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CHAPTER 1

INTRODUCTION

1.1 PROJECT OVERVIEW

Natural disaster occurs, users in social media, sensors, cameras, satellites, and the like generate vast amounts of data. Emergency responders and victims use this data for situational awareness, decision-making, and safe evacuations. However, making sense of the generated information under time-bound situations is a challenging task as the amount of data can be significant, and there is a need for intelligent systems to analyze, process, and visualize it. With recent advancements in Artificial Intelligence (AI), numerous researchers have begun exploring AI, machine learning (ML), and deep learning (DL) techniques for big data analytics in managing disasters efficiently. This paper adopts a systematic literature approach to report on the application of AI, ML, and DL in disaster management. Through a systematic review process, we identified one relevant hundred publications. After that, we analyzed all the identified papers and concluded that most of the reviewed articles used AI, ML, and DL methods on social media data, satellite data, sensor data, and historical data. The most common algorithms are support vector machines (SVM), Naïve Bayes (NB), Random Forest (RF), Convolutional Neural Networks (CNN), Artificial neural networks. The proposed model works in two blocks: Block-I convolutional neural network (B-I CNN).

1.2 PURPOSE

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. Many deep learning techniques have been applied by various researchers to detect and classify natural disasters to overcome losses in ecosystems, but detection of natural disasters still faces issues due to the complex and imbalanced structures of images.

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.

The impacts are high on the development agenda. Efforts to reduce or mitigate the impacts of disasters are increasingly focused on exposure and vulnerability of human populations rather than just the nature of the hazard. There are a range of measures that can be taken to protect public health, based around these four aspects.

CHAPTER – 2

LITERATURE SURVEY

2.1 EXISTING PROBLEM

Natural disasters can cause great damage on the environment, property, wildlife and human health. These events may include earthquakes, floods, hurricanes, tornadoes, tsunamis, landslides, wildfires, volcanic eruptions, and extreme temperatures.

Natural disasters kill tens of thousands each year. If we look at the average over the past decade, approximately 45,000 people globally died from natural disasters each year. This represents around 0.1% of global deaths. Disasters are serious disruptions to the functioning of a community that exceed its capacity to cope using its own resources. Disasters can be caused by natural, man-made and technological hazards, as well as various factors that influence the exposure and vulnerability of a community.

- i. To monitor pollution, ecosystem destruction and natural disaster on large-scale dynamically and around the clock- Generalized signal and channel algorithm and parameter acquisition.
- ii. It represents a model of risk assessment of urban drought which integrates hazard, exposure, vulnerability and emergency response and recovery capability.

2.2 PROBLEM STATEMENT DEFINITION

Analyzing the changes in the environment that it cannot be predictable because the changes in the environment happened suddenly. To save the peoples from the disaster damages some times people are not supporting the rules given by the government people are felt nervous in the period of natural disasters.

I am	I'm trying to	But	Because	Which makes me feel
Researcher	Analyze the changes in the environment.	Sometimes it cannot be predictable.	Because the changes in the environment happened suddenly.	Guilty
People	Prevent from the damages by the disaster.	We can't do anything.	Economic Level	Culpable
Government	Save the peoples from the disaster damages.	Sometimes people are not supporting the rules given by the government.	People felt nervous in the period of natural disasters.	Worried
Socialist	Help the peoples in the period of disasters.	But we can't serve for all the peoples who are in need.	Lot of people are affected during the disasters period.	Nervous

CHAPTER - 3

IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS

It is mainly used as user friendly which it makes an accuracy is good and it can be predict what is going to happen for future prediction. It preventing the loss of human lives and AI is used to communicate directly without the usage of the network. Drones and robot is used to locate survivors and it is used to transmit the information.

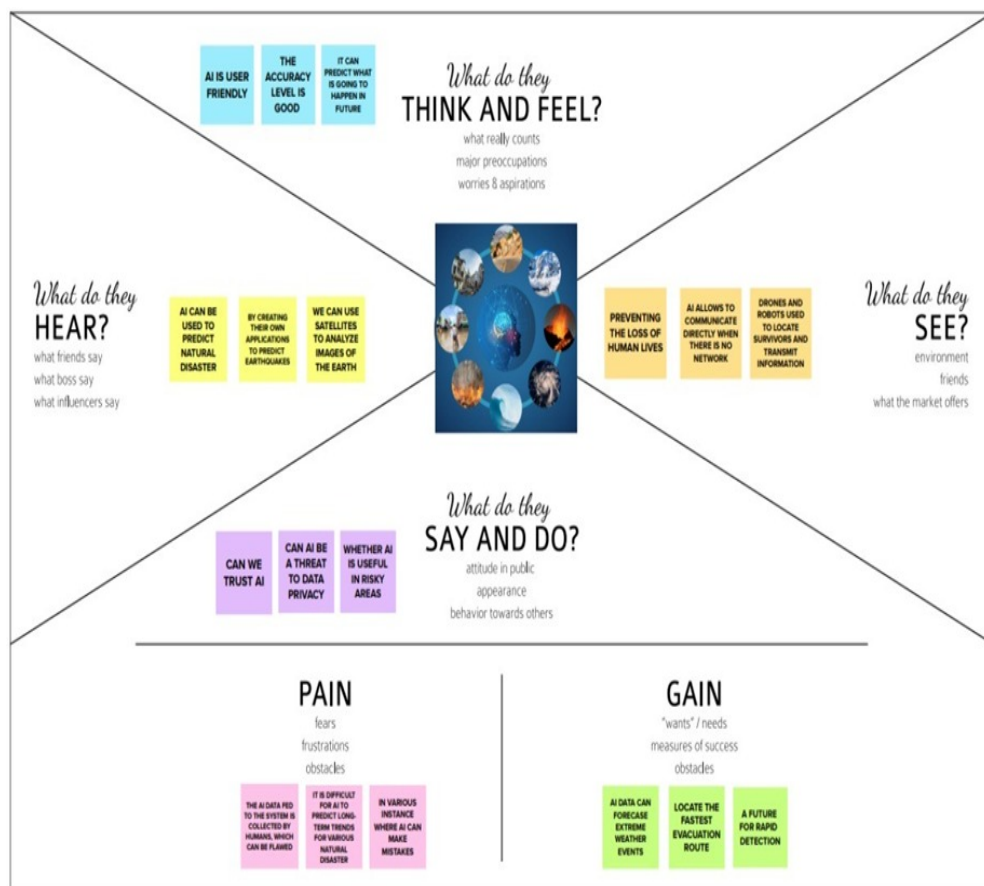


Figure 3.1 Empathy Map

3.2 IDEATION & BRAINSTORMING

Brainstorming is a method of generating ideas and sharing knowledge to solve a particular commercial or technical problem, in participants are encouraged to think without interruption. Brainstorming is a group activity where each participant shares their ideas as soon as they come to mind.

