  100%; margin-
  bottom: 10px;
}
.carousel-control.right,   .carousel-control.left
  { background-image: none; color: #f4511e;
}
.carousel-indicators li {
  border-color: #f4511e;
}
.carousel-indicators    li.active    {    background-
```

```
  color: #f4511e;
}
.item h4 {
  font-size: 19px; line-
  height: 1.375em;
  font-weight: 400;
  font-style: italic;
  margin: 70px 0;
}
.item span {
  font-style: normal;
}
.panel { border: 1px solid
  #f4511e; border-radius:0
  !important; transition: box-
  shadow 0.5s;
}
.panel:hover { box-shadow: 5px 0px 40px
  rgba(0,0,0, .2);
}
.panel-footer .btn:hover { border:
1px solid #f4511e; background-
color: #fff !important; color:
#f4511e; }
.panel-heading { color: #fff !important;
  background-color: #f4511e
  !important; padding: 25px; border-
  bottom: 1px solid transparent; border-
  top-left-radius: 0px; border-top-right-
  radius: 0px; border-bottom-left-
  radius: 0px; border-bottom-right-
  radius: 0px;
}
.panel-footer {
  background-color: white !important;
}
.panel-footer h3 { font-
  size: 32px;
```

```
}
.panel-footer h4 {
  color:    #aaa;    font-
  size: 14px;
}
.panel-footer .btn {
  margin:          15px          0;
  background-color:
  #f4511e; color: #fff;
}
.navbar { margin-bottom: 0;
background-color: #0059ff; z-
index: 9999; border: 0; font-size:
12px !important; line-height:
1.42857143 !important; letter-
spacing: 4px; border-radius: 0;
font-family: Montserrat, sans-serif;
}
.navbar li a, .navbar .navbar-brand {
  color: #fff !important;
}
.navbar-nav li a:hover, .navbar-nav li.active a
  {  color:  #f4511e  !important;  background-
  color: #fff !important;
}
.navbar-default .navbar-toggle {
  border-color: transparent;
  color: #fff !important;
}  footer  .glyphicon  {
font-size:           20px;
margin-bottom:  20px;
color: #f4511e;
}
.slideanim {visibility:hidden;}
.slide { animation-name: slide; -
  webkit-animation-name: slide;
  animation-duration:      1s;      -
  webkit-animation-duration: 1s;
  visibility: visible;
}
@keyframes slide {
  0% {
    opacity: 0; transform:
    translateY(70%);
  }
  100% {
    opacity: 1; transform:
    translateY(0%);
  }
}
@-webkit-keyframes slide {
  0% {
    opacity: 0;
    -webkit-transform: translateY(70%);
  }
  100% {
    opacity: 1;
    -webkit-transform: translateY(0%);
  }
}
@media screen and (max-width: 768px) { .col-sm-4 { text-align: center; margin: 25px 0;
  }
  .btn-lg {
    width: 100%; margin-
    bottom: 35px;
  }
}
@media screen and (max-width: 480px) {
  .logo { font-size:
    150px;
  }
}


.container { padding: 16px;
        max-width: max-
        content;
```

```
}

.container { max-width:
    1376px; margin: auto;
    padding: 2rem
    1.5rem;
}

.cards { display: flex;
    flex-wrap: wrap;
    align-items: center;
    justify-content:
    center;
  }

  .card { cursor:
    pointer;
    background-
    color:
    transparent;
    height: 300px;
    perspective:
    1000px;
    margin: 1rem;
    align-items:
    center; justify-
    content:
    center;
  }

  .card h3 { border-bottom: 1px
    #fff solid; padding-bottom:
    10px; margin-bottom: 10px;
    text-align: center; font-size:
    1.6rem; word-spacing: 3px;
  }

  .card p{ opacity:
```

```
  0.75; font-size:
  0.8rem; line-
  height: 1.4;
}

.card img { width:
  360px; height:
  300px; object-fit:
  cover; border-
  radius: 3px;
}

.card-inner { position:
  relative; width: 360px;
  height: 100%; transition:
  transform 0.9s;
  transform-style:
  preserve-3d;
}

.card:hover .card-inner {
  transform: rotateY(180deg);
}

.card-front,
.card-back {
  position:
  absolute; width:
  360px; height:
  100%;
  -webkit-backface-visibility: hidden; backface-
  visibility: hidden;
}

.card-back { background-
  color: #222; color: #fff;
  padding: 1.5rem;
  transform:
        rotateY(180deg);
       }
       .text-block {
        position: absolute;
        bottom: 20px; right:
        20px; background-
        color: black; color:
        white;

        padding-left: 20px; padding-
        right: 20px;
       }
.features-section img {
   display: none;
  }

  .testimonials-section { background:
   var(--primary-colour); color:
   white;
  }


  .testimonials-section li
   { background:
   #0059ff; text-align:
   center; width: 80%;
   border-radius: 1em;
  }

  .testimonials-section li img
   { width: 6em; height: 6em;
   border: 3px solid #ffffff;
   border-radius: 50%;
   margin-top: -2.5em;
  }

  ul {
   list-style-type:
   none; margin: 0;
```

```
          padding: 0;
        }

   ul.features-list {
          margin:   0;   padding-
          left: .1em;
        }
 ul.features-list    li    {
        font-size:  1.1em;
        margin-bottom:
        1em; margin-left:
        2em;     position:
        relative;
        }

        ul.features-list li:before {
          content:    ";    left:    -2em;
          position:   absolute;   width:
          20px;      height:      20px;
          background-image:
          url("#");   background-size:
          contain;         margin-right:
          .5em;
        }

        .features-section      img      {
          display: none;
        }
        </style>
      </head>
      <body>
      <div class="card text-center">
      <div class="card-header">
      <ul class="nav nav-tabs card-header-tabs">
      <li class="nav-item">
      <a class="nav-link active" aria-current="true" href="home.html" style="font-size:
      24px;">Home</a>
      </li>
```

```
<li class="nav-item">
<a class="nav-link" href="intro.html" style="font-size: 24px;">Introduction</a>
</li>
<li class="nav-item">
<a class="nav-link" href="upload.html" style="font-size: 24px;">Upload</a>
</li>
</ul>
<h3 style="float: right;">AI based Natural Disaster Analysis</h3>
</div>
<div class="container-fluid">
    <div class="container">


        <div class="cards">


            <div class="card">
                <div class="card-inner">
                    <div class="card-front">
                        <img src="https://images.unsplash.com/photo-1454789476662-
53eb23ba5907?ixid=MXwxMjA3fDB8MHxwaG90by1wYWdlfHx8fGVufDB8fHw%3D&ixlib=r
b- 1.2.1&auto=format&fit=crop&w=689&q=80" alt="">
                        <div class="text-block">
                            <h1>Cyclone</h1>
                            <h3>violent winds, torrential rain, high waves and, very destructive storm</h3>
                        </div>


                    </div>
                    <div class="card-back">

                        <h3>Cyclone</h3>
<h3>The effects of tropical cyclones include heavy rain, strong wind, large storm surges near
                            landfall, and tornadoes. The destruction from a tropical cyclone, such as a hurricane or
                            tropical storm, depends mainly on its intensity, its size, and its location.</h3>
                    </div>
                </div>
            </div>
  <div class="container">


                <div class="cards">
```

```
          <div class="card">
            <div class="card-inner">
              <div class="card-front">
                <img src="https://images.unsplash.com/photo-1603869311144-
66b03d340b32?ixid=MXwxMjA3fDB8MHxzZWFyY2h8M3x8ZWFydGhxdWFrZXxlbnwwfHwwfA%
3 D%3D&ixlib=rb-1.2.1&auto=format&fit=crop&w=500&q=60" alt="">
                <div class="text-block">
                  <h1>Earth Quake</h1>
                  <h3>Sudden release of stored energy in the Earth's crust that creates seismic
waves.
                  </h3>

