Natural Disaster Intensity Analysis and Classification

PROJECT REPORT

UNDER THE GUIDANCE OF

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FACULTY MENTOR(S)NAME : **Sujeetha D**

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APPLICATION DOMAIN: Artificial Intelligence

COLLEGE NAME: Mahendra Engineering College

Project Report Format

1. **INTRODUCTION**
   1.1. Project Overview

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. 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.

1.2 Purpose

To tackle this problem, we developed a multi-layered 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.

2. LITERATURE SURVEY

2.1 Existing problem

PROJECT DESCRIPTION:

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 multi-layered 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.

SURVEY:

PAPER-01:

NAME:

Natural Disasters Intensity Analysis and ClassificationBased onMultispectral Images Using Multi-Layered Deep ConvolutionalNeural Network.

WORK:

Deep learning, natural disasters intensity and classification, convolutional neural network.

TOOLS FOR ALOGRITHM:

Convolutional Neural Network

FINDINGS:

The proposed model works in two blocks: Block-I convolutional neural network (B-I CNN), for detection and occurrence of disasters, and Block-II convolutional neural network (B-II CNN), for classification of natural disaster intensity types with different filters and parameters.

PAPER-02:

NAME:

Recent Efforts in Earthquake Prediction(1990–2007) Ashif Panakkat and Hojjat Adeli.

WORK:

Datacollection, Seismicity, Mathematical predication.

FINDINGS:

The most significant recent efforts in predicting the three earthquake parameters, namely, the time of occurrence, epicentral location, and the magnitude of future earthquakes are reviewed. Prediction studies can be broadly grouped based on the basic approach, which vary from purely theoretical geophysics, to genetic mutations and biology, to statistical, mathematical, and computational modelling of earthquake parameter data recorded in historical catalogs of seismic regions. The papers reviewed in this article are classified into two groups: (1) studies based on recording and analysing earthquake precursors (seismic monitoring); and (2) studies based on historic earthquake data analysis.

PAPER-03:

NAME:

UAV Image-based Forest Fire Detection Approach Using Convolutional Neural Network

WORK:

Wildfire detection; fire classification on; fire segmentation; vision transformers; UAV; aerialimage

TOOLS FOR ALOGRITHM:

Convolutional Neural Network

FINDINGS:

EfficientNet-B5 andDenseNet-201 models, is proposed to identify and classify wildfire using aerial images. In addition, two vision transformers (Transnet and Trans Fire) and adeep convolutionalmodel(EfficientSeg) were employed to segment wildfire regions and determine the precise fire regions.

PAPER-04:

NAME:

UAVs in Disaster Management:Application ofIntegrated AerialImagery andConvolutional Neural Network for Flood Detection

Authors:

Afiz Suliman Munawar**,** Fahim Ullah**,** Siddra Qayyum**,** Sara Imran Khan**,** MohammadMojtahedi

WORK:

Convolutional neural network (CNN); Disaster management; aerial imagery; flood detection;Unmannedaerial vehicles (UAVs)

TOOLS FOR ALOGRITHM:

Convolutional Neural Network

FINDINGS:

For training phase, 2150 image patches are created by resizing and cropping source images. These patches in training dataset train CNN model to detect and extract the regions where a flood related change has occurred. This model is tested against both pre and post disaster images to validate it .0 highlights the occurrence of a disaster, whereas 1 represents nodisaster**s**

PAPER-05:

NAME:

Current efforts for prediction and assessment of natural disasters: Earthquakes, tsunamis, volcanic eruptions, hurricanes, tornados and floods

AUTHOR:

P. AMezquita-Sanc
M.Valtierra-Rodriguez,
H. Adeli

WORK:

Big Data Prediction

FINDINGS:

Signal and image processing techniques and statistical analyses used for prediction and assessment of natural disasters

2.2 References

~https://www.researchgate.net/publication/350830884_Natural_Disasters_Intensity_Analysis_anticlassicismation_Based_on_Multispectral_Images_ Using_Multi-Layered_Deep_Convolution al_Neural_Network.

~https://www.researchgate.net/publication/248880503_Recent_Efforts_in_Earthquake_Prediction_1990-2007

~ https://www. researchgate. net/publication /335865644 _UAV_Image based_Forest_Fire_Detection_Approach Using_Convolutional_Neural_Network

~https://www.researchgate.net/publication/353015053_UAVs_in_Disaster_Management_Application_of_Ing rated_Aerial_Imagery_and_Convolutional_Neural_Network_for_ Flood_Detection

~https://www.magiran.com/paper/1779408/?lang=n

2.3 Problem Statement Definition

Customer Problem Statement Template:

Create a problem statement to understand your customer's point of view. The Customer Problem Statement template helps you focus on what matters to create experiences people will love.

A well-articulated customer problem statement allows you and your team to find the ideal solution for the challenges your customers face. Throughout the process, you'll also be able to empathize with your customers, which helps you better understand how they perceive your product or service.

I am	Describe customer with 3-4 key characteristics - *who are they?*	Describe the customer and their attributes here
I'm trying to	*List their outcome or "job" the care about - what are they trying to achieve?*	List the thing they are trying to achieve here
but	Describe what problems or barriers stand in the way – *what bothers them most?*	Describe the problems or barriers that get in the way here
because	Enter the "root cause" of why the problem or barrier exists – *what needs to be solved?*	Describe the reason the problems or barriers exist
which makes me feel	Describe the emotions from the customer's point of view – *how does it impact them emotionally?*	Describe the emotions the result from experiencing the problems or barriers

Problem Statement for "Natural Disaster Intensity Analysis and Classification using Artificial Intelligence."

PROBLEM STATEMENT 1:

PROBLEM STATEMEN 2:

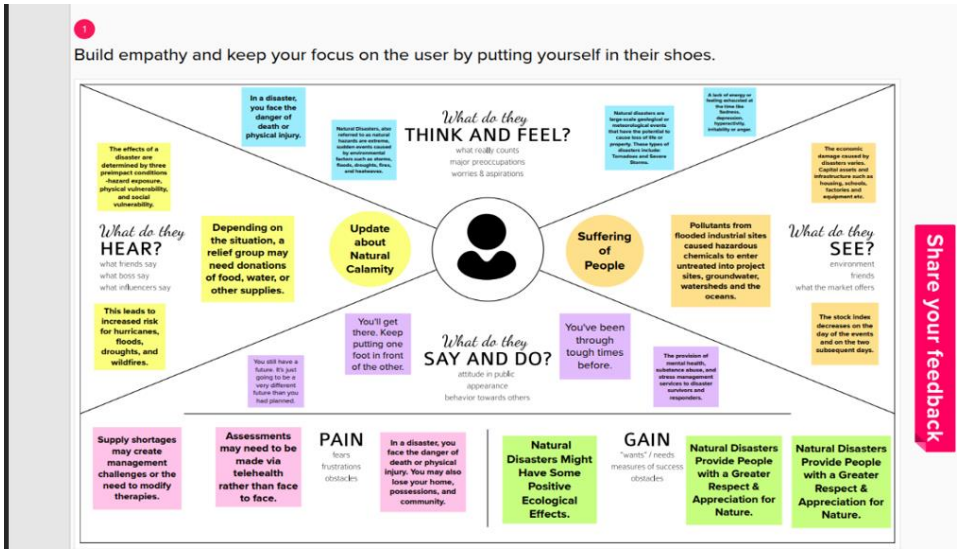
PROBLEM STATEMENT 1& PROBLEM STATEMEN 2

Problem Statement (PS)	**I am (Customer)**	**I'm trying to**	**But**	**Because**	**Which makes me feel**
Problem Statement-1	An employee from NDRF	Classify the type of natural disaster	It is difficult to identify	The data is of images and images are of various forms	Tensed and frustrated

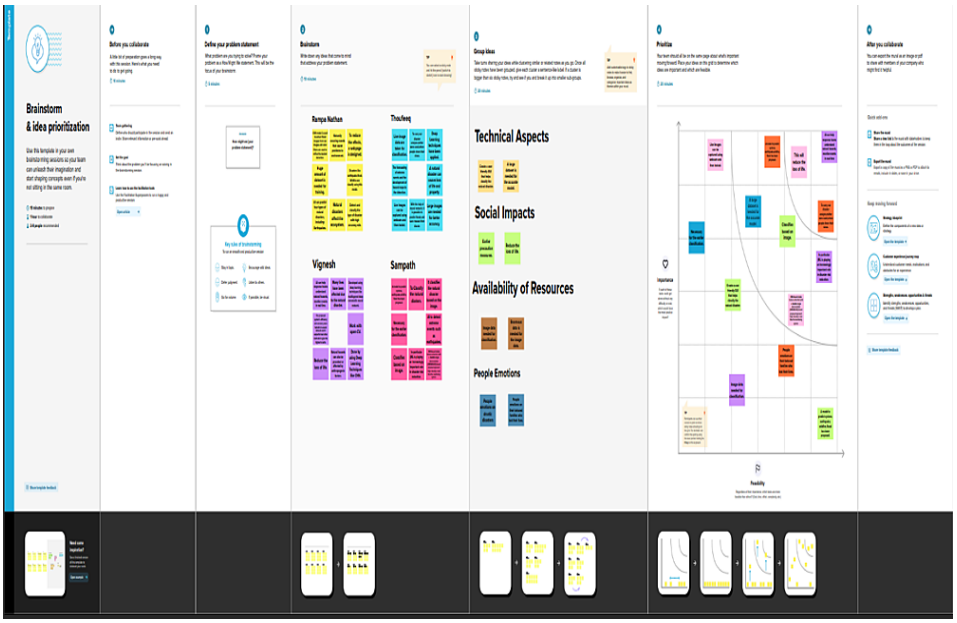
Problem Statement-2	A student	Classify the type of natural disaster in order to learn about that disaster	It is difficult to identify	The data is of images and images are of various forms	Tensed and frustrated

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canva



3.2 Ideation & Brainstorming



3.3 Proposed Solution

S. No	Parameter	Description
1.	Problem Statement (Problem to be solved)	To classify the natural disaster and the effect based on the webcam image given as input using Artificial Intelligence
2.	Idea / Solution description	The classification is done by deep learning techniques such as Convolutional Neural Network (CNN) and Machine Learning Techniques.
3.	Novelty / Uniqueness	It is based on the satellite and multispectral image and the classification using Multi-layered Deep Convolutional Neural Networks.
4.	Social Impact / Customer Satisfaction	The people can easily identify the type of natural disaster and its effect on the environment which leads to the earlier identification and reduced damage in the ecosystem.

5.	Business Model (Revenue Model)	We build a system that classifies the natural disaster and its intensity and it is believed that the website is useful for all people and also the website works for a long time effectively.
6.	Scalability of the Solution	The website will be made available for all the people who needs to classify the type of natural disaster. The machine learning and deep learning algorithms that are being used made it easier for the classification and intensity analysis.

3.4 Problem Solution fit

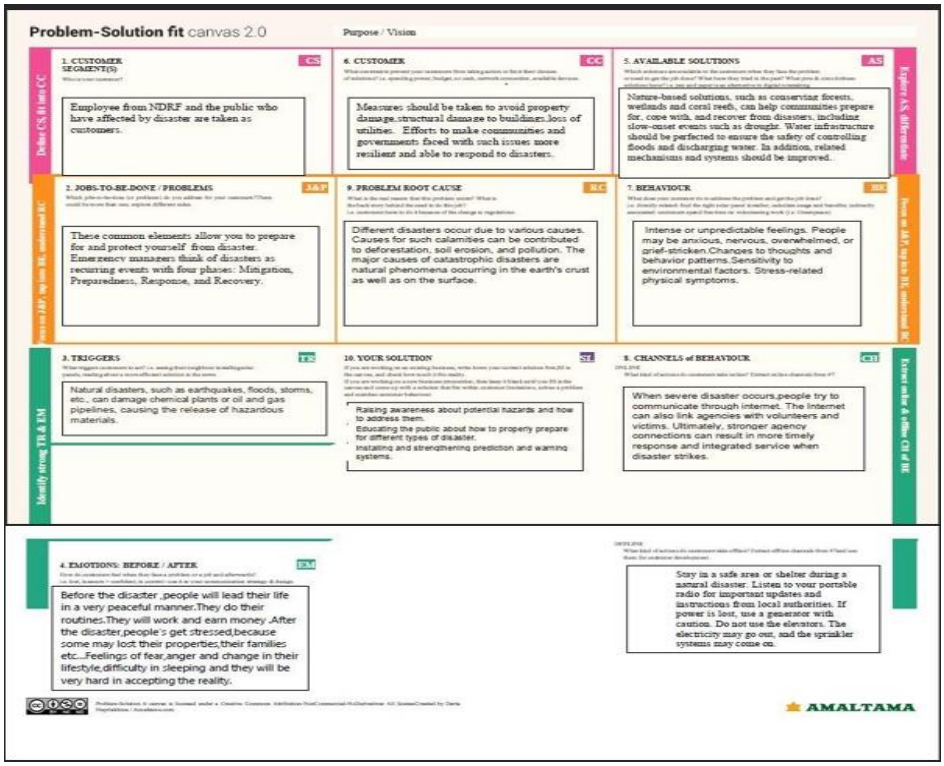
The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it actually solves the customer's problem. It helps entrepreneurs, marketers and corporate innovators identify behavioural patterns and recognize what would work and why?