STEP 1 - BRAINSTORMING AND IDEA PRIORITIZATION

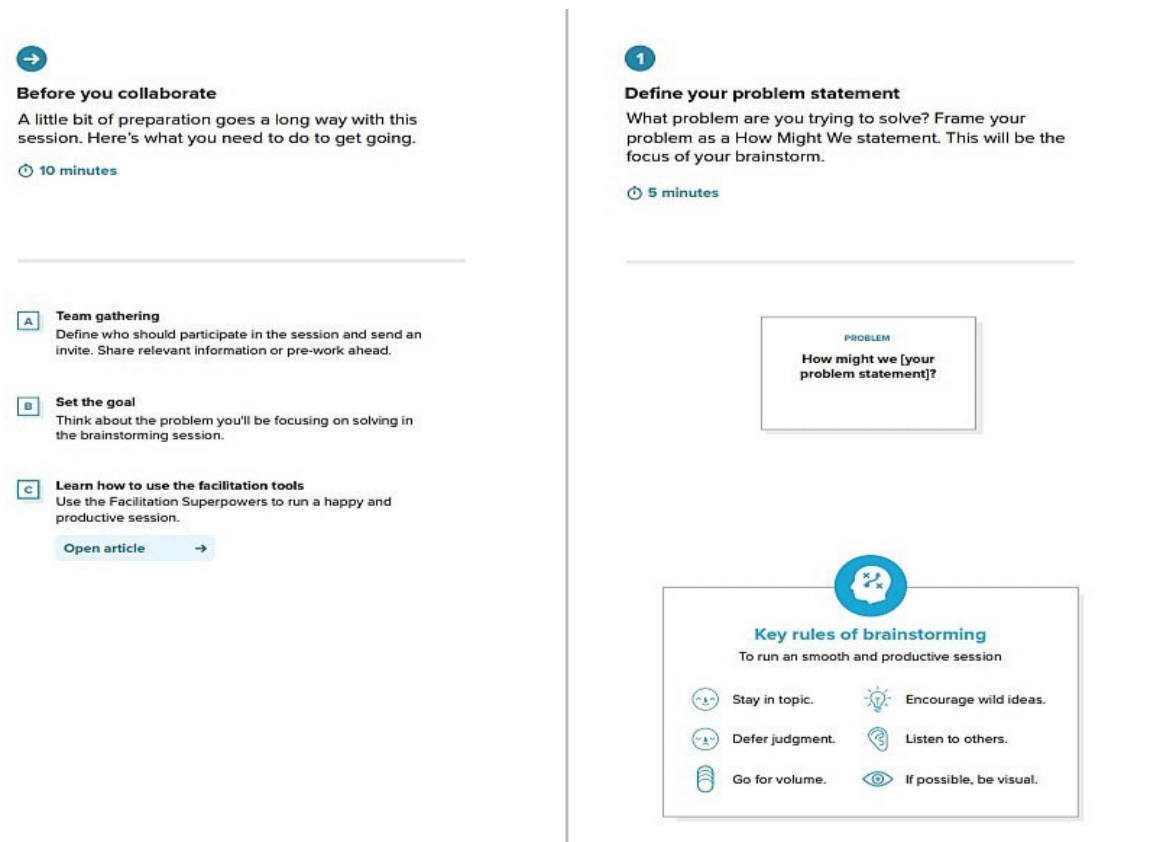


Figure 3.2 Ideation and Brainstorming

STEP 2 - BRAINSTORM, IDEA LISTING AND GROUPING

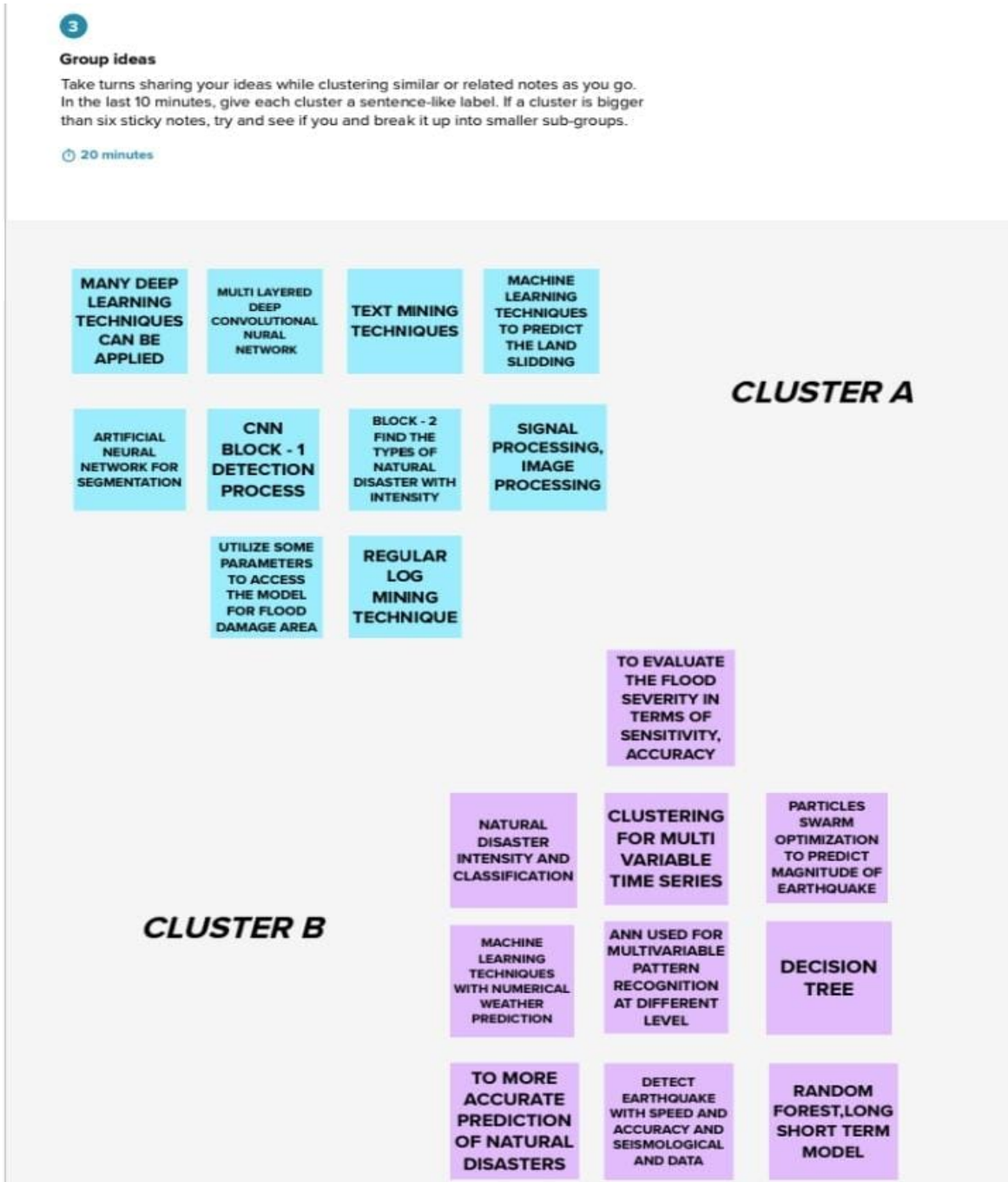


Figure 3.2 Brainstorm, Idea Listing and Grouping

STEP 3 - IDEA PRIORITIZATION

4

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.

⌚ 20 minutes

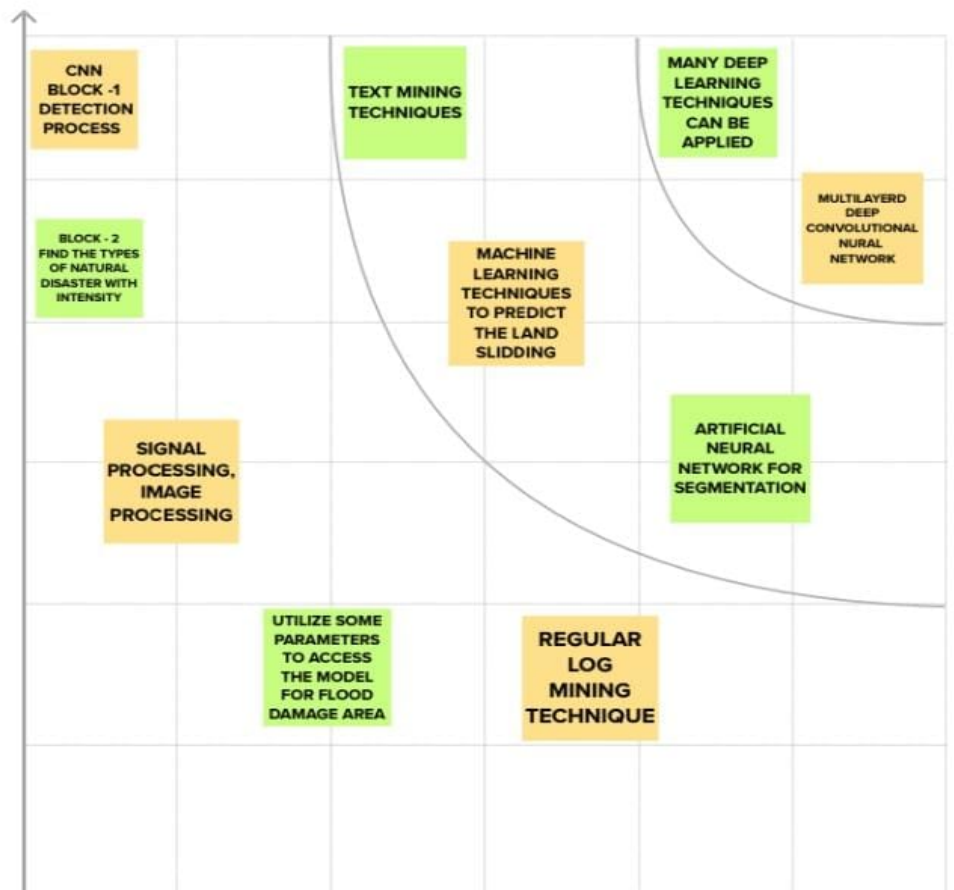


Figure 3.3 Idea Prioritization

3.3 PROPOSED SOLUTION

Natural disaster intensity and effect analysis using Artificial intelligence the parameter of problem statement. Nature-based solutions to disasters, Climate change is increasing the frequency, intensity and magnitude of disasters, leading to a higher number of deaths, injuries and increased economic losses. The techniques applied are: deep learning, artificial neural network and machine learning techniques. It is based on multispectral images using a multi-layered deep convolutional neural network. AI data can forecast extreme weather events. Locate the fastest evacuation route.

S No.	Parameter	Description
1	Problem Statement (Problem to be solved)	Natural disaster intensity and effect analysis using Artificial intelligence.
2	Idea / Solution description	The techniques applied are: deep learning, artificial neural network for segmentation and machine learning techniques.
3	Novelty / Uniqueness	It is based on multi spectral images using multilayered deep convolutional neural network.
4	Social Impact / Customer Satisfaction	AI data can forecast extreme weather events. Locate the fastest evacuation route. It is a future for rapid detection.
5	Business Model (Revenue Model)	We give a solution to the natural disaster intensity and effect analysis.

6	Scalability of the Solution	AI algorithms could instantaneously assess flooding, building and road damage based on satellite images and weather forecasts.
---	-----------------------------	--

3.4 PROBLEM SOLUTION FIT

CUSTOMER SEGMENT AI data can forecast extreme weather events. Locate the fastest evacuation route. It is a future for rapid detection.	JOBS-TO-BE-DONE / PROBLEMS Natural disaster intensity and effect analysis using Artificial intelligence.
TRIGGERS Natural Disaster, also referred to as natural hazards are extreme, sudden events caused by environmental factors such as storms, floods, droughts, fires, and heat waves.	EMOTIONS: BEFORE/ AFTER BEFORE: The disaster, a positive association was found between place- identity and well being, indicating that the stronger emotions participants evolved to the place. AFTER: Accordingly, participants almost lost their emotional bond to the area but maintained their memories and thoughts about the site intact and, by that, their positive well being associations with the locations.