                </div>



              </div>

              <div class="card-back">

                <h3>Earth Quake</h3>

<h3>Earthquakes are usually caused when rock underground suddenly breaks along a fault.
                  This sudden release of energy causes the seismic waves that make the ground
shake.
                  ... During the earthquake and afterward, the plates or blocks of rock start moving,
              and they continue to move until they get stuck again.</h3> </div>
            </div>
          </div>
<div class="container">
<div class="cards">
 <div class="card">
                <div class="card-inner">
                  <div class="card-front">
                    <img src="https://images.unsplash.com/photo-1547683905-
f686c993aae5?ixid=MXwxMjA3fDB8MHxzZWFyY2h8MXx8Zmxvb2R8ZW58MHx8MHw%3D&ixl
ib =rb-1.2.1&auto=format&fit=crop&w=500&q=60" alt="">
                    <div class="text-block">
                      <h1>Flood</h1>
                      <h3>A flood is an overflow of water on normally dry ground</h3>
                    </div>


                  </div>
                  <div class="card-back">
                    <h3>Flood</h3>
<h3>During heavy rain, the storm drains can become overwhelmed or plugged by
                      debris and flood the roads and buildings nearby. Low spots, such as
                      underpasses, underground parking garages, basements, and low water
crossings
                      can become death traps. Areas near rivers are at risk from floods.</h3>
                  </div>
                </div>
              </div>
 <div class="container">

                <div class="cards">

                  <div class="card">
                    <div class="card-inner">
                      <div class="card-front">
                        <img src="https://images.unsplash.com/photo-1473260079709-
83c808703435?ixid=MXwxMjA3fDB8MHxzZWFyY2h8NHx8d2lsZGZpcmV8ZW58MHx8MHw%3
D &ixlib=rb-1.2.1&auto=format&fit=crop&w=500&q=60" alt="">
                        <div class="text-block">
                          <h1>WildFire</h1>
                          <h3>Uncontrolled fire in a forest, grassland, brushland</h3>
                        </div>

                      </div>
                      <div class="card-back">
                        <h3>Wildfire</h3>
                        <h3>Wildfires can be caused by an accumulation of dead matter (leaves,
                          twigs, and trees) that can create enough heat in some instances to
                          spontaneously combust and ignite the surrounding area. Lightning
                          strikes the earth over 100,000 times a day. 10 to 20% of these
                          lightning strikes can cause fire.</h3>
                      </div>
                    </div>
                  </div>
</div>
```

intro.html:

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta  name="viewport"  content="width=device-width,  initial-scale=1.0">  <link
href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/css/bootstrap.min.css"
rel="stylesheet" integrity="sha384-
Zenh87qX5JnK2Jl0vWa8Ck2rdkQ2Bzep5IDxbcnCeuOxjzrPF/et3URy9Bv1WTRi"
crossorigin="anonymous">
<title>Document</title>
</head>
<body>
<div class="card text-center">
<div class="card-header">
<ul class="nav nav-tabs card-header-tabs">
<li class="nav-item">
<a class="nav-link" aria-current="true" href="home.html" style="font-size:
24px;">Home</a>
</li>
<li class="nav-item">
<a class="nav-link active" href="intro.html" style="font-size: 24px;">Introduction</a></li>
<li class="nav-item">
<a class="nav-link" href="upload.html" style="font-size: 24px;">Upload</a>
</li>
</ul>
<h3 style="float: right;">AI based Natural Disaster Analysis</h3>
</div>
</div>
<h2 style="padding: 50px; margin: 50px; word-spacing: 15px; text-align: center ;line-height:
1.6;">
China, India and the United States are among the countries in the world most affected by natural
disasters. Natural disasters have the potential to wreck and even end the lives of those people, who stand
in their way. <br><br> However, whether or not you are likely to be affected by a natural disaster
dramatically depends on where in the world you live, The objectiveofthe project is to human build a web
application to detect the type of disaster. The input is taken from the in-built webcam, which in turn is
given to the pre-trained model. The model predicts the type of disaster and displayed on UI. </h2>
```