Purpose:

- Solve complex problems in a way that fits the state of your customers.
- Succeed faster and increase your solution adoption by tapping into existing mediums and channels of behaviour.
- Sharpen your communication and marketing strategy with the right triggers and messaging.
- Increase touch-points with your company by finding the right problem-behaviour fit and building trust by solving frequent annoyances, or urgent or costly problems.

- Understand the existing situation in order to improve it for your target group

Problem Solution Fit for Natural Disaster Intensity Analysis and Classification Using Artificial Intelligence



4. REQUIREMENT ANALYSIS

4.1 Functional requirement

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Request Permission	Access permission from web camera.
FR-2	Disaster Prediction	Based on the webcam image, natural disaster is classified.
FR-3	Accuracy	Since the training and testing images are huge, the accuracy is higher.

FR-4	Speed	The generation of results from the input images are faster.
FR-5	Resolution	The resolution of the integrated web camera should be high enough to capture the video frames.
FR-6	User Interface	Maximizing the interaction in Web Designing Service.

4.2 Non-Functional requirement

Following are the non-functional requirements of the proposed solution

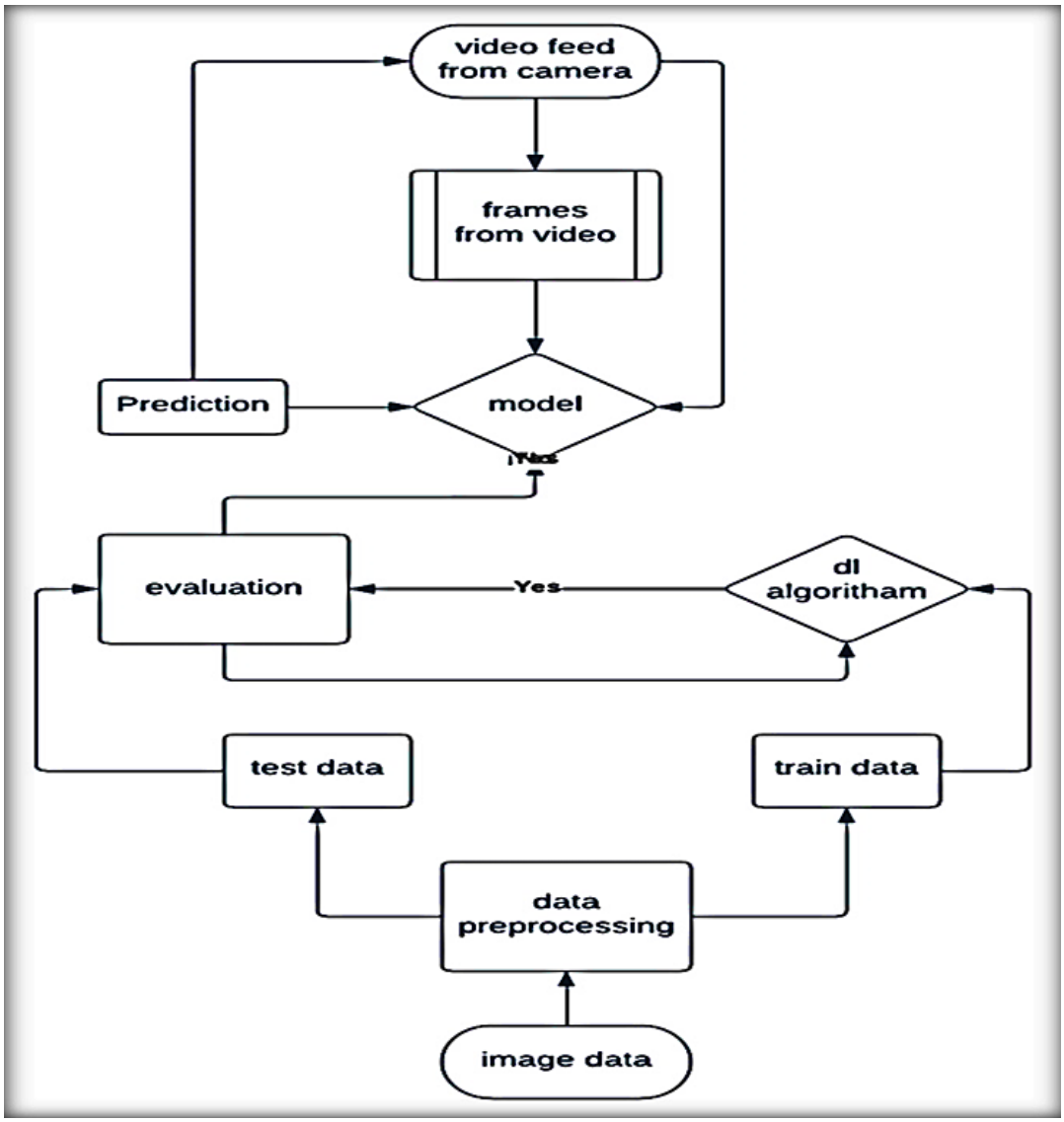
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	User friendly and classify the disaster easily.
NFR-2	Security	The model is secure due to the cloud deployment models and also there is no login issue.
NFR-3	Reliability	Accurate prediction of the natural disaster and the website can also be fault tolerant.
NFR-4	Performance	It is shown that the model gives almost 90 percent accuracy 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 Google chrome, Microsoft edge and also it can be extended to the NDRF and customers.

5. PROJECT DESIGN

5.1 Data Flow Diagrams

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 enters and leaves the system, what changes the information, and where data is stored.