<p>AVAILABLE SOLUTIONS</p> <p>Artificial Intelligence algorithms could instantaneously assess flooding, building and road damage based on satellite images and weather forecasts, allowing resources to distribute emergency aid more effectively and identify those still in danger and isolated from escape routes.</p>	<p>CUSTOMER CONSTRAINTS</p> <p>According to the Decision, the intensity of each type of disaster has been classified a maximum of 5 levels which are presented by 5 different colours, including: Level 1 with light blue indicates light intensity of risk; Level 2 with light yellow indicates medium intensity; Level 3 with orange indicates significant.</p>
<p>BEHAVIOUR</p> <p>Natural disasters are traumatic events and it is thus likely that they affect individuals behavior in the short and possibly longer term.</p>	<p>CHANNELS of BEHAVIOUR</p> <p>ONLINE What kind of actions do customers take online? Extract online channels.</p> <p>OFFLINE What kind of actions do customers take offline?</p>
<p>PROBLEM ROOT CAUSE</p> <p>Causes for such calamities can be contributed to deforestation, soil erosion, and pollution.</p>	<p>YOUR SOLUTION</p> <p>Nature based solutions, such as conserving forests, wetlands and coral reefs, can help communities prepare for, cope with, and recover from disasters, including slow-on set events such as drought.</p>

CHAPTER - 4

REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS

Disaster management is a challenging but highly rewarding career. disaster management coordinates the responses to major disasters such as floods, earthquakes, wildfires and terror attacks whilst minimizing the impact on those affected. It is skilled work needing significant expertise. If you want to get into disaster management, there are a number of key requirements you should meet. Maintain customer service by minimizing disruptions of business operations Protect facilities, physical assets and electronic information.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story/Sub-Task)
FR-1	User Requirements	Awareness of disasters, Guidelines about disaster management, Clear note about the disasters.

FR - 3	UserConfirmation	Confirmation via Phone Confirmation via Email Confirmation via OTP
FR - 4	Payment Options	CashonDelivery Debit Card/Credit Card Net Banking,Paytm Wallet and UPI
FR - 5	Product Delivery and Installation	Door Step Delivery Take Away Free installation
FR - 6	Product Feedback	Through WebPage Through Phone Calls ThroughGoogle Forms

4.2 NON-FUNCTIONAL REQUIREMENTS

Non functional Requirements (NFRs) define system attributes such as security, reliability, performance, maintainability, scalability, and usability. They serve as constraints or restrictions on the design of the system across the different backlogs. It Have a clear and self-explanatory manual. Application has to be secured with two step authorization passwords and passkeys will be assigned as per the users need. Hardwarerequire a regularchecking and serviceSoftware may be updated periodically immediate alert is provided in case of any system failure. It depends on the patient's need and the user'scustomization. The product has to cover all the space of isolation wards irrespective of the siz or area of a medical field.

FR NO.	Non-Functional Requirement	Description
NFR-1	Usability	Have a clear and self explanatory manual. Easier to use.
NFR-2	Security	Application has to be secured with two step authorization, Passwords and pass keys will be assigned as per the users need.
NFR-3	Reliability	Hardware require a regular checking and service Software may be updated periodically immediate alert is provided in case of any system failure.
NFR-4	Performance	The application must have a good interface. The system provides acknowledgment in just one second once the 'patient's information is checked.
NFR-5	Availability	All the features will be available when the user requires. It depends on the patient's need and the user's customization.
NFR-6	Scalability	The product has to cover all the space of isolation wards Irrespective of the size or area of a medical field.

CHAPTER - 5

PROJECT DESIGN

5.1 DATA FLOW DIAGRAM

User, have to register for the application by entering my email,password,and confirming my password by using it can access by account/dashboard the use will receive confirmation email once then it have registered for the application by confirming the email & click confirm mail. Then it can also register through the application via Facebook by registering and accessing through the dashboard with Facebook Login.The other method is to register the application through the email and access through the dashboard with email Login.Then it can loged into the application by entering email& password to get into the dashboard.It can able to monitor the devices as well as the cloud servicesto contact customer care executive at any time.The user can get the alert message an dinstant environmental parameters by clicking the message box as well as the alarm systeminour industry.Theuser have to start the program by making the decision and signup that have to logged into the authentication by registration profile.The data collection for natural disaster have to predict the disaster by pressing or indicating it into the alert alert message an dinstant environmental parameter.

Flow

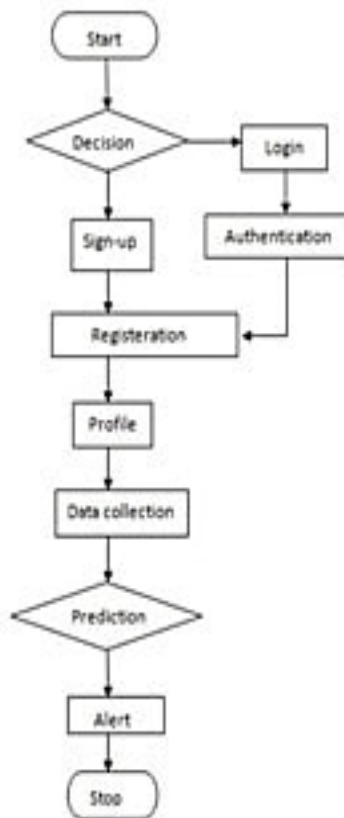
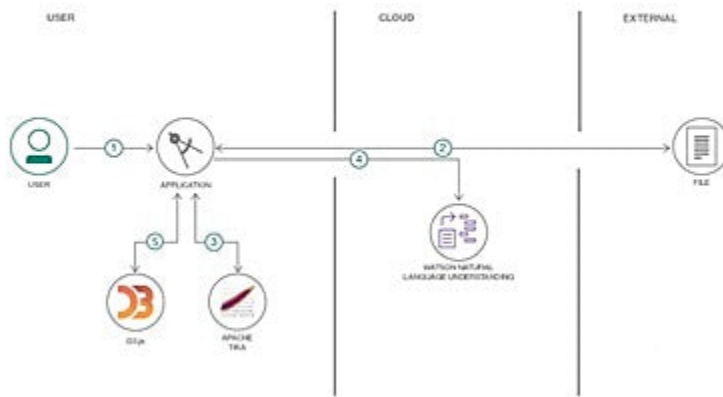
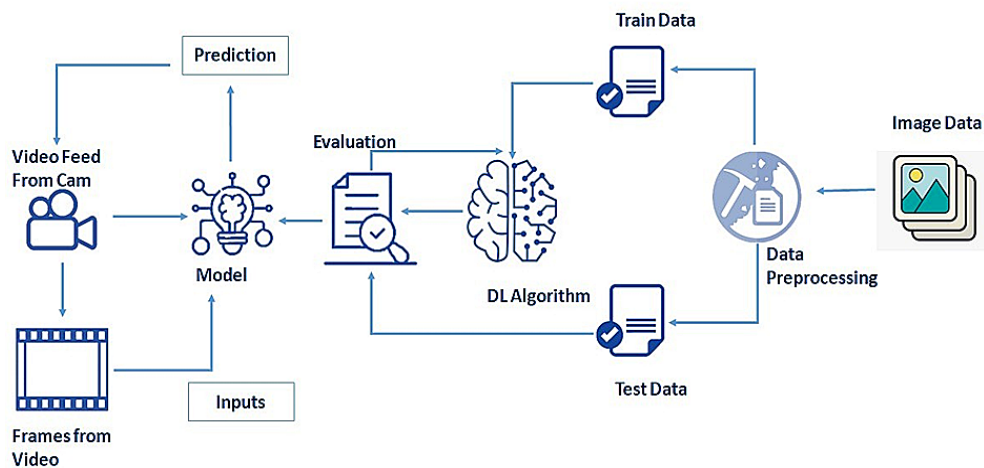


Figure 5.1 Data Flow

5.2 SOLUTION & TECHNICAL ARCHITECTURE

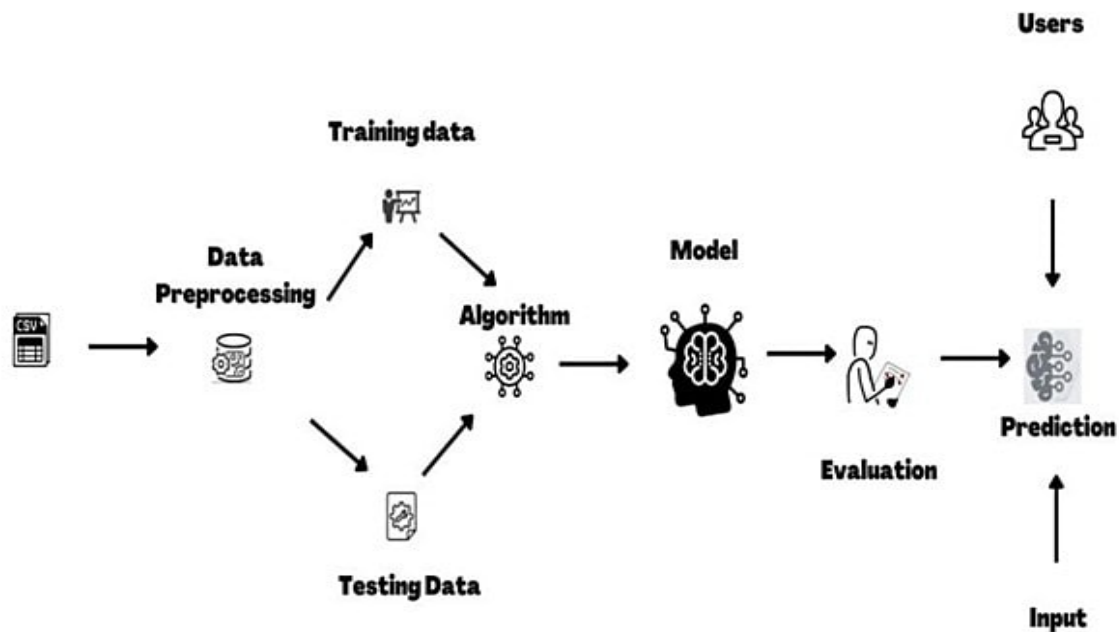
TECHNICAL ARCHITECTURE

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. Many deep learning techniques have been applied by various researchers to detect and classify natural disasters to overcome losses in ecosystems, but detection of natural disasters still faces issues due to the complex and imbalanced structures of images. 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 show cased on the OpenCV window.