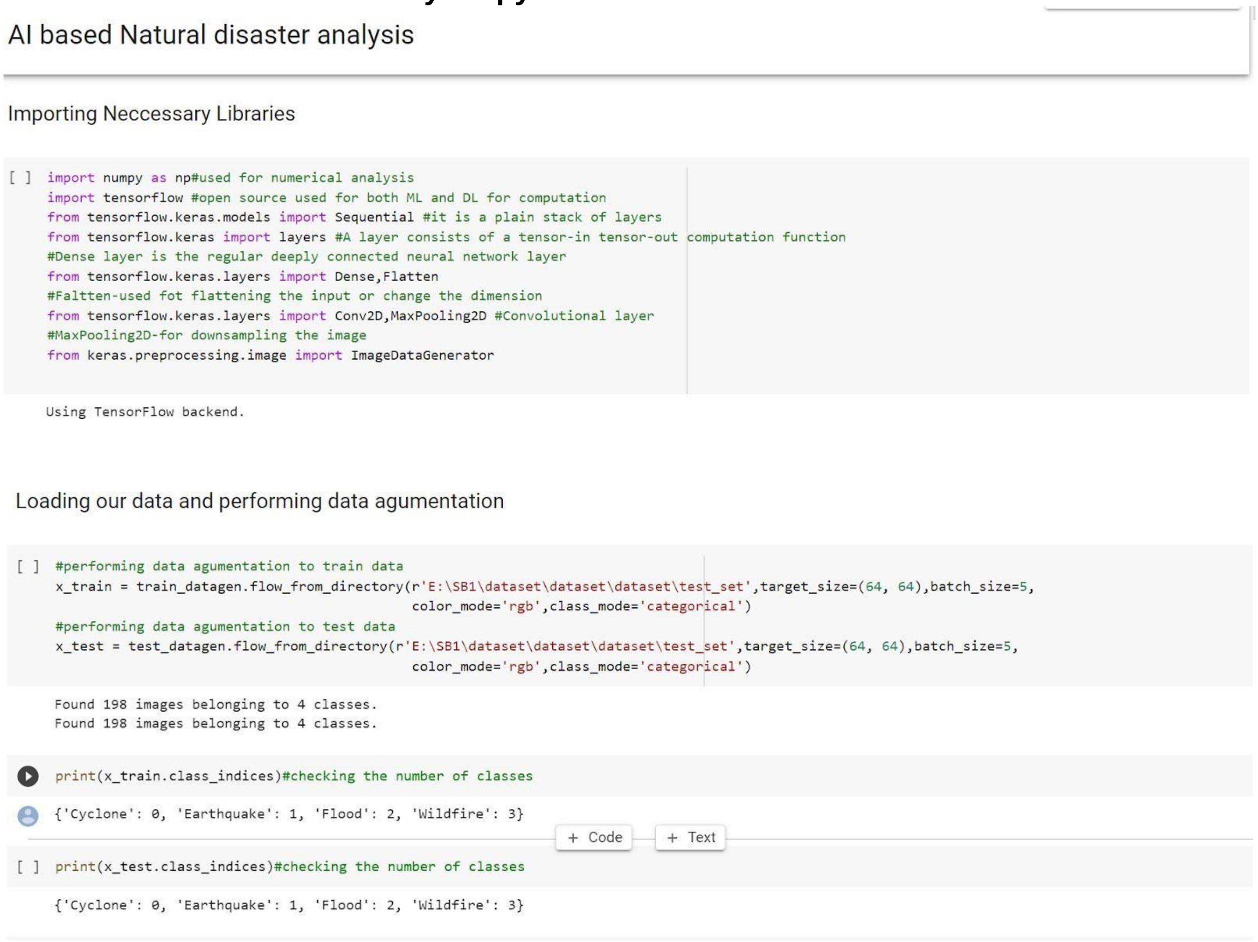
```
</body>
</html>
```

upload.html:

```
<<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta  name="viewport"  content="width=device-width,  initial-scale=1.0">  <link
href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/css/bootstrap.min.css"
rel="stylesheet" integrity="sha384-
Zenh87qX5JnK2Jl0vWa8Ck2rdkQ2Bzep5IDxbcnCeuOxjzrPF/et3URy9Bv1WTRi"
crossorigin="anonymous">
<title>Document</title>
</head>
<body>
<div class="card text-center">
<div class="card-header">
<ul class="nav nav-tabs card-header-tabs">
<li class="nav-item">
<a class="nav-link" aria-current="true" href="home.html" style="font-size:
24px;">Home</a>
</li>
<li class="nav-item">
<a   class="nav-link"   href="intro.html"   style="font-size:   24px;">Introduction</a>
</li>
<li class="nav-item">
<a class="nav-link active" href="upload.html" style="font-size: 24px;">Upload</a>
</li>
</ul>
<h3 style="float: right;">AI based Natural Disaster Analysis</h3>
</div>
</div>
<form action = "uploader.html" method = "POST" enctype = "multipart/form-data">
<input type = "file" name = "filename" /> <input
type = "submit" value="Submit"/>
```

```
</form>
<script src="https://cdn.jsdelivr.net/npm/@popperjs/core@2.11.6/dist/umd/popper.min.js"
integrity="sha384-
oBqDVmMz9ATKxIep9tiCxS/Z9fNfEXiDAYTujMAeBAsjFuCZSmKbSSUnQlmh/jp3"
crossorigin="anonymous"></script>
<script src="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/js/bootstrap.min.js"
integrity="sha384-
IDwe1+LCz02ROU9k972gdyvl+AESN10+x7tBKgc9I5HFtuNz0wWnPclzo6p9vxnk"crossorigin="anony
mous"></script>
</body>
</html>
```

AI based Natural disaster analysis.ipynb



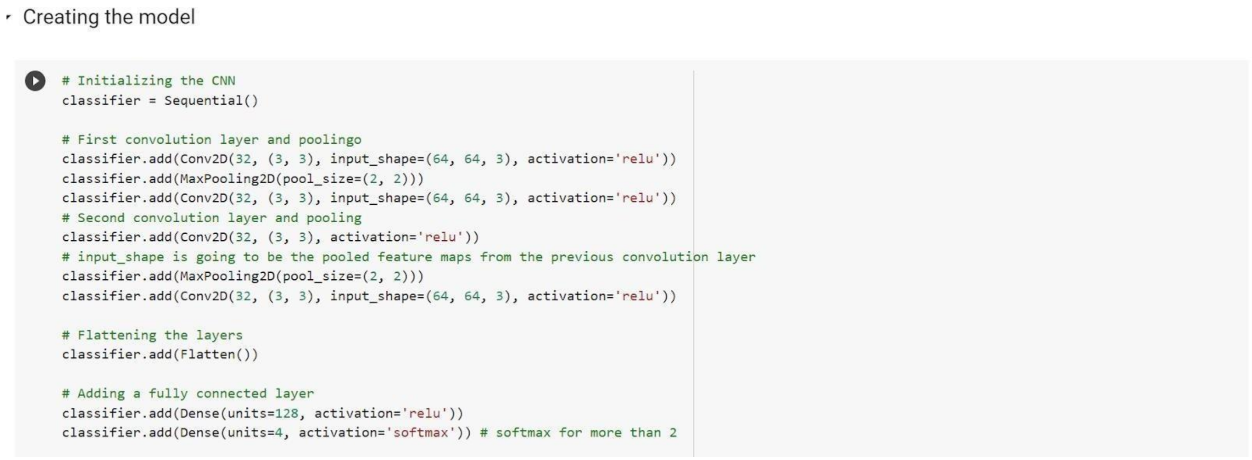
AI based Natural disaster analysis

Importing Neccessary Libraries

```
[ ] import numpy as np#used for numerical analysis
    import tensorflow #open source used for both ML and DL for computation
    from tensorflow.keras.models import Sequential #it is a plain stack of layers
    from tensorflow.keras import layers #A layer consists of a tensor-in tensor-out computation function
    #Dense layer is the regular deeply connected neural network layer
    from tensorflow.keras.layers import Dense,Flatten
    #Faltten-used fot flattening the input or change the dimension
    from tensorflow.keras.layers import Conv2D,MaxPooling2D #Convolutional layer
    #MaxPooling2D-for downsampling the image
    from keras.preprocessing.image import ImageDataGenerator

    Using TensorFlow backend.
```

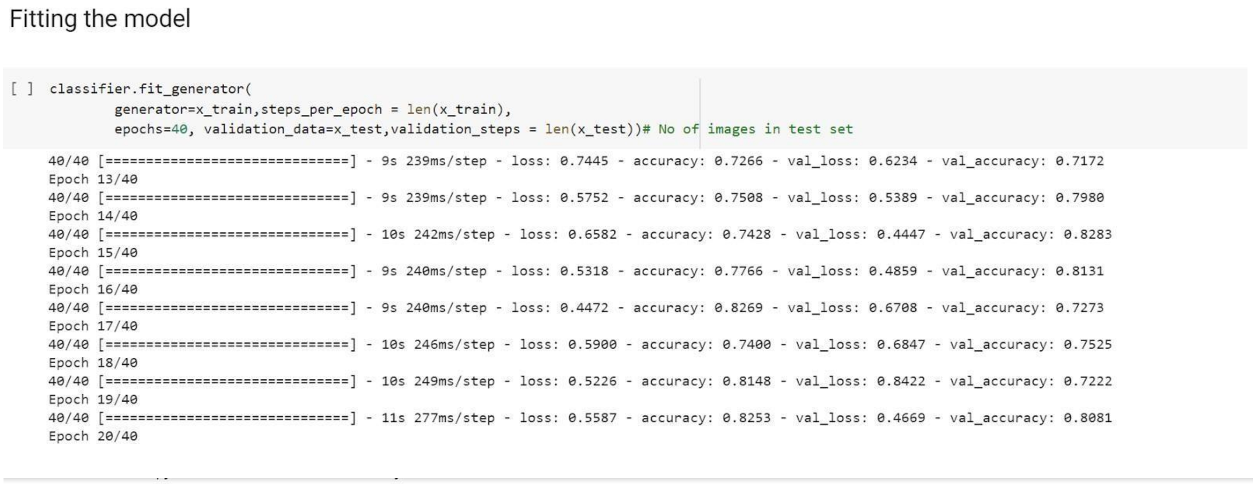
Loading our data and performing data agumentation

```
[ ] #performing data agumentation to train data
    x_train = train_datagen.flow_from_directory(r'E:\SB1\dataset\dataset\dataset\test_set',target_size=(64, 64),batch_size=5,
                                                color_mode='rgb',class_mode='categorical')
    #performing data agumentation to test data
    x_test = test_datagen.flow_from_directory(r'E:\SB1\dataset\dataset\dataset\test_set',target_size=(64, 64),batch_size=5,
                                                color_mode='rgb',class_mode='categorical')

    Found 198 images belonging to 4 classes.
    Found 198 images belonging to 4 classes.

    print(x_train.class_indices)#checking the number of classes

    {'Cyclone': 0, 'Earthquake': 1, 'Flood': 2, 'Wildfire': 3}

[ ] print(x_test.class_indices)#checking the number of classes

    {'Cyclone': 0, 'Earthquake': 1, 'Flood': 2, 'Wildfire': 3}
```