Example:



5.2 Solution & Technical Architecture

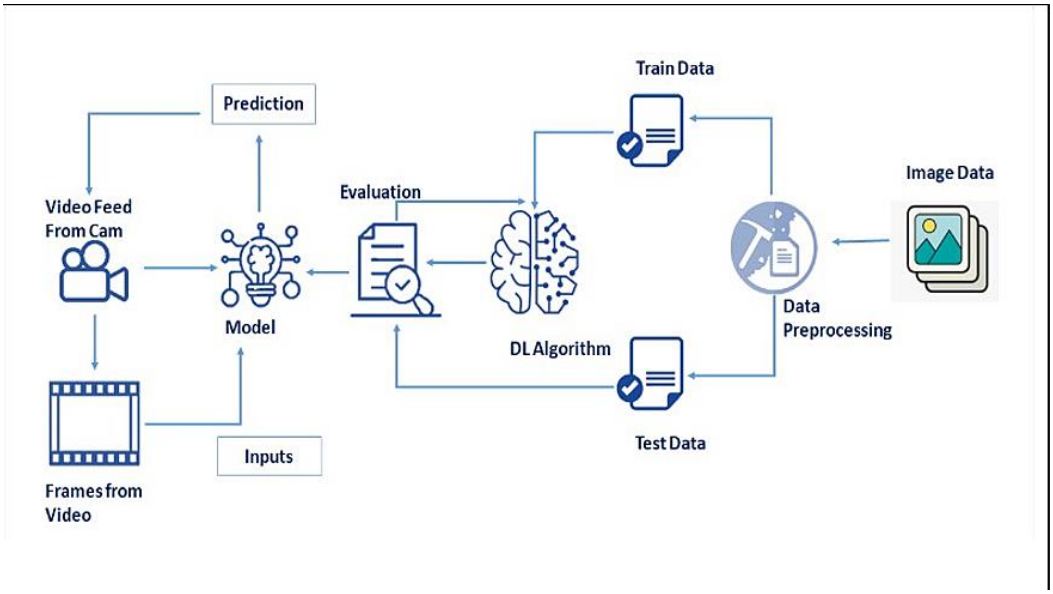


Table-1: Components & Technologies:

S. No	Component	Description	Technology
1.	User Interface	User interacts with application for the prediction of Any Natural disaster which will happen in future minutes.	HTML, CSS, JavaScript, Django, Python.
2.	Feature Engineering Pipeline	Algorithms can't make sense of raw data. We have to select, transform, combine, and otherwise prepare our data so the algorithm can find useful patterns.	Image processing, pattern extraction, etc.
3.	Model Training kit	It learns patterns from the data. Then they use these patterns to perform particular tasks.	Multiclass Classification Model, Regression Model, etc.
4.	Prediction unit	This function is used to predict outcomes from the new trained data to perform new tasks and solve new problems.	Decision trees, Regression, Neural networks.
5.	Evaluation system	It monitors that how Algorithm performs on data as well as during training.	Chi-Square, Confusion Matrix, etc.
6.	Interactive services	To interact with our model and give it problems to solve. Usually this takes	Application programming interface, etc.

		the form of an API, a user interface, or a command-line interface.	
7.	Data collection unit	Data is only useful if it's accessible, so it needs to be stored ideally in a consistent structure and conveniently in one place.	IBM Cloud, SQL Server.
8.	Data generation system	Every machine learning application lives off data. That data has to come from somewhere. Usually, it's generated by one of your core business functions.	Synthetic data generation.
9.	Database management system	An organized collection of data stored in database, so that it can be easily accessed and managed.	MySQL, DynamoDB etc.
10.	IBM Cloud services	Processed data stored in cloud service which can be access by the admin anywhere over the internet.	IBM Cloud etc.

Table-2: 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, pensor flow.
2.	Authentication	This keeps our models secure and makes sure only those who have permission can use them.	Encryption and Decryption (OTP).
3.	Application interface	User uses mobile application and web application to interact with model	Android and Web Developmen t
4.	Availability (both Online and Offline work)	Its include both online and offline work. As good internet connection is need for online work to explore the software perfectly. Offline work includes the saved data to explore for later time.	Caching, backend server.

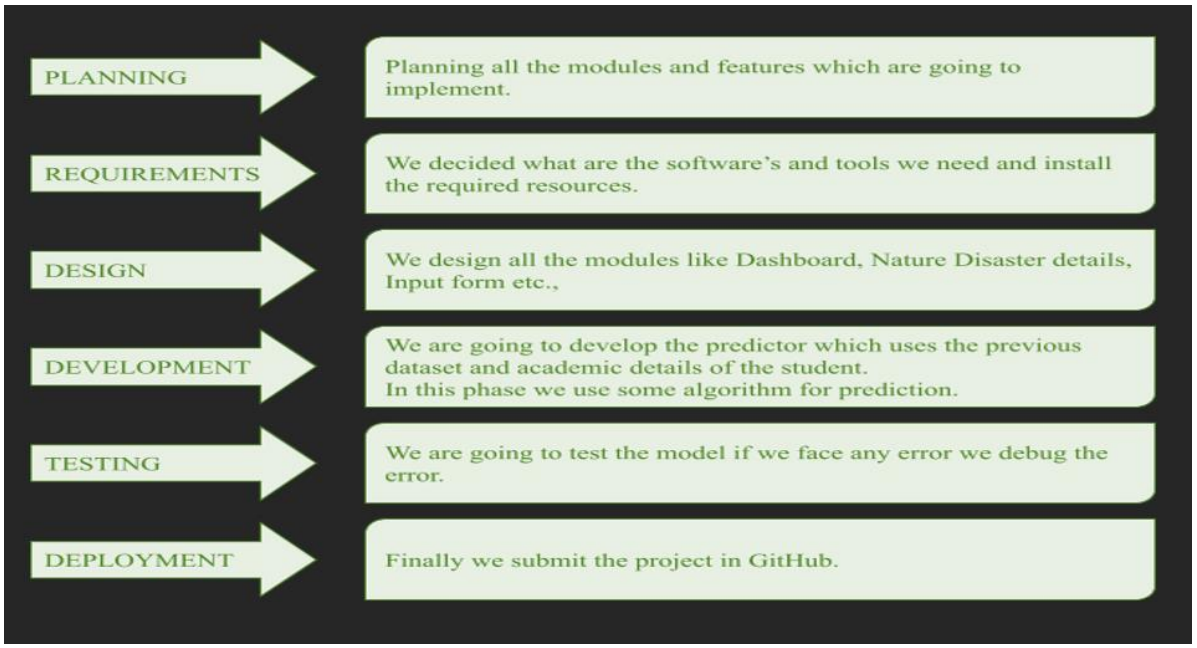
5.	Regular Updates	The truly excellent software product needs a continuous process of improvements and updates. Maintain your server and make sure that your content is always up-to-date. Regularly update an app and enrich it with new features.	Waterfall Approach Incremental Approach Spiral Approach
6.	Personalization	Software has features like flexible fonts, backgrounds, settings, colour themes, etc. which make a software interface looks good and functional.	HubSpot Proof