SOLUTION ARCHITECTURE

Solution architecture is the initial step taken when an organization aims to create a set of enterprise solutions, applications and processes that integrate with each other in order to address specific needs and requirements and that of en lead to software architecture and technical architecture work The solution architecture is described in a document that specifies acerta in level of vision for all current ad future solutions,applications and processes that the organization has design and development of solutions an applications then follow the guidelines specified in the solution architecture document to ensure that they conform to set standards that make integration and communication easier, and make the tracking of problems and in consistencies between well solutions easier as well.



5.3 USER STORIES

Sprint	Functional Requirement	User Story Number	User Story/ Task	Story Points	Priority	Team Members
Sprint-I	Registration	USN-I	As a user, I can register for the application by entering my email, password, and confirming my password.	8	High	Harini V
Sprint-I	Login	USN-2	As a user, I can log into the application by entering email & password.	8	High	Soniya A
Sprint-2	Data Sync	USN-6	Syncing the data given to the website.	3 8	Medium	Sathish H
Sprint 3	Enhancement Phase	USN-18	Creating a Main web page.	8	High	Indhumathi A
Sprint-4	Run the application	USN-19	Connecting the frontend and backend using API.	8	High	Kavvya V

CHAPTER-6

PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANNING ESTIMATION

SPRINT-I:

Functional Requirement - Building HTML pages for login and Registration.

StoryPoints-8

Task1-Develop HTML and CSS for login and registration.

Task 2-Develop Java script code and attach to HTML

SPRINT-II:

Functional Requirement - Creation the main page and collecting data for image processing

Story Points-7

Task1-Creating main page using HTML.

Task2-Collecting the dataset for image processing.

SPRINT-III:

Functional Requirement - Data Collection and Preprocessing.

Story Points-8

Task1–Taking pre-processing measures

for better data.

Task2– Image data generator.

Task3–Generating

SPRINT-IV:

Functional Requirement – Run the application.

StoryPoints– 8

Task1–Merge the frontend and back end

code.

Task2–Run the application.

6.2 SPRINT DELIVERY SCHEDULE:

SPRINT	DURATION	SPRINT START DATE	SPRINT END DATE(PLANNED)	SPRINT END DATE(ACTUAL)
Sprint1	03Days	24Oct2022	26Oct2022	26Oct2022
Sprint2	10Days	27Oct2022	10Nov2022	10Nov2022
Sprint3	02Days	11Nov2022	09Nov2022	09Nov2022
Sprint4	03Days	10Nov2022	12Nov2022	12Nov2022

6.3 REPORTS FROM JIRA

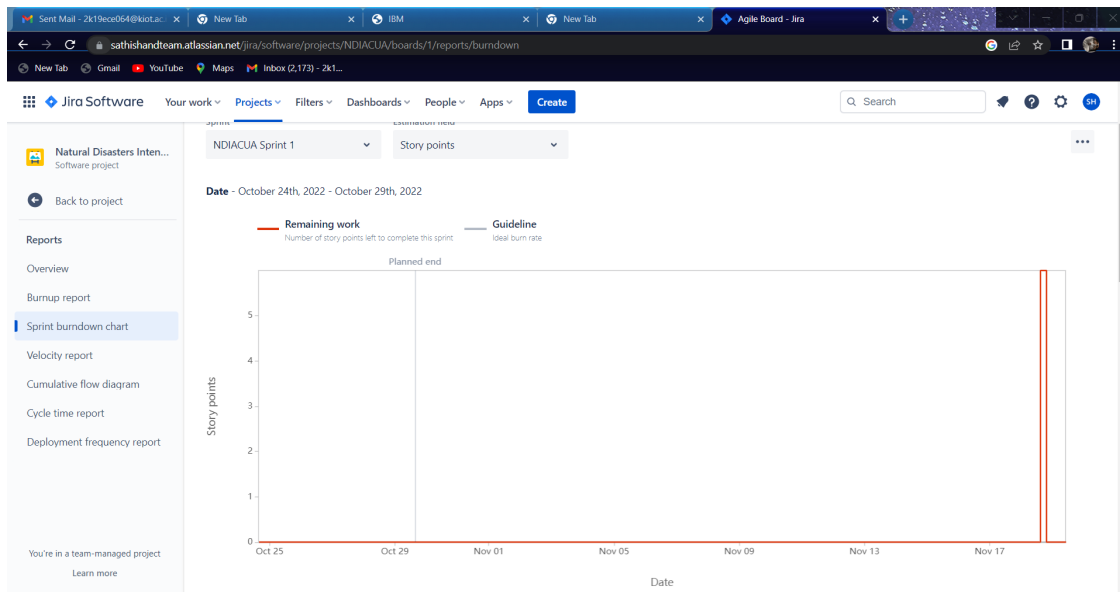


Figure 6.3.1 Jira report

VELOCITY REPORT

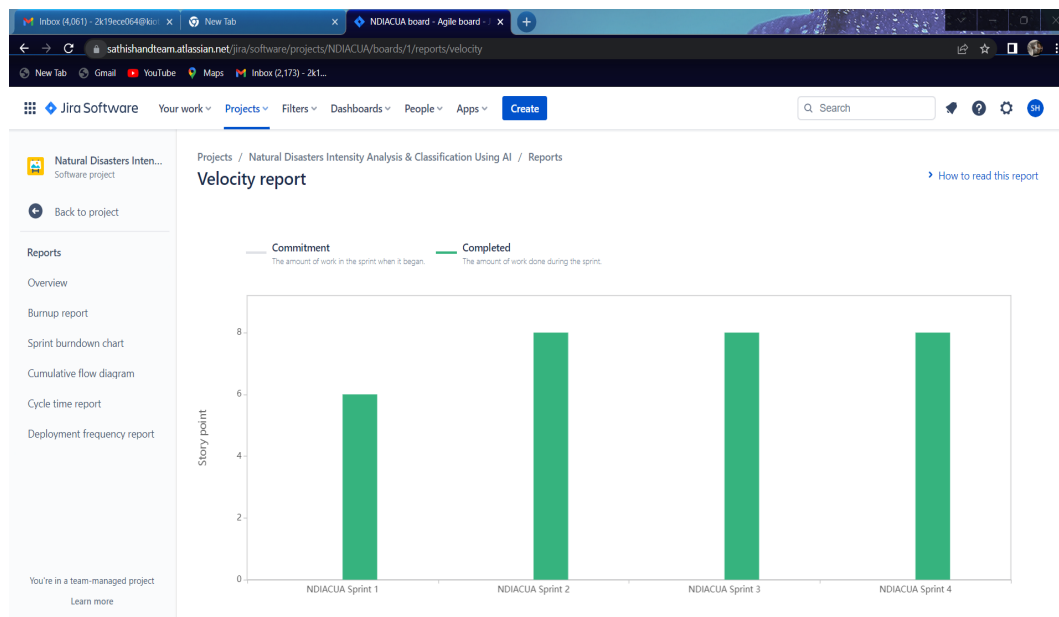


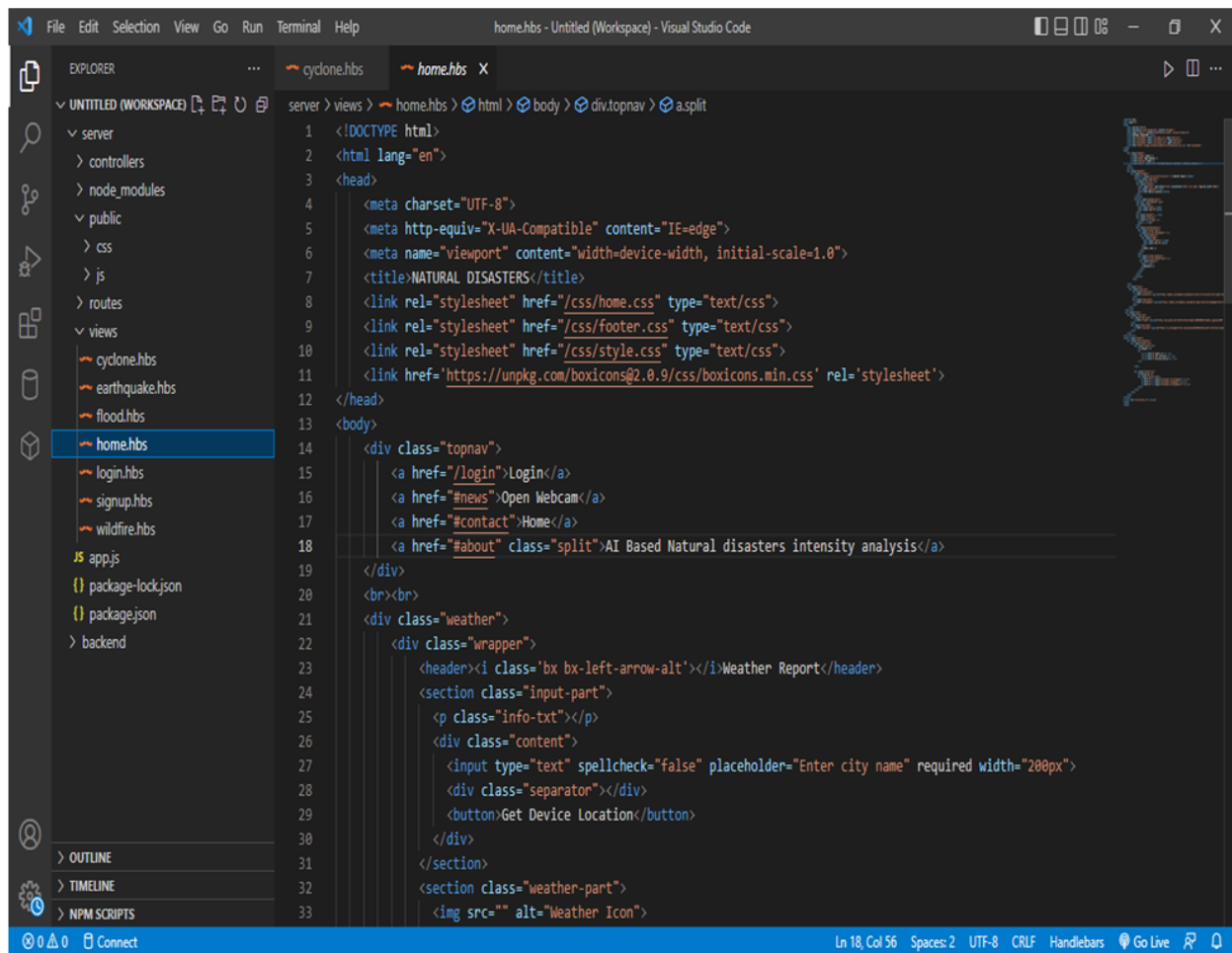
Figure 6.3.2 Velocity Report

CHAPTER-7

CODING AND SOLUTIONING

7.1 FEAUTURE 1

We have included the options like **weather widget** in our website.By this option we can know the temperature and weather report in our current location. The weather widget can display the current weather,a weather forecast for the next few gradients and no images are used.