Creating the model

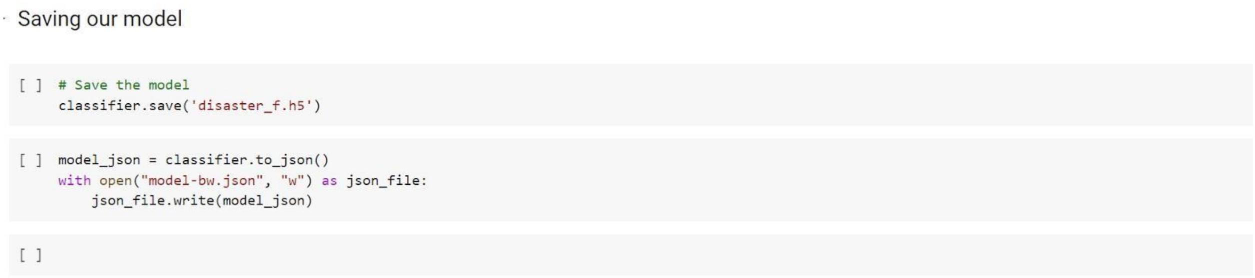
```
# Initializing the CNN
classifier = Sequential()

# First convolution layer and poolingo
classifier.add(Conv2D(32, (3, 3), input_shape=(64, 64, 3), activation='relu'))
classifier.add(MaxPooling2D(pool_size=(2, 2)))
classifier.add(Conv2D(32, (3, 3), input_shape=(64, 64, 3), activation='relu'))
# Second convolution layer and pooling
classifier.add(Conv2D(32, (3, 3), activation='relu'))
# input_shape is going to be the pooled feature maps from the previous convolution layer
classifier.add(MaxPooling2D(pool_size=(2, 2)))
classifier.add(Conv2D(32, (3, 3), input_shape=(64, 64, 3), activation='relu'))

# Flattening the layers
classifier.add(Flatten())

# Adding a fully connected layer
classifier.add(Dense(units=128, activation='relu'))
classifier.add(Dense(units=4, activation='softmax')) # softmax for more than 2
```



Fitting the model

```
classifier.fit_generator(
        generator=x_train,steps_per_epoch = len(x_train),
        epochs=40, validation_data=x_test,validation_steps = len(x_test))# No of images in test set
```

```
40/40 [==============================] - 9s 239ms/step - loss: 0.7445 - accuracy: 0.7266 - val_loss: 0.6234 - val_accuracy: 0.7172
Epoch 13/40
40/40 [==============================] - 9s 239ms/step - loss: 0.5752 - accuracy: 0.7508 - val_loss: 0.5389 - val_accuracy: 0.7980
Epoch 14/40
40/40 [==============================] - 10s 242ms/step - loss: 0.6582 - accuracy: 0.7428 - val_loss: 0.4447 - val_accuracy: 0.8283
Epoch 15/40
40/40 [==============================] - 9s 240ms/step - loss: 0.5318 - accuracy: 0.7766 - val_loss: 0.4859 - val_accuracy: 0.8131
Epoch 16/40
40/40 [==============================] - 9s 240ms/step - loss: 0.4472 - accuracy: 0.8269 - val_loss: 0.6708 - val_accuracy: 0.7273
Epoch 17/40
40/40 [==============================] - 10s 246ms/step - loss: 0.5900 - accuracy: 0.7400 - val_loss: 0.6847 - val_accuracy: 0.7525
Epoch 18/40
40/40 [==============================] - 10s 249ms/step - loss: 0.5226 - accuracy: 0.8148 - val_loss: 0.8422 - val_accuracy: 0.7222
Epoch 19/40
40/40 [==============================] - 11s 277ms/step - loss: 0.5587 - accuracy: 0.8253 - val_loss: 0.4669 - val_accuracy: 0.8081
Epoch 20/40
```

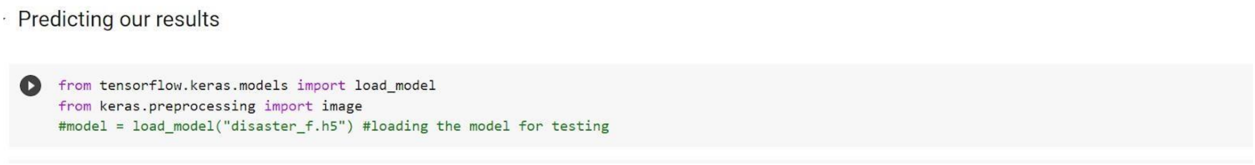


Saving our model

```
[ ] # Save the model
    classifier.save('disaster_f.h5')
```

```
[ ] model_json = classifier.to_json()
    with open("model-bw.json", "w") as json_file:
        json_file.write(model_json)
```