5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer	Installation	USN-1	As a user, I can install this where the disaster occurs	I can do it by myself	High	Sprint-1
Customer	Power connection	USN-2	As a user, I want ensure power supply for all devices	I will ensure it	High	Sprint-2
Customer	Safety	USN-3	As a user, I want to ensure that the device should be in safest place which covers the maximum area	I will ensure that	High	Sprint-3
Customer	Battery backup	USN-4	As a user, I want check the batter backup to prevent it from power loss	I can assure that	High	Sprint-4
Customer	Internet Connectivity	USN-5	As a user, I want to check the internet connectivity	I will ensure that	High	Sprint-5

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation



6.1 Sprint Delivery Schedule

Product Backlog, Sprint Schedule, and Estimation

Use the below template to create product backlog and sprint schedule

Sprint	Functional Requirement (Epic)	User story Number	User story / Task	Story points	Priority	Team members
Sprint-1	Registration	USN – 1	As a user, registering into the product using a valid email address	5	High	Rampa Nathan
Sprint-2	Registration	USN – 2	As a user, registering into the product using a valid username and password	3	Medium	Rampa Nathan

Sprint-1	Authentication	USN – 3	As a user, I adept to logging into the system with credentials	4	High	Rampa Nathan Thoufeeq
Sprint-2	Authentication	USN - 4	As a user, I adept to logging into the system with OTP	2	High	Rampa Nathan Sampath
Sprint-1	Designation of Region	USN – 5	selecting the region of interest to be monitored and analysed	3	High	Rampa Nathan Vignesh
Sprint-2	Analysis of Required Phenomenon	USN – 6	Regulating certain factors influencing the actions of the phenomenon	3	High	Rampa Nathan Sampath
Sprint-2	Accumulation of required Data	USN – 7	Gathering data and detailed report on past event analysis	3	Low	Rampa Nathan Vignesh
Sprint-4	Organizing Unstructured data	USN – 8	Choosing a required algorithm for specific analysis	2	High	Rampa Nathan Sampath
Sprint-2	Algorithm selection	USN – 9	Choosing a required algorithm for specific analysis	6	High	Rampa Nathan Thoufeeq
Sprint-3	Prediction and analysis of data	USN – 10	Predicting and visualizing the data effectively	36	High	Rampa Nathan Vignesh

Project Tracker, Velocity & Burndown Chart:

Sprint	**Total Story Points**	**Duration**	**Sprint Start Date**	**Sprint End Date (Planned)**	**Story Points Completed (as on Planned End** Date**)**	**Sprint Release Date (Actual)**

Sprint-1	12	6 days	24 Oct 2022	29 Oct 2022	12	30 Oct 2022
Sprint-2	14	6 days	31 Oct 2022	5 Nov 2022	14	6 Nov 2022
Sprint-3	6	6 days	07 Nov 2022	12 Nov 2022	6	8 Nov 2022
Sprint-4	6	6 days	14 Nov 2022	19 Nov 2022	6	20 Nov 2022

Velocity:

Sprint - 1

Average Velocity = Sprint duration / Velocity

= 12 / 6

= 2

Sprint - 2

Average Velocity = Sprint duration / Velocity

= 14 / 6

= 2.3

Sprint - 3

Average Velocity = Sprint duration / Velocity

= 6 / 6

= 1

Sprint - 4

Average Velocity = Sprint duration / Velocity

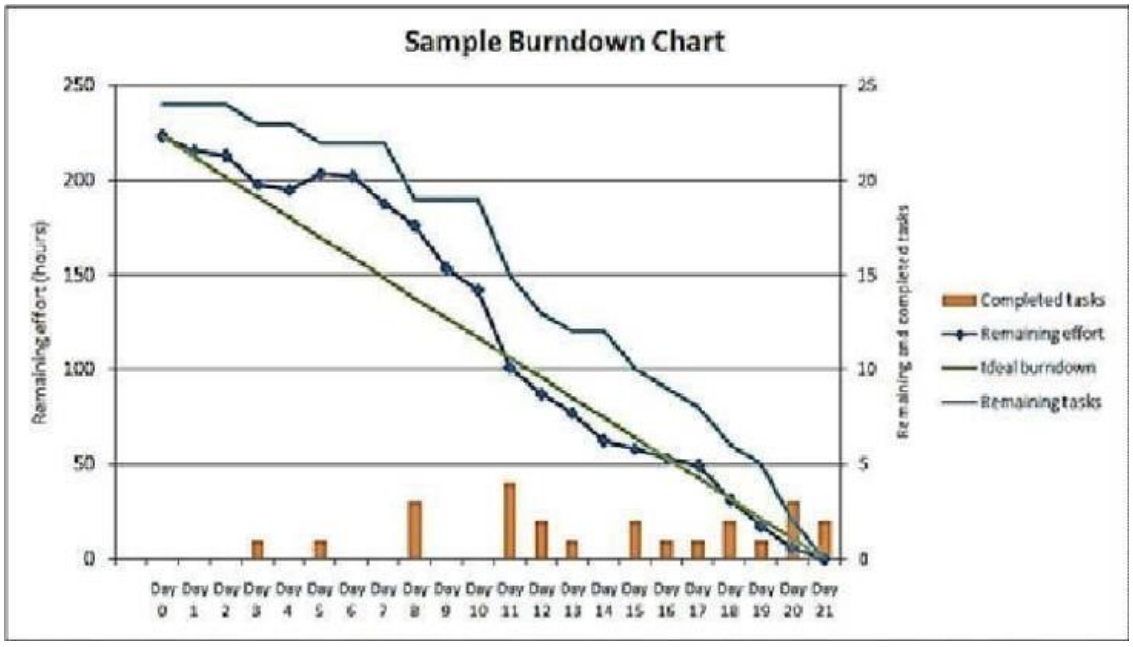
= 6 / 6

= 1

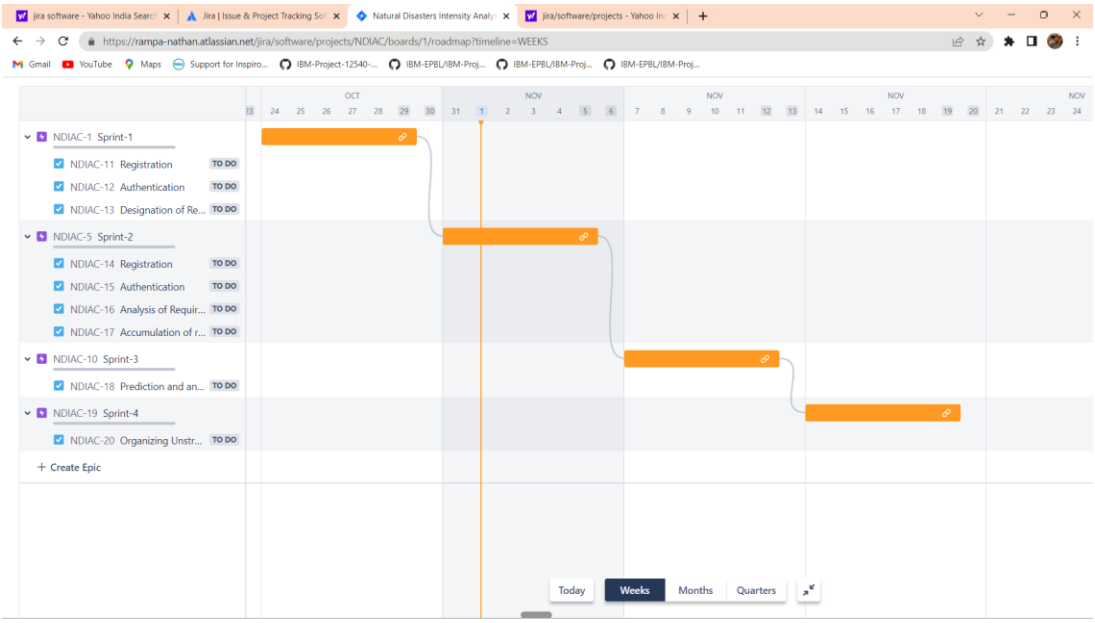
Burndown Chart:

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.

An approximate work plan in burndown



6.3 Reports from JIRA

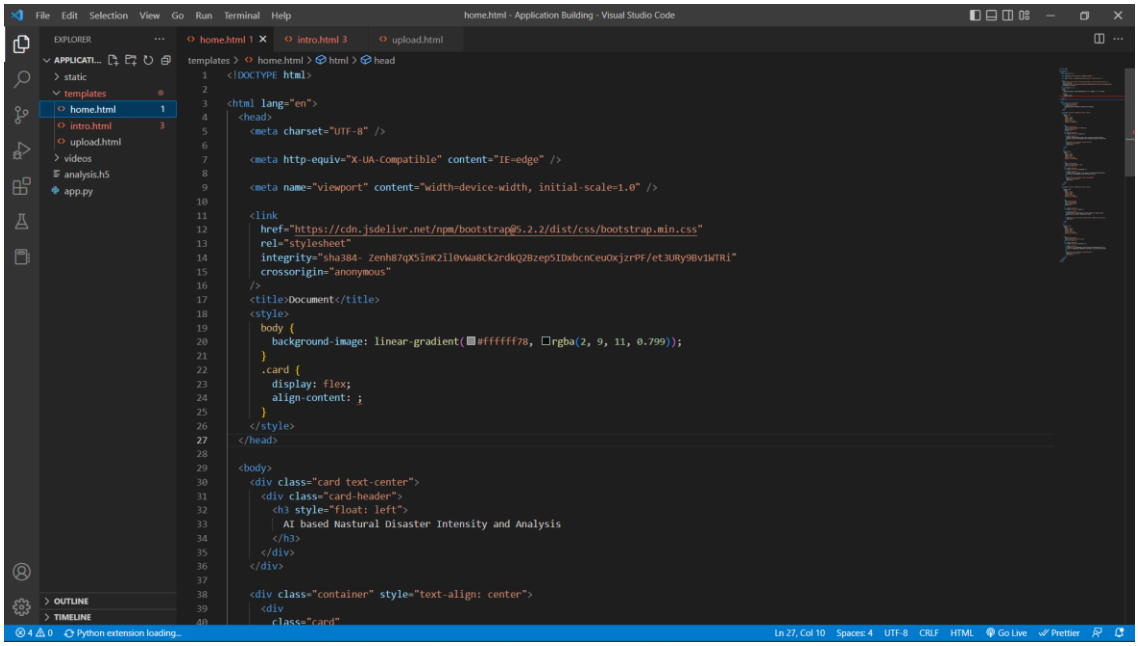


7. CODING AND SOLUTION

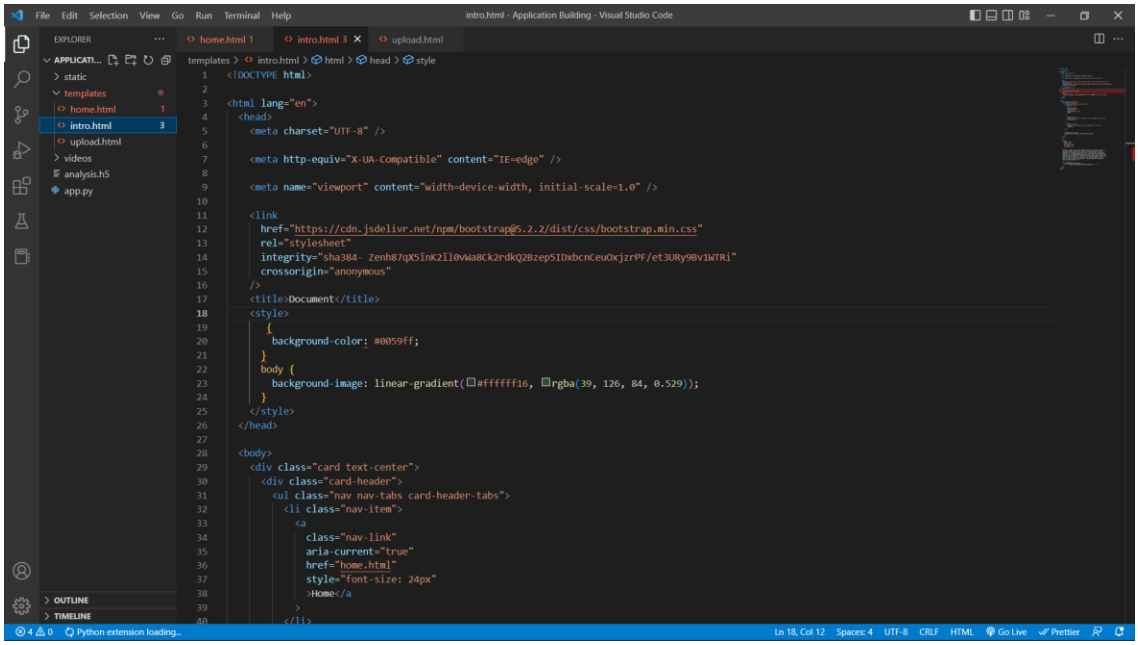
7.1 Feature 1

A convolutional neural network is a class of artificial neural networks. It is a Deep Learning algorithm that can take in an input image, assign importance to various objects in the image and be able to differentiate one from the other. The pre-processing required in a Convent is much lower as compared to other classification algorithms. The advantage of CNNs is to provide an efficient dense network which performs the prediction or identification efficiently. Code is attached below.