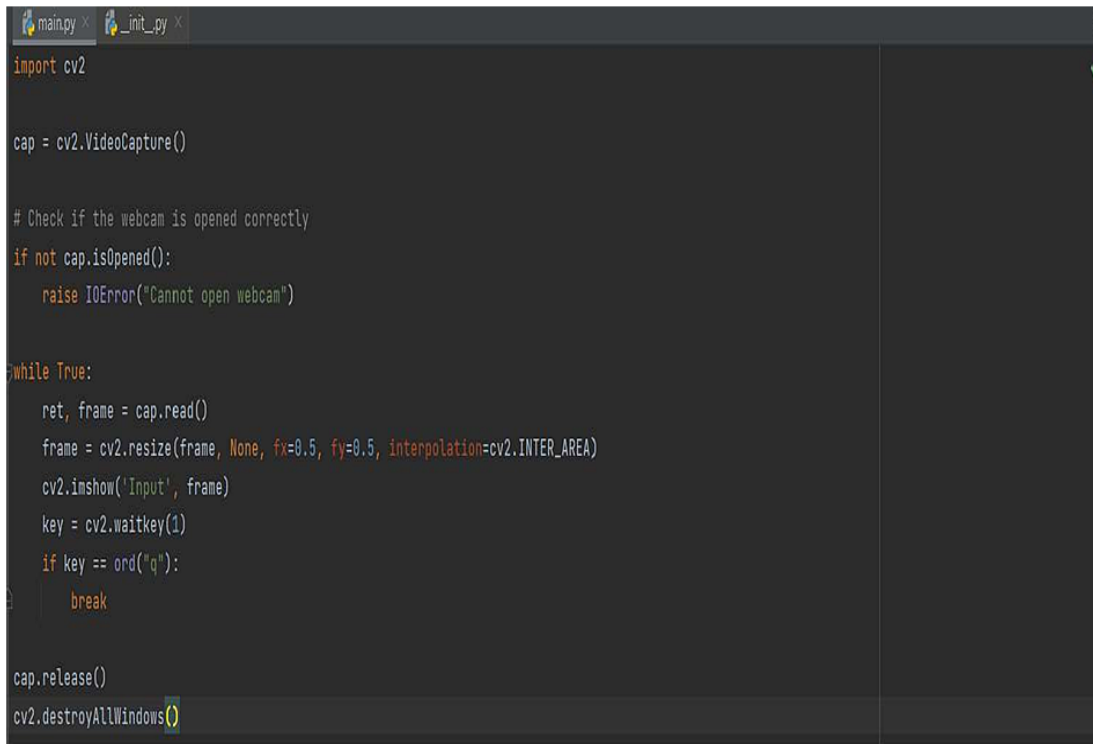
The image is a screenshot of the Visual Studio Code editor. The Explorer panel on the left shows a project structure with folders like 'server', 'public', and 'views'. The 'home.hbs' file is selected. The main editor area displays the HTML code for this file. The code includes a DOCTYPE declaration, meta tags for charset, viewport, and title, and several CSS links. The body contains a top navigation bar with links for login, news, contact, and about. Below this is a weather widget section with a header, an input field for city name, a button to get device location, and a placeholder for weather information. The status bar at the bottom indicates the current line and column (Ln 18, Col 56) and other settings like UTF-8 encoding and CRLF line endings.

```
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <meta http-equiv="X-UA-Compatible" content="IE=edge">
6   <meta name="viewport" content="width=device-width, initial-scale=1.0">
7   <title>NATURAL DISASTERS</title>
8   <link rel="stylesheet" href="/css/home.css" type="text/css">
9   <link rel="stylesheet" href="/css/footer.css" type="text/css">
10  <link rel="stylesheet" href="/css/style.css" type="text/css">
11  <link href="https://unpkg.com/boxicons@2.0.9/css/boxicons.min.css" rel="stylesheet">
12 </head>
13 <body>
14   <div class="topnav">
15     <a href="/login">Login</a>
16     <a href="/news">Open Webcam</a>
17     <a href="/contact">Home</a>
18     <a href="/about" class="split">AI Based Natural disasters intensity analysis</a>
19   </div>
20   <br><br>
21   <div class="weather">
22     <div class="wrapper">
23       <header><i class="bx bx-left-arrow-alt"></i>Weather Report</header>
24       <section class="input-part">
25         <p class="info-txt"></p>
26         <div class="content">
27           <input type="text" spellcheck="false" placeholder="Enter city name" required width="200px">
28           <div class="separator"></div>
29           <button>Get Device Location</button>
30         </div>
31       </section>
32       <section class="weather-part">
33         <img src="" alt="Weather Icon">
```

Figure 7.1.1 HTML code

FEATURE2: BACK-END

We have developed a code for image processing.

A screenshot of a Python IDE with two tabs: 'main.py' and '_init_.py'. The 'main.py' tab is active and contains the following code:

```
import cv2

cap = cv2.VideoCapture()

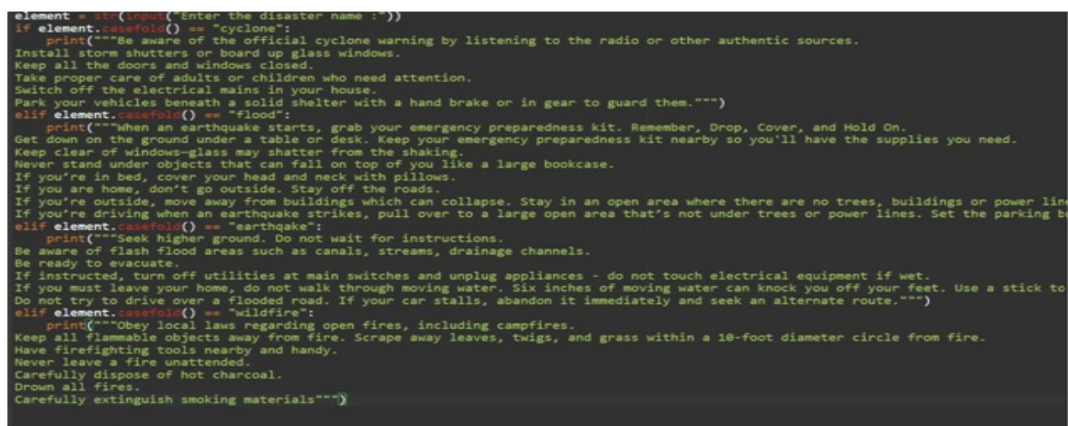
# Check if the webcam is opened correctly
if not cap.isOpened():
    raise IOError("Cannot open webcam")

while True:
    ret, frame = cap.read()
    frame = cv2.resize(frame, None, fx=0.5, fy=0.5, interpolation=cv2.INTER_AREA)
    cv2.imshow('Input', frame)
    key = cv2.waitKey(1)
    if key == ord('q'):
        break

cap.release()
cv2.destroyAllWindows()
```