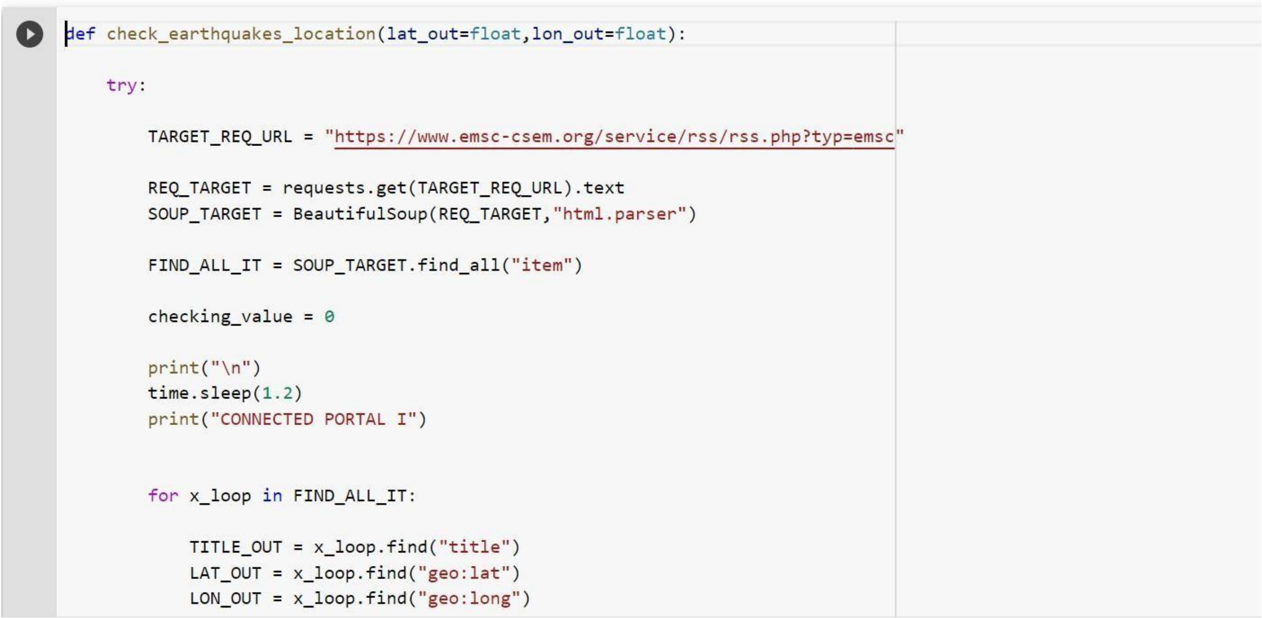
```
[ ]
```



Predicting our results

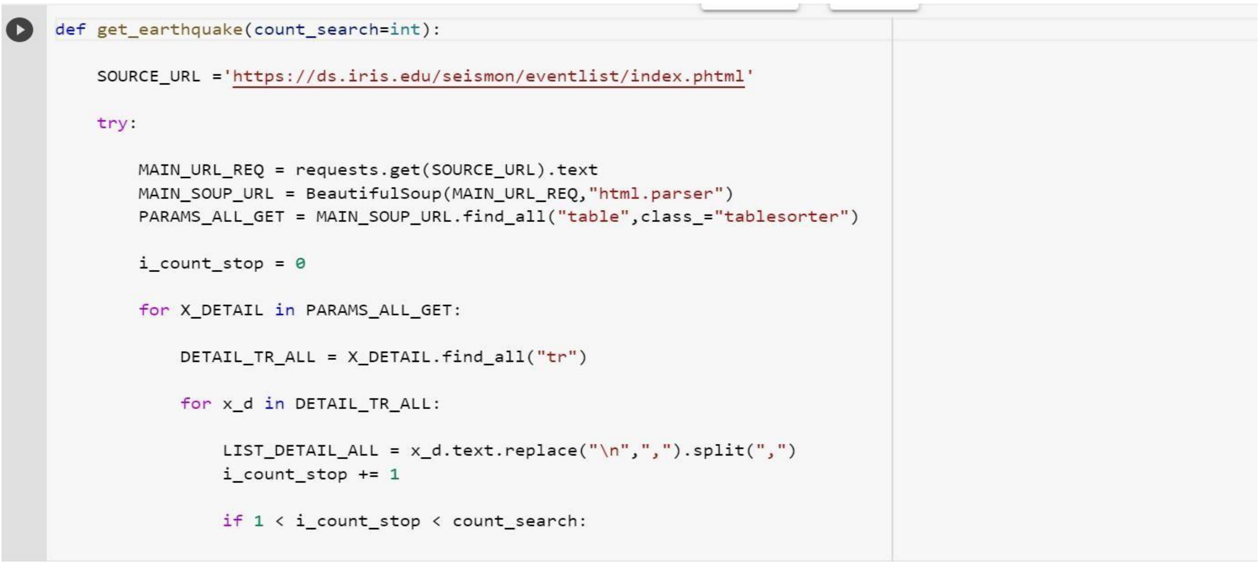
```
from tensorflow.keras.models import load_model
from keras.preprocessing import image
#model = load_model("disaster_f.h5") #loading the model for testing
```

c_check_earthquake.py:



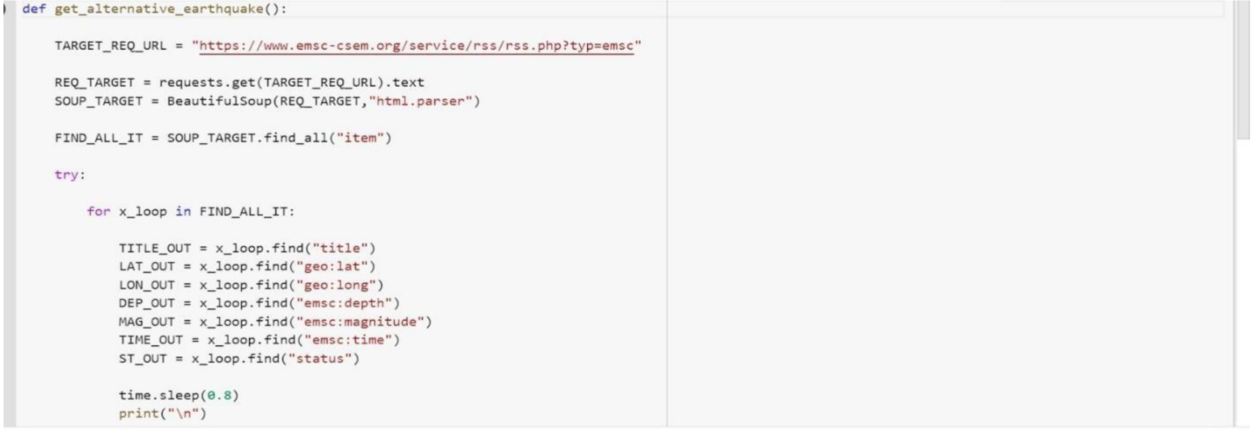
```
def check_earthquakes_location(lat_out=float,lon_out=float):

    try:

        TARGET_REQ_URL = "https://www.emsc-csem.org/service/rss/rss.php?typ=emsc"

        REQ_TARGET = requests.get(TARGET_REQ_URL).text
        SOUP_TARGET = BeautifulSoup(REQ_TARGET,"html.parser")

        FIND_ALL_IT = SOUP_TARGET.find_all("item")

        checking_value = 0

        print("\n")
        time.sleep(1.2)
        print("CONNECTED PORTAL I")


        for x_loop in FIND_ALL_IT:

            TITLE_OUT = x_loop.find("title")
            LAT_OUT = x_loop.find("geo:lat")
            LON_OUT = x_loop.find("geo:long")
```

C_earthquake_g.py:



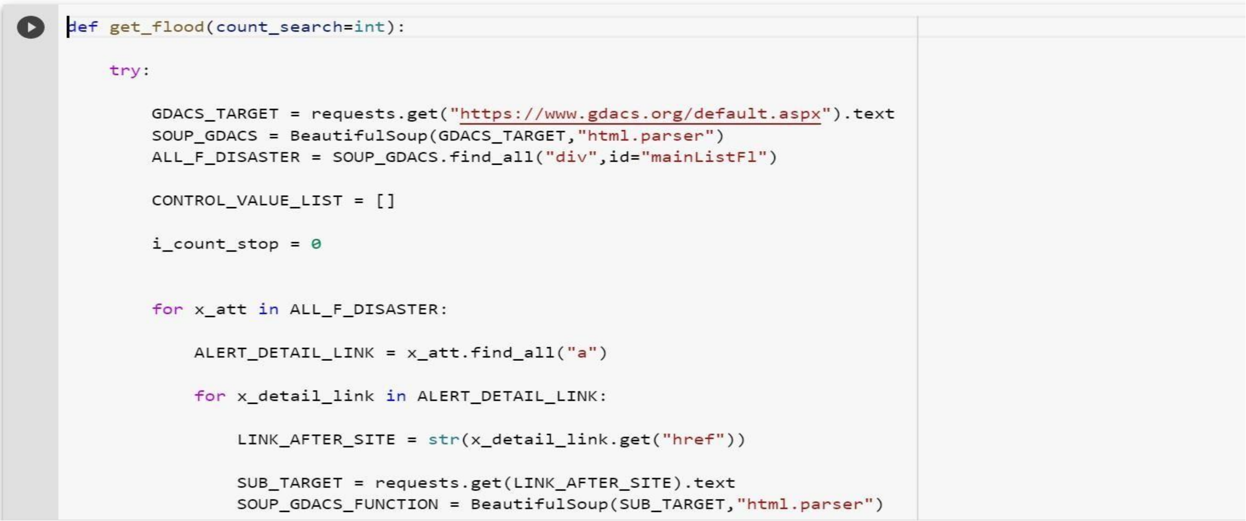
```
def get_earthquake(count_search=int):

    SOURCE_URL ='https://ds.iris.edu/seismon/eventlist/index.phtml'

    try:

        MAIN_URL_REQ = requests.get(SOURCE_URL).text
        MAIN_SOUP_URL = BeautifulSoup(MAIN_URL_REQ,"html.parser")
        PARAMS_ALL_GET = MAIN_SOUP_URL.find_all("table",class_="tablesorter")

        i_count_stop = 0

        for X_DETAIL in PARAMS_ALL_GET:

            DETAIL_TR_ALL = X_DETAIL.find_all("tr")

            for x_d in DETAIL_TR_ALL:

                LIST_DETAIL_ALL = x_d.text.replace("\n",",").split(",")
                i_count_stop += 1

                if 1 < i_count_stop < count_search:
```

c_alternative_earthquake.py:



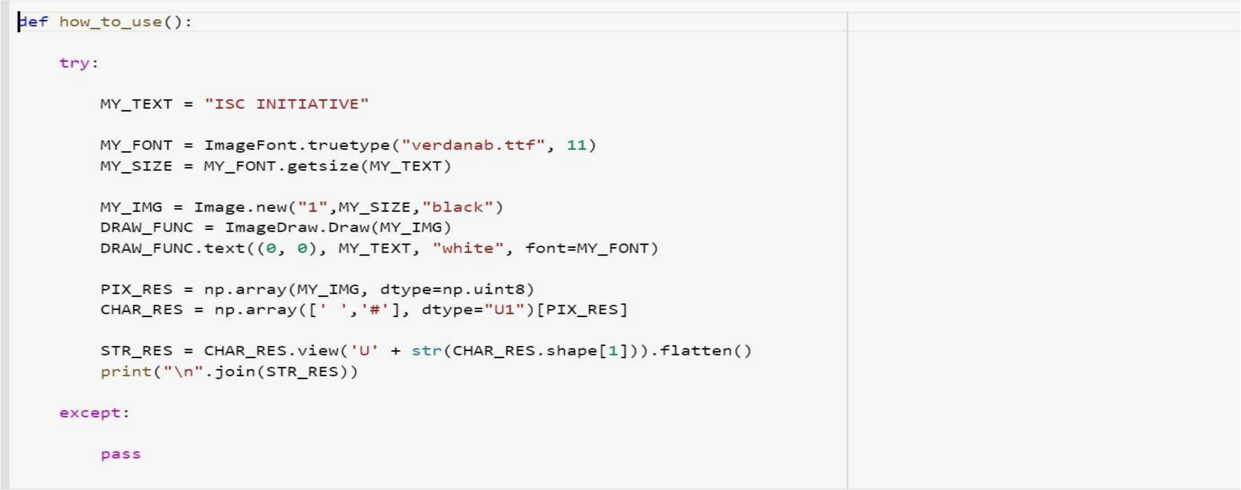
```
def get_alternative_earthquake():

    TARGET_REQ_URL = "https://www.emsc-csem.org/service/rss/rss.php?typ=emsc"

    REQ_TARGET = requests.get(TARGET_REQ_URL).text
    SOUP_TARGET = BeautifulSoup(REQ_TARGET,"html.parser")

    FIND_ALL_IT = SOUP_TARGET.find_all("item")

    try:

        for x_loop in FIND_ALL_IT:

            TITLE_OUT = x_loop.find("title")
            LAT_OUT = x_loop.find("geo:lat")
            LON_OUT = x_loop.find("geo:long")
            DEP_OUT = x_loop.find("emsc:depth")
            MAG_OUT = x_loop.find("emsc:magnitude")
            TIME_OUT = x_loop.find("emsc:time")
            ST_OUT = x_loop.find("status")

            time.sleep(0.8)
            print("\n")
```

C_flood.py:



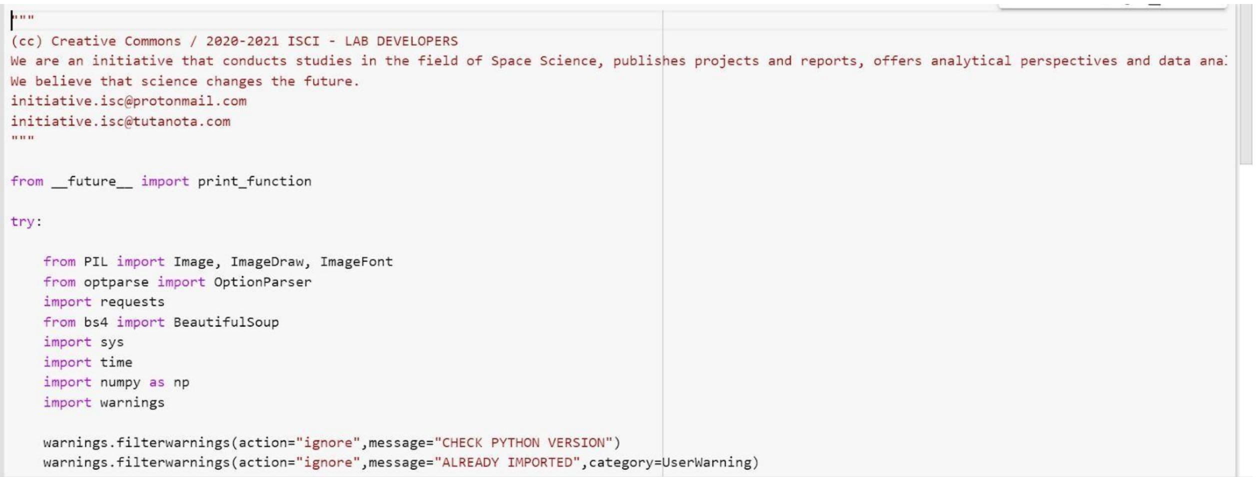
```
def get_flood(count_search=int):

    try:

        GDACS_TARGET = requests.get("https://www.gdacs.org/default.aspx").text
        SOUP_GDACS = BeautifulSoup(GDACS_TARGET,"html.parser")
        ALL_F_DISASTER = SOUP_GDACS.find_all("div",id="mainListFl")

        CONTROL_VALUE_LIST = []

        i_count_stop = 0


        for x_att in ALL_F_DISASTER:

            ALERT_DETAIL_LINK = x_att.find_all("a")

            for x_detail_link in ALERT_DETAIL_LINK:

                LINK_AFTER_SITE = str(x_detail_link.get("href"))

                SUB_TARGET = requests.get(LINK_AFTER_SITE).text
                SOUP_GDACS_FUNCTION = BeautifulSoup(SUB_TARGET,"html.parser")
```

c_help.py:



```
def how_to_use():

    try:

        MY_TEXT = "ISC INITIATIVE"

        MY_FONT = ImageFont.truetype("verdanab.ttf", 11)
        MY_SIZE = MY_FONT.getsize(MY_TEXT)

        MY_IMG = Image.new("1",MY_SIZE,"black")
        DRAW_FUNC = ImageDraw.Draw(MY_IMG)
        DRAW_FUNC.text((0, 0), MY_TEXT, "white", font=MY_FONT)

        PIX_RES = np.array(MY_IMG, dtype=np.uint8)
        CHAR_RES = np.array([' ','#'], dtype="U1")[PIX_RES]

        STR_RES = CHAR_RES.view('U' + str(CHAR_RES.shape[1])).flatten()
        print("\n".join(STR_RES))

    except:

        pass
```