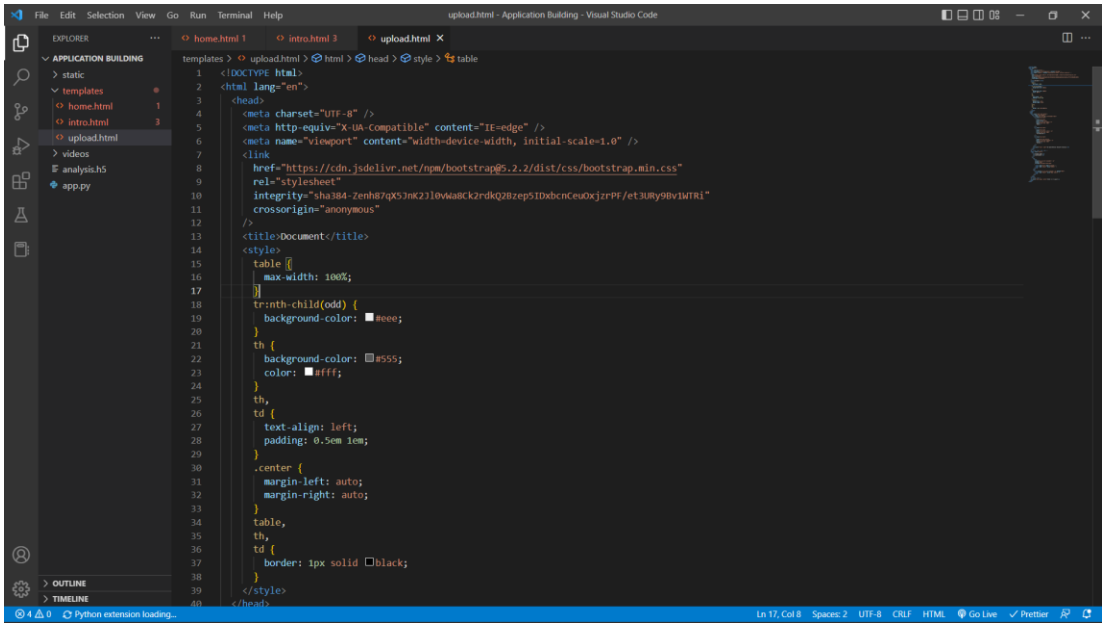
Home.html



Intro.htm



Upload.html

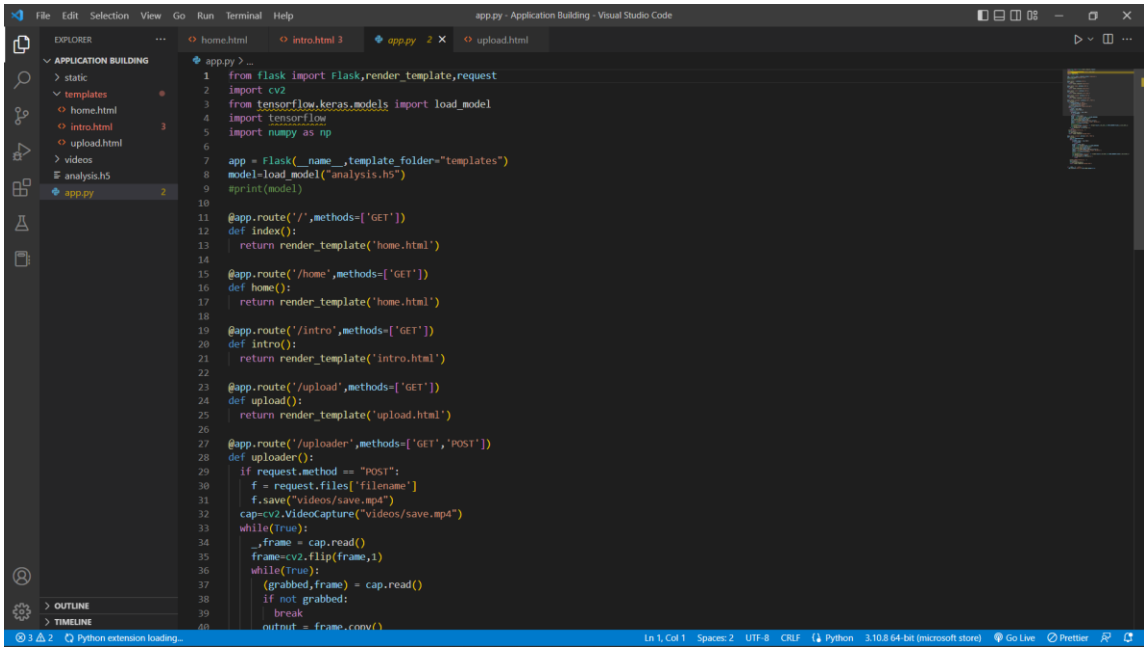


7.2 Feature 2

We developed a multi-layered 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. A multilayer neural network with appropriate weights has been shown to be able to approximate any input-output function making it an attractive tool for modelling and forecasting.

Code is attached below.

App.py



8 TESTING

8.1 Test Cases

Section	Total Cases	Not Tested	Fail	Pass
Client Application	10	0	3	7
Security	2	0	1	1
Performance	3	0	1	2
Exception Reporting	2	0	0	2

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:

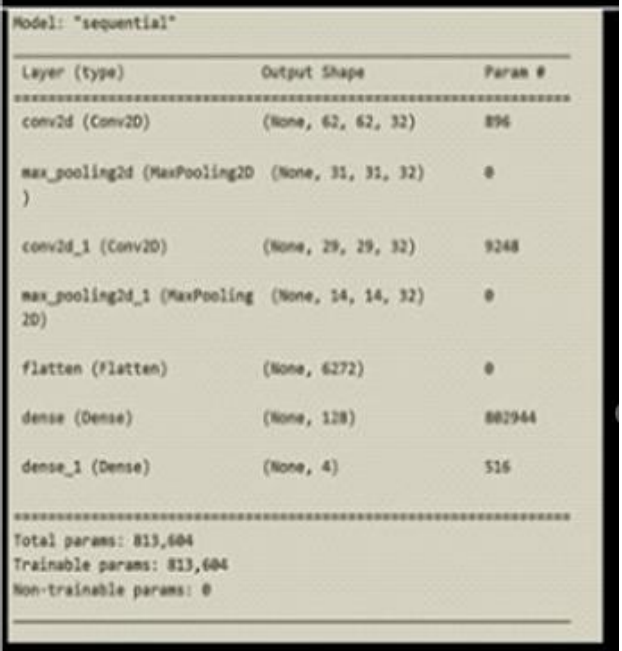
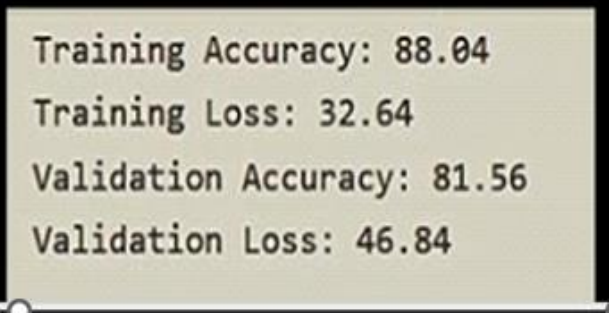
This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Total
By Design	1	0	1	0	2
Duplicate	0	0	0	0	0
External	0	0	2	0	2
Fixed	4	1	0	1	6
Not Reproduced	0	0	0	1	1
Skipped	0	0	0	1	1
Won't Fix	1	0	1	0	2
Total	6	1	4	3	14