Figure 7.1.2 Webcam Code

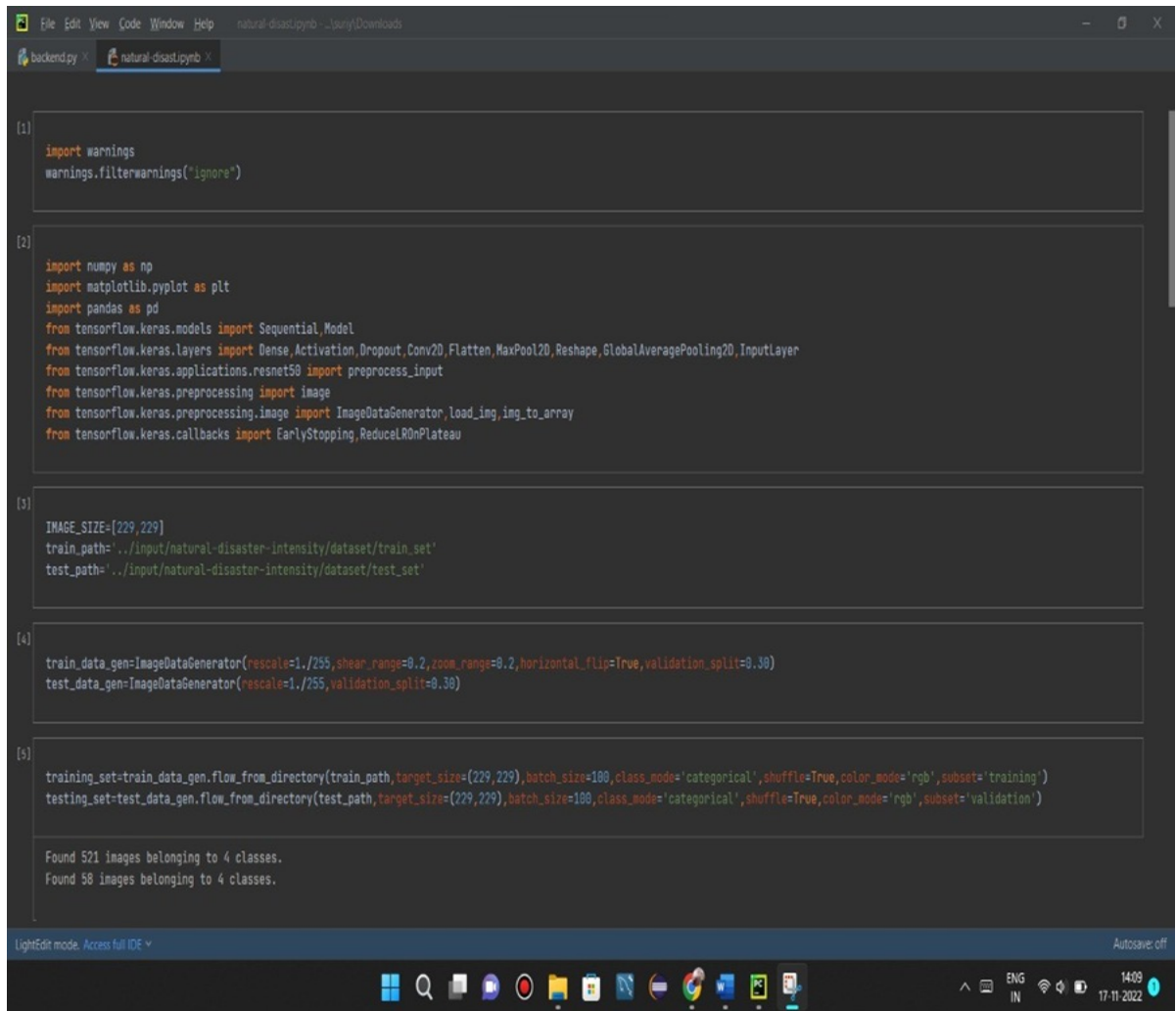
We have included the options like precautions in our backend code. By this option it will predictor intimate the precaution of the disaster.

A screenshot of a Python IDE showing a code snippet for disaster prediction. The code prompts the user to enter a disaster name and then provides specific instructions for each type of disaster:

```
element = str(input("Enter the disaster name :"))
if element.casefold() == "cyclone":
    print("""Be aware of the official cyclone warning by listening to the radio or other authentic sources.
    Install storm shutters or board up glass windows.
    Keep all the doors and windows closed.
    Take proper care of adults or children who need attention.
    Switch off the electrical mains in your house.
    Park your vehicles beneath a solid shelter with a hand brake or in gear to guard them.""")
elif element.casefold() == "flood":
    print("""When an earthquake starts, grab your emergency preparedness kit. Remember, Drop, Cover, and Hold On.
    Get down on the ground under a table or desk. Keep your emergency preparedness kit nearby so you'll have the supplies you need.
    Keep clear of windows-glass may shatter from the shaking.
    Never stand under objects that can fall on top of you like a large bookcase.
    If you're in bed, cover your head and neck with pillows.
    If you are home, don't go outside. Stay off the roads.
    If you're outside, move away from buildings which can collapse. Stay in an open area where there are no trees, buildings or power lines.
    If you're driving when an earthquake strikes, pull over to a large open area that's not under trees or power lines. Set the parking brake.
elif element.casefold() == "earthquake":
    print("""Seek higher ground. Do not wait for instructions.
    Be aware of flash flood areas such as canals, streams, drainage channels.
    Be ready to evacuate.
    If instructed, turn off utilities at main switches and unplug appliances - do not touch electrical equipment if wet.
    If you must leave your home, do not walk through moving water. Six inches of moving water can knock you off your feet. Use a stick to
    Do not try to drive over a flooded road. If your car stalls, abandon it immediately and seek an alternate route.""")
elif element.casefold() == "wildfire":
    print("""Obey local laws regarding open fires, including campfires.
    Keep all flammable objects away from fire. Scrape away leaves, twigs, and grass within a 10-foot diameter circle from fire.
    Have firefighting tools nearby and handy.
    Never leave a fire unattended.
    Carefully dispose of hot charcoal.
    Drown all fires.
    Carefully extinguish smoking materials""")
```

Figure 7.1.3 Code for Prediction

We built a model for train set and test set using python flask.



```
[1] import warnings
warnings.filterwarnings("ignore")

[2] import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
from tensorflow.keras.models import Sequential, Model
from tensorflow.keras.layers import Dense, Activation, Dropout, Conv2D, Flatten, MaxPool2D, Reshape, GlobalAveragePooling2D, InputLayer
from tensorflow.keras.applications.resnet50 import preprocess_input
from tensorflow.keras.preprocessing import image
from tensorflow.keras.preprocessing.image import ImageDataGenerator, load_img, img_to_array
from tensorflow.keras.callbacks import EarlyStopping, ReduceLROnPlateau

[3] IMAGE_SIZE=(229, 229)
train_path= '../input/natural-disaster-intensity/dataset/train_set'
test_path= '../input/natural-disaster-intensity/dataset/test_set'

[4] train_data_gen=ImageDataGenerator(rescale=1./255, shear_range=0.2, zoom_range=0.2, horizontal_flip=True, validation_split=0.30)
test_data_gen=ImageDataGenerator(rescale=1./255, validation_split=0.30)

[5] training_set=train_data_gen.flow_from_directory(train_path, target_size=(229, 229), batch_size=100, class_mode='categorical', shuffle=True, color_mode='rgb', subset='training')
testing_set=test_data_gen.flow_from_directory(test_path, target_size=(229, 229), batch_size=100, class_mode='categorical', shuffle=True, color_mode='rgb', subset='validation')

Found 521 images belonging to 4 classes.
Found 58 images belonging to 4 classes.
```