c_import.py



```
"""
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We are an initiative that conducts studies in the field of Space Science, publishes projects and reports, offers analytical perspectives and data ana
We believe that science changes the future.
initiative.isc@protonmail.com
initiative.isc@tutanota.com
"""

from __future__ import print_function

try:

    from PIL import Image, ImageDraw, ImageFont
    from optparse import OptionParser
    import requests
    from bs4 import BeautifulSoup
    import sys
    import time
    import numpy as np
    import warnings

    warnings.filterwarnings(action="ignore",message="CHECK PYTHON VERSION")
    warnings.filterwarnings(action="ignore",message="ALREADY IMPORTED",category=UserWarning)
```
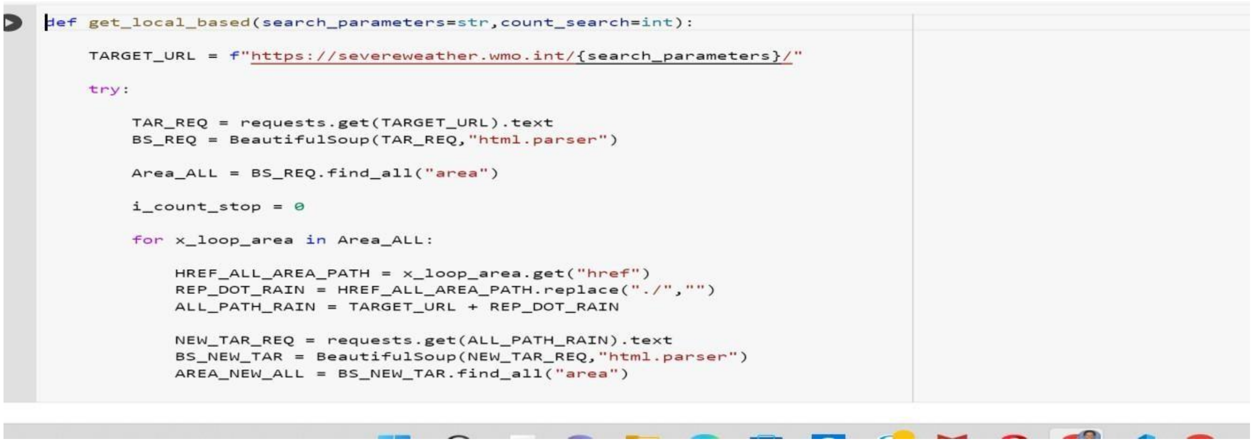
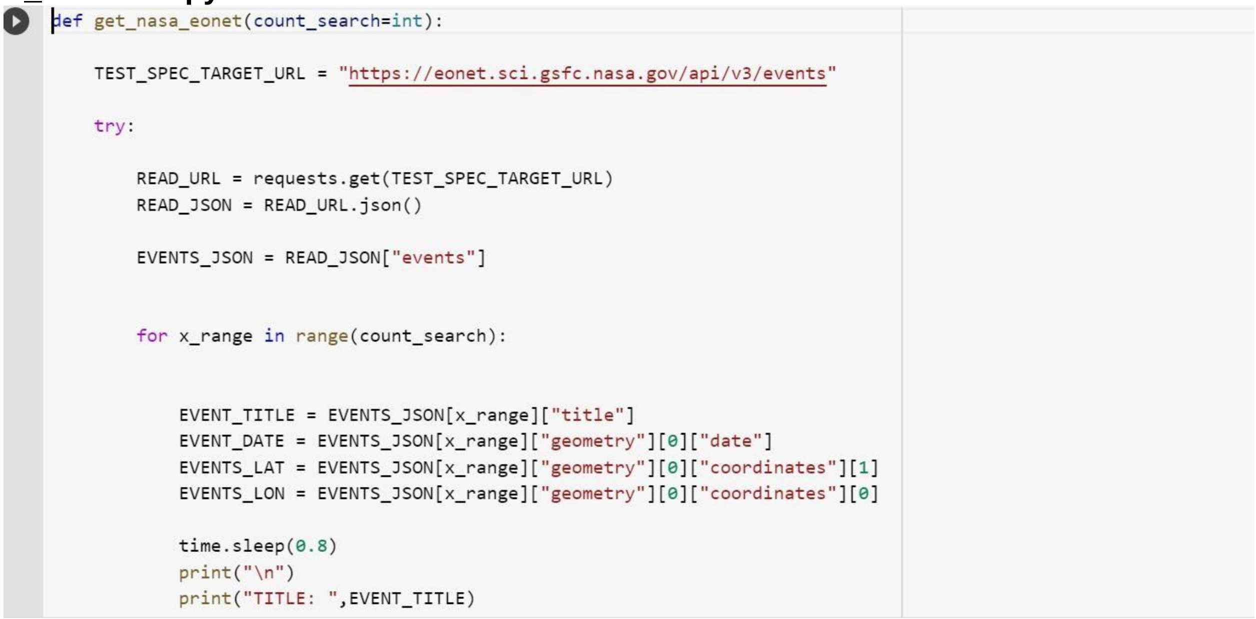

C_local_alert:



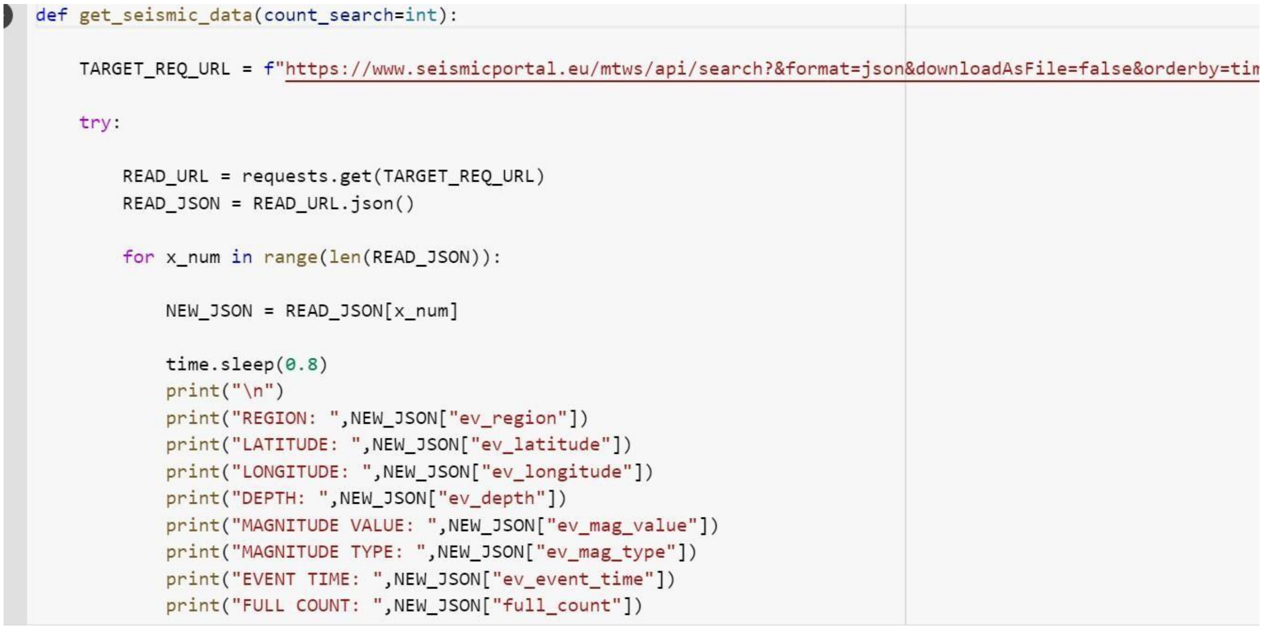
```
def get_local_based(search_parameters=str,count_search=int):

    TARGET_URL = f"https://severeweather.wmo.int/{search_parameters}/"

    try:

        TAR_REQ = requests.get(TARGET_URL).text
        BS_REQ = BeautifulSoup(TAR_REQ,"html.parser")

        Area_ALL = BS_REQ.find_all("area")

        i_count_stop = 0

        for x_loop_area in Area_ALL:

            HREF_ALL_AREA_PATH = x_loop_area.get("href")
            REP_DOT_RAIN = HREF_ALL_AREA_PATH.replace("./","")
            ALL_PATH_RAIN = TARGET_URL + REP_DOT_RAIN

            NEW_TAR_REQ = requests.get(ALL_PATH_RAIN).text
            BS_NEW_TAR = BeautifulSoup(NEW_TAR_REQ,"html.parser")
            AREA_NEW_ALL = BS_NEW_TAR.find_all("area")
```

C_nasaoent.py:



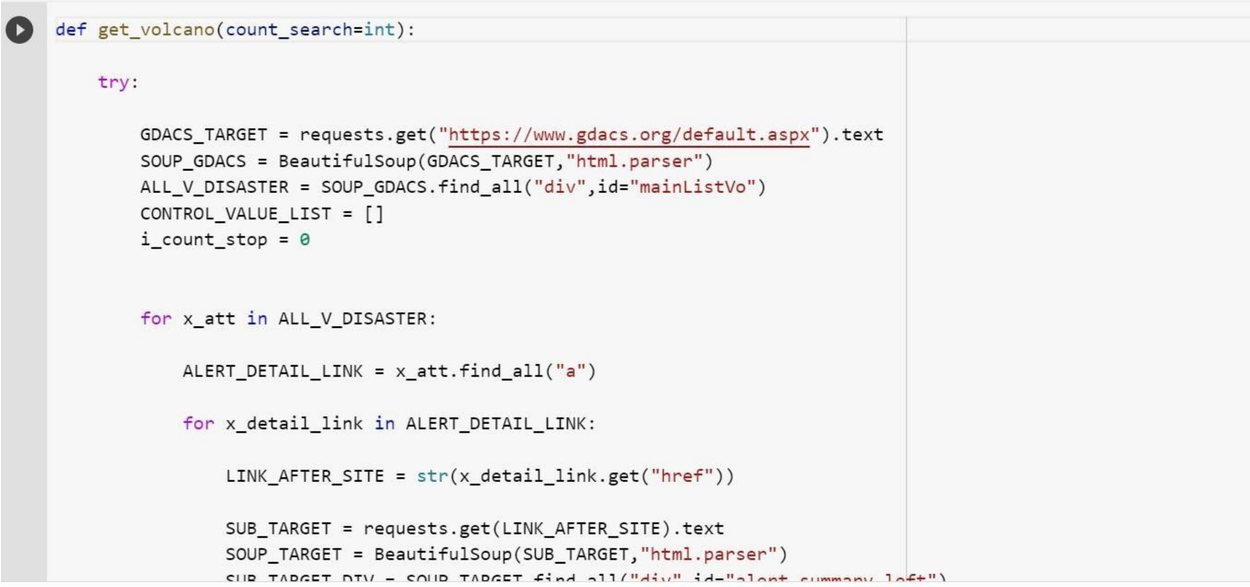
```
def get_nasa_eonet(count_search=int):

    TEST_SPEC_TARGET_URL = "https://eonet.sci.gsfc.nasa.gov/api/v3/events"

    try:

        READ_URL = requests.get(TEST_SPEC_TARGET_URL)
        READ_JSON = READ_URL.json()

        EVENTS_JSON = READ_JSON["events"]


        for x_range in range(count_search):


            EVENT_TITLE = EVENTS_JSON[x_range]["title"]
            EVENT_DATE = EVENTS_JSON[x_range]["geometry"][0]["date"]
            EVENTS_LAT = EVENTS_JSON[x_range]["geometry"][0]["coordinates"][1]
            EVENTS_LON = EVENTS_JSON[x_range]["geometry"][0]["coordinates"][0]

            time.sleep(0.8)
            print("\n")
            print("TITLE: ",EVENT_TITLE)
```

c_seismic.py:



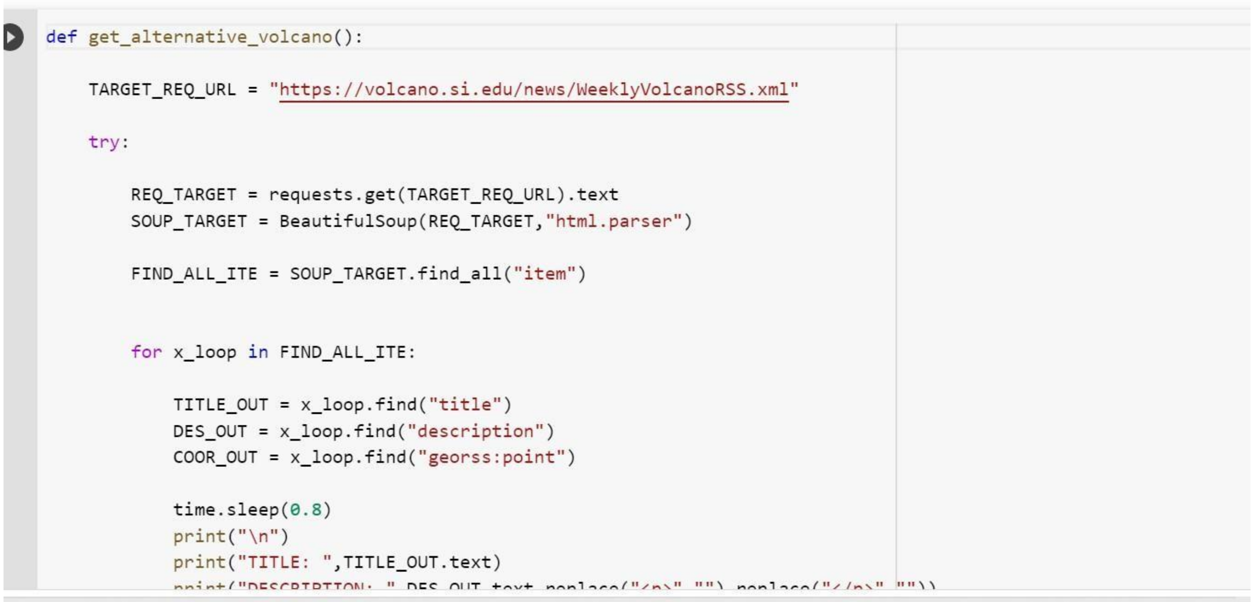
```
def get_seismic_data(count_search=int):

    TARGET_REQ_URL = f"https://www.seismicportal.eu/mtws/api/search?&format=json&downloadAsFile=false&orderby=tim

    try:

        READ_URL = requests.get(TARGET_REQ_URL)
        READ_JSON = READ_URL.json()

        for x_num in range(len(READ_JSON)):

            NEW_JSON = READ_JSON[x_num]

            time.sleep(0.8)
            print("\n")
            print("REGION: ",NEW_JSON["ev_region"])
            print("LATITUDE: ",NEW_JSON["ev_latitude"])
            print("LONGITUDE: ",NEW_JSON["ev_longitude"])
            print("DEPTH: ",NEW_JSON["ev_depth"])
            print("MAGNITUDE VALUE: ",NEW_JSON["ev_mag_value"])
            print("MAGNITUDE TYPE: ",NEW_JSON["ev_mag_type"])
            print("EVENT TIME: ",NEW_JSON["ev_event_time"])
            print("FULL COUNT: ",NEW_JSON["full_count"])
```

C_valcano_g:



```
def get_volcano(count_search=int):

    try:

        GDACS_TARGET = requests.get("https://www.gdacs.org/default.aspx").text
        SOUP_GDACS = BeautifulSoup(GDACS_TARGET,"html.parser")
        ALL_V_DISASTER = SOUP_GDACS.find_all("div",id="mainListVo")
        CONTROL_VALUE_LIST = []
        i_count_stop = 0


        for x_att in ALL_V_DISASTER:

            ALERT_DETAIL_LINK = x_att.find_all("a")

            for x_detail_link in ALERT_DETAIL_LINK:

                LINK_AFTER_SITE = str(x_detail_link.get("href"))

                SUB_TARGET = requests.get(LINK_AFTER_SITE).text
                SOUP_TARGET = BeautifulSoup(SUB_TARGET,"html.parser")
                SUB_TARGET_DIV = SOUP_TARGET.find_all("div",id="alert_summary_left")
```

C_valcano_alternative:



```
def get_alternative_volcano():

    TARGET_REQ_URL = "https://volcano.si.edu/news/WeeklyVolcanoRSS.xml"

    try:

        REQ_TARGET = requests.get(TARGET_REQ_URL).text
        SOUP_TARGET = BeautifulSoup(REQ_TARGET,"html.parser")

        FIND_ALL_ITE = SOUP_TARGET.find_all("item")


        for x_loop in FIND_ALL_ITE:

            TITLE_OUT = x_loop.find("title")
            DES_OUT = x_loop.find("description")
            COOR_OUT = x_loop.find("georss:point")

            time.sleep(0.8)
            print("\n")
            print("TITLE: ",TITLE_OUT.text)
            print("DESCRIPTION: ",DES_OUT.text.replace("<p>","").replace("</p>",""))
```