Figure 7.1.4 Python Flask

CHAPTER –8

TESTING

8.1 TESTCASE

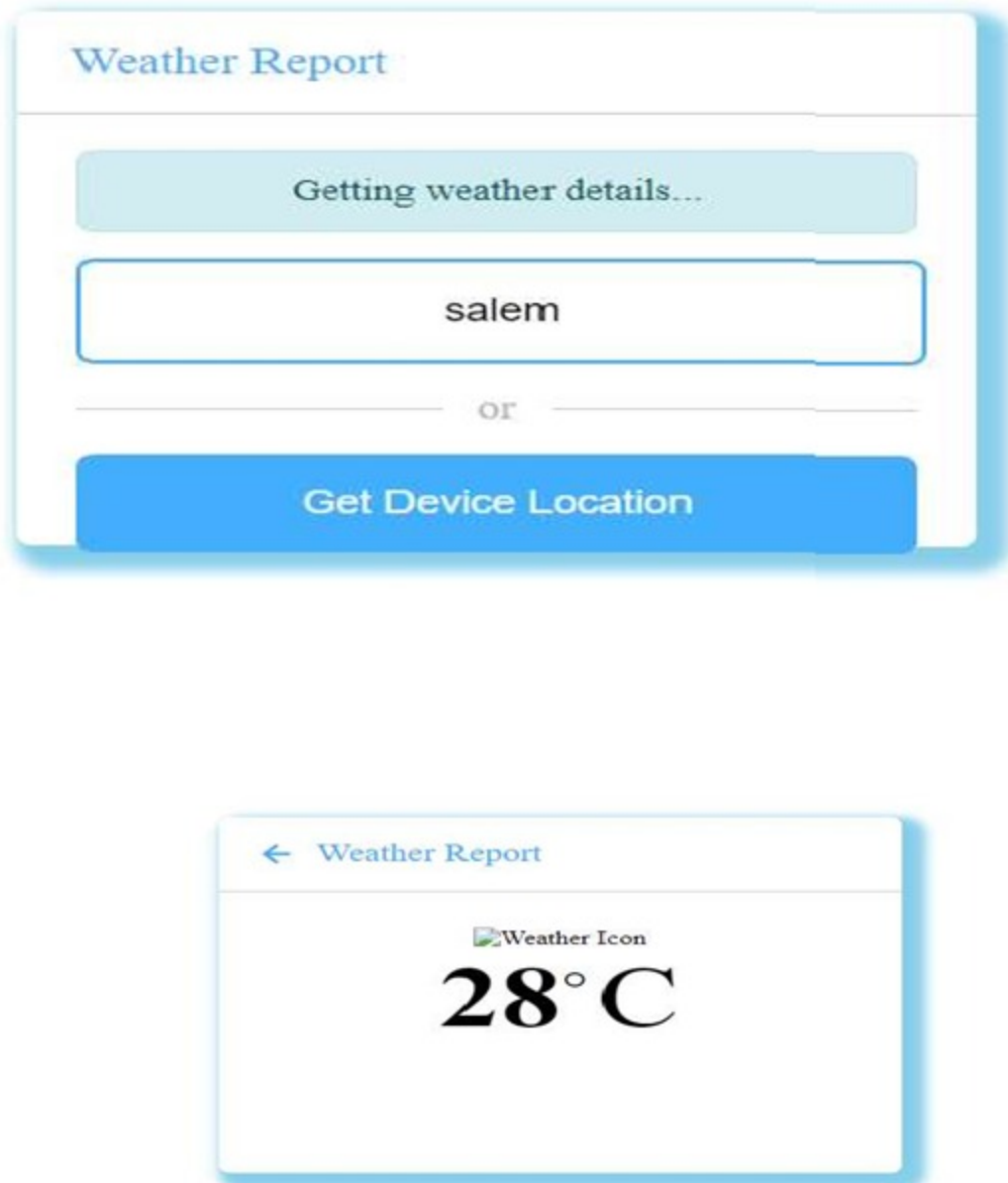


Figure 8.1.1 Weather Widget

Output for the model building for train set and test set using python flask.

```
backendspy - natural-disaster.py
Epoch 18/20
4/6 [=====] - 34s 4s/step - loss: 0.5233 - accuracy: 0.7927 - val_loss: 1.2129 - val_accuracy: 0.5862
Epoch 19/20
4/6 [=====] - 33s 4s/step - loss: 0.4238 - accuracy: 0.8196 - val_loss: 1.0063 - val_accuracy: 0.7241
Epoch 20/20
4/6 [=====] - 33s 5s/step - loss: 0.3634 - accuracy: 0.8676 - val_loss: 1.0333 - val_accuracy: 0.7984

<keras.callbacks.History at 8x779ec4777850>

[51]
model.save("nature.h5")

[52]
from tensorflow.keras.models import load_model
from keras.preprocessing import image
model = load_model("nature.h5")

[53]
a = ['Cyclone', 'earthquake', 'flood', 'Wildfire']
img = image.load_img('.../input/natural-disaster-intensity/dataset/test-set/Cyclone/876.jpg',
                    target_size=(229, 229))
x = image.img_to_array(img)
x = x.expand_dims(x, axis=0)
pred = model.predict(x)
a[pred]

'Cyclone'

[54]
testing_set.class_indices

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

Figure 8.1.2 Python Flask Output

Output for the weather prediction.

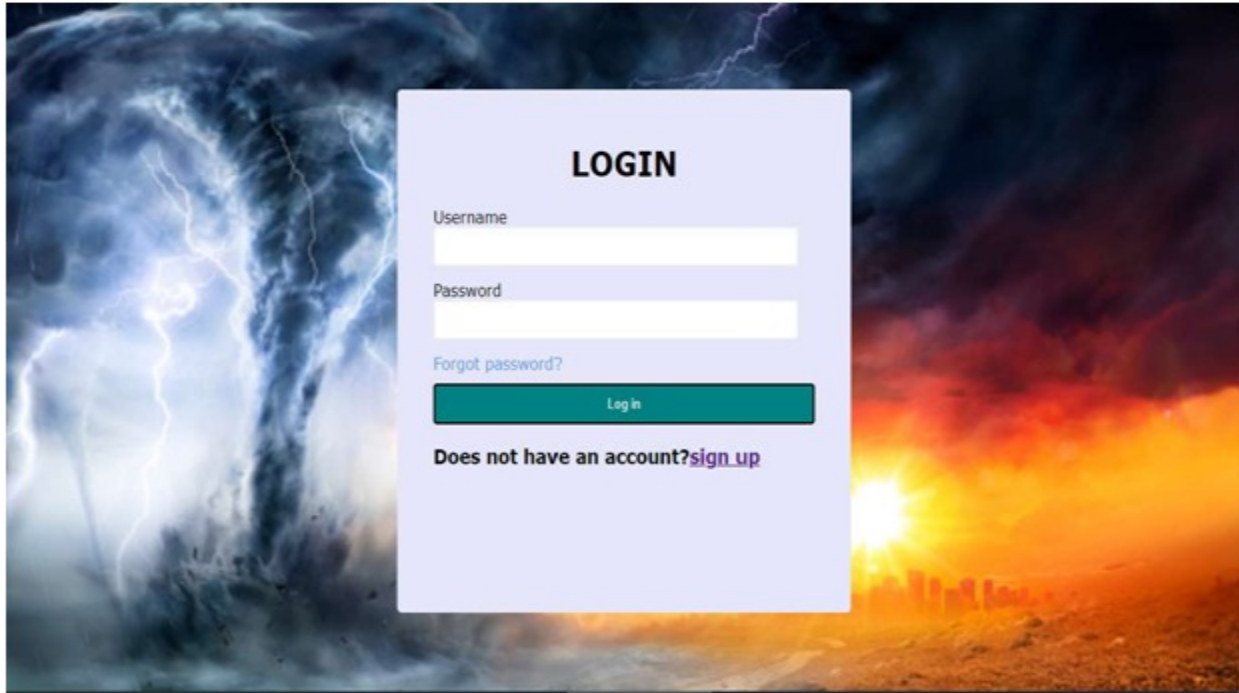
```
1 element = str(input("Enter the disaster name :"))
2 if element.casefold() == "cyclone":
3     print("""Be aware of the official cyclone warning by listening to the radio or other authentic sources.
4     Install storm shutters or board up glass windows.
5     Keep all the doors and windows closed.
6     Take proper care of adults or children who need attention.
7     Switch off the electrical mains in your house.
8     Park your vehicles beneath a solid shelter with a hand brake or in gear to guard them.""")
9 elif element.casefold() == "flood":
10     print("""When an earthquake starts, grab your emergency preparedness kit. Remember, Drop, Cover, and Hold On.
11     Get down on the ground under a table or desk. Keep your emergency preparedness kit nearby so you'll have the supplies you need.
12     Keep clear of windows-glass may shatter from the shaking.
13     Never stand under objects that can fall on top of you like a large bookcase.
14     If you're in bed, cover your head and neck with pillows.
15     If you are home, don't go outside. Stay off the roads.
16     If you're outside, move away from buildings which can collapse. Stay in an open area where there are no trees, buildings or power lines.
17     If you're driving when an earthquake strikes, pull over to a large open area that's not under trees or power lines. Set the parking
18 elif element.casefold() == "earthquake":
19     print("""Seek higher ground. Do not wait for instructions.
20     Be aware of flash flood areas such as canals, streams, drainage channels.
21

input
Enter the disaster name :flood
When an earthquake starts, grab your emergency preparedness kit. Remember, Drop, Cover, and Hold On.
Get down on the ground under a table or desk. Keep your emergency preparedness kit nearby so you'll have the supplies you need.
Keep clear of windows-glass may shatter from the shaking.
Never stand under objects that can fall on top of you like a large bookcase.
If you're in bed, cover your head and neck with pillows.
If you are home, don't go outside. Stay off the roads.
If you're outside, move away from buildings which can collapse. Stay in an open area where there are no trees, buildings or power lines.
If you're driving when an earthquake strikes, pull over to a large open area that's not under trees or power lines. Set the parking brake. Stay in the vehicle.

..Program finished with exit code 0
Press ENTER to exit console.[]
```

Figure 8.1 3 Weather Prediction Output

LOGINPAGE



LOGIN

Username

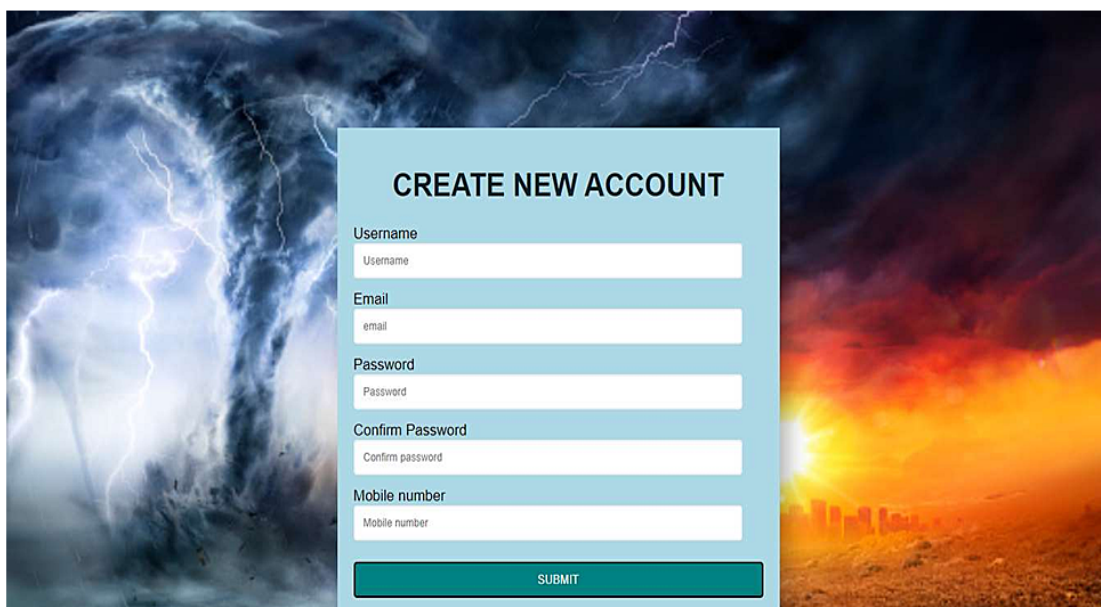
Password

[Forgot password?](#)

Does not have an account?[sign up](#)

Figure 8.1.4 Login page

SIGNUPPAGE



CREATE NEW ACCOUNT

Username

Email

Password

Confirm Password

Mobile number

Figure 8.1.5 Signup Page

8.2 USER ACCEPTANCE TESTING

S.NO	TEST SCENARIO	DESCRIPTION	TEST STEP	EXPECTED RESULT	ACTUAL RESULT	STATUS
1.	Login credentials	To test the register and login functionality of Our applications.	1.Register yourself through registration page 2.login with credentials.	Login should be success and redirect to the prediction page.	As expected	Pass
2.	User data	To display the user profile.	1.Login with your credentials. 2.Prediction page will open. 3.At the top -right of the page check the user profile.	Should able to see the correct user profile.	As expected	Pass
3.	Image processing	To display the disaster and prediction for uploaded image.	1.Upload the image. 2.Then it will show about the disaster and prediction.	Able to know about the disasters and precautions.	As expected	Pass

CHAPTER-9

9.1 PERFORMANCE METRICES

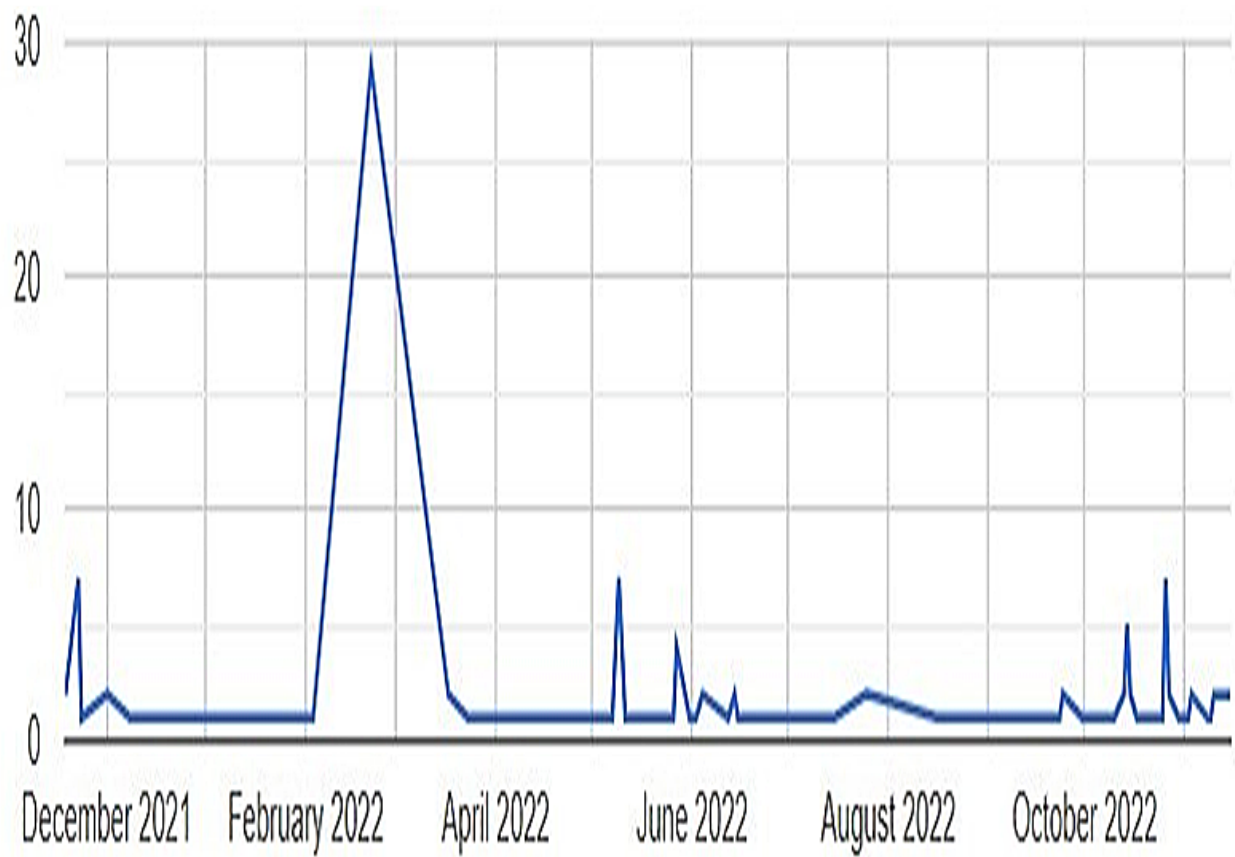


Figure 9.1 Performance Metrics

CHAPTER-10

ADVANTAGES AND DISADVANTAGES

ADVANTAGE:

1. Disaster management plays an integral role in keeping communities safe.
2. It involves coordinating the resources, such as pollution control systems, and responsibilities, such as following best practice policies, needed to prevent,prepare for,respond to, and recover from emergencies.
3. The wind will ca use top soil to be distributed to areas in which it is laking.
4. The property value and living conditions in some areas will improve through there development of infrastructure.
5. Hurricanes help to bring people together as they help each other in the after math.

DISADVANTAG:

1. An area impacted by a natural disaster will show scars of the event for years to come
2. Loss of Life.
3. Damage to the Economy
4. Serious Environmental Change.
5. Injury or other health impacts

CHAPTER-11

CONCLUSION

It is the combination of the hazard along with exposure of a vulnerable society that results in a disaster. Natural disasters can be aggravated by inadequate building norms, marginalization of people, inequities, over exploitation of resources, extreme urban sprawl and climate change. Natural disasters, like floods, earthquakes or extreme climate outbreaks, severely challenge the health and welfare of people, animals and the ecosystem. Earthquakes shake the ground surface, can cause buildings to collapse, disrupt transport and services, and can cause fires. They can trigger landslides and tsunamis. Earthquakes occur mainly as a result of plate tectonics, which involves blocks of the Earth moving about the Earth's surface. Natural disasters are catastrophic events with atmospheric, geological, and hydrological origins that can cause fatalities, property damage and social environmental disruption. Disaster management is a process of effectively preparing for and responding to disasters. It involves strategically organizing resources to lessen the harm that disasters cause. It also involves a systematic approach to managing the responsibilities of disaster prevention, preparedness, response, and recovery. This is a plan that outlines what hazards your business is at risk of facing, what you can do to avoid or manage them and how to get your business back up and running should a disaster strike. The conclusion of your disaster management plan reiterates the salient points and provides action able take a ways.

CHAPTER–12

FUTURE SCOPE

The scope of a disaster is based on the number of people adversely affected by the extreme event (killed, injured, evacuated, etc.) or the extent of the stricken geographical area. Emergency management can ensure its place in the future if it focuses on policies, programs, and activities that improve the safety and social and economic security of individuals, institutions, and communities. To do this, emergency management must focus more effort in promoting and implementing mitigation. Prevent disasters and achieve substantial reduction of disaster risk and losses in lives, livelihoods, health, and assets (economic, physical, social, cultural and environmental) Increase resilience and prevent the emergence of new disaster risks and reduce the existing risks.

It provides for horizontal and vertical integration among all the agencies and departments of the Government. The plan also spells out the roles and responsibilities of all levels of Government right up to Panchayat and Urban Local Body level in a matrix format. The plan has a regional approach, which will be beneficial not only for disaster management but also for development planning.

It is designed in such a way that it can be implemented in a scalable manner in all phases of disaster management. It also identifies major activities such as early warning, information dissemination, medical care, fuel, transportation, search and rescue, evacuation, etc. to serve as a checklist for agencies responding to a disaster.

CHAPTER 13

APPENDIX

13.1 SOURCE CODE

```
import cv2

cap = cv2.VideoCapture()

# Check if the webcam is opened correctly
if not cap.isOpened():
    raise IOError("Cannot open webcam")

while True:
    ret, frame = cap.read()
    frame = cv2.resize(frame, None, fx=0.5, fy=0.5, interpolation=cv2.INTER_AREA)
    cv2.imshow('Input', frame)
    key = cv2.waitKey(1)
    if key == ord("q"):
        break

cap.release()
cv2.destroyAllWindows()
```

```

element = str(input("Enter the disaster name :"))
if element.casefold() == "cyclone":
    print("""Be aware of the official cyclone warning by listening to the radio or other authentic sources.
    Install storm shutters or board up glass windows.
    Keep all the doors and windows closed.
    Take proper care of adults or children who need attention.
    Switch off the electrical mains in your house.
    Park your vehicles beneath a solid shelter with a hand brake or in gear to guard them.""")
elif element.casefold() == "flood":
    print("""When an earthquake starts, grab your emergency preparedness kit. Remember, Drop, Cover, and Hold On.
    Get down on the ground under a table or desk. Keep your emergency preparedness kit nearby so you'll have the supplies you need.
    Keep clear of windows-glass may shatter from the shaking.
    Never stand under objects that can fall on top of you like a large bookcase.
    If you're in bed, cover your head and neck with pillows.
    If you are home, don't go outside. Stay off the roads.
    If you're outside, move away from buildings which can collapse. Stay in an open area where there are no trees, buildings or power lines.
    If you're driving when an earthquake strikes, pull over to a large open area that's not under trees or power lines. Set the parking brake. Stay in the vehi...""")
elif element.casefold() == "earthquake":
    print("""Seek higher ground. Do not wait for instructions.
    Be aware of flash flood areas such as canals, streams, drainage channels.
    Be ready to evacuate.
    If instructed, turn off utilities at main switches and unplug appliances - do not touch electrical equipment if wet.
    If you must leave your home, do not walk through moving water. Six inches of moving water can knock you off your feet. Use a stick to test depth.
    Do not try to drive over a flooded road. If your car stalls, abandon it immediately and seek an alternate route.""")
elif element.casefold() == "wildfire":
    print("""Obey local laws regarding open fires, including campfires.
    Keep all flammable objects away from fire. Scrape away leaves, twigs, and grass within a 10-foot diameter circle from fire.
    Have firefighting tools nearby and handy.
    Never leave a fire unattended.
    Carefully dispose of hot charcoal.
    Drown all fires.
    Carefully extinguish smoking materials""")

```

13.2 GITHUM & PROJECT DEMO LINK

GITHUB LINK - <https://github.com/IBM-EPBL/IBM-Project-41219-1660640254>

PROJECT DEMO LINK - <https://youtu.be/0j7By6hMloM>

CHAPTER 14

REFERENCES

PAPER 1 - Land Surface temperature retrieval using HJ1B/IRS data and analysis of its effect.

AUTHOR - Xiaoguang Jiang

YEAR - 2013

PAPER 2 - Study on Risk assessment model of urban Drought in Hilly Area of Central Sichuan Basin.

AUTHOR - Liangqun Jiang

YEAR - 2009

PAPER 3 - Urban Damage Detection Using Decorrelation of SAR Interferometric Data.

AUTHOR - C .Yonezawa

YEAR - 2003