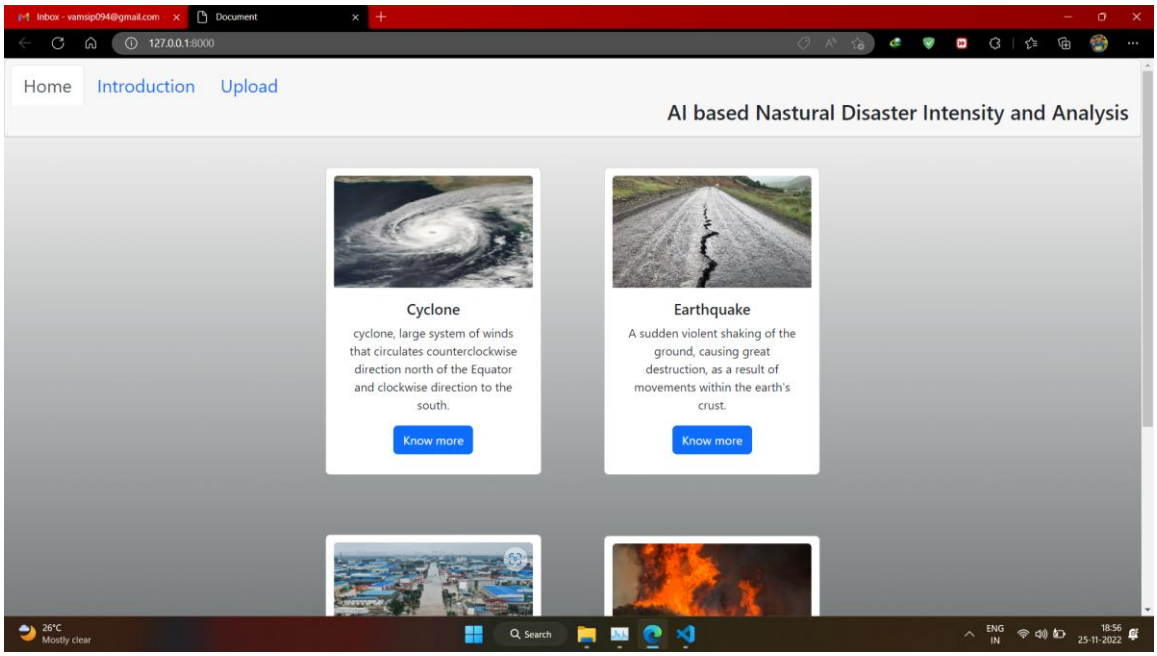
9RESULTS

9.1 PERFORMANCE METRICES

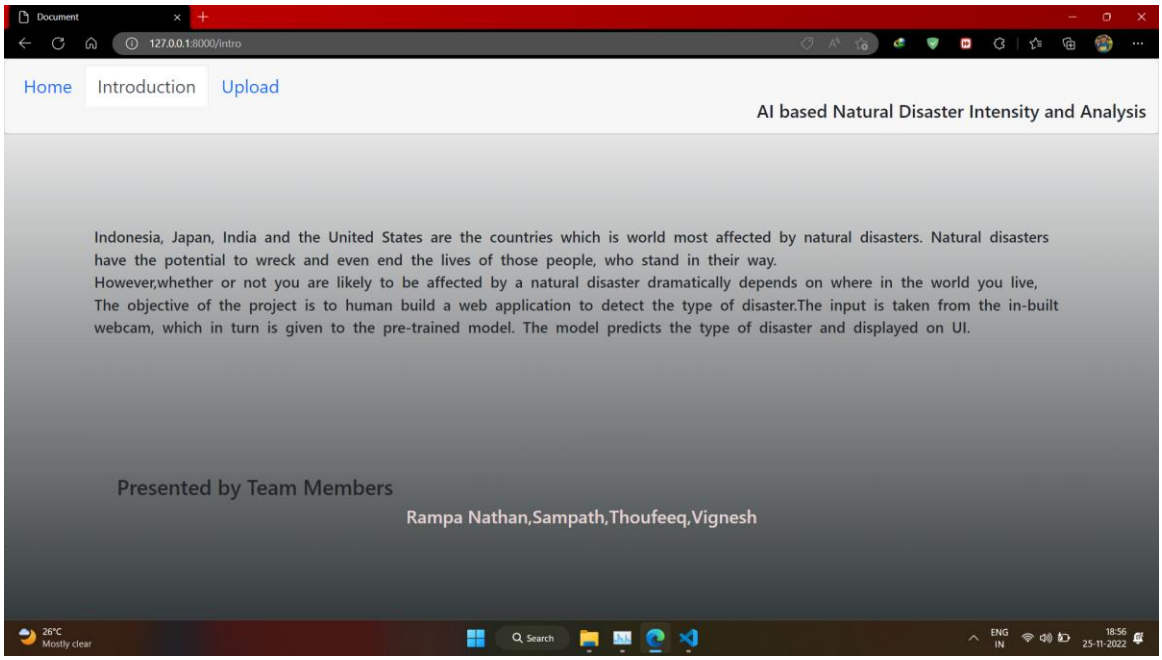
The nature disaster intensity analysis and classification with test data and train data has been executed successfully. The model has been trained over 1000+ images and the model have an accuracy of nearly 99% and the model has been tested with the data which is separate from the trained data and has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

S.No.	Parameter	Values	Screenshot
1.	Model Summary	-	
2.	Accuracy	Training Accuracy – 88.04% Validation Accuracy -81.56%	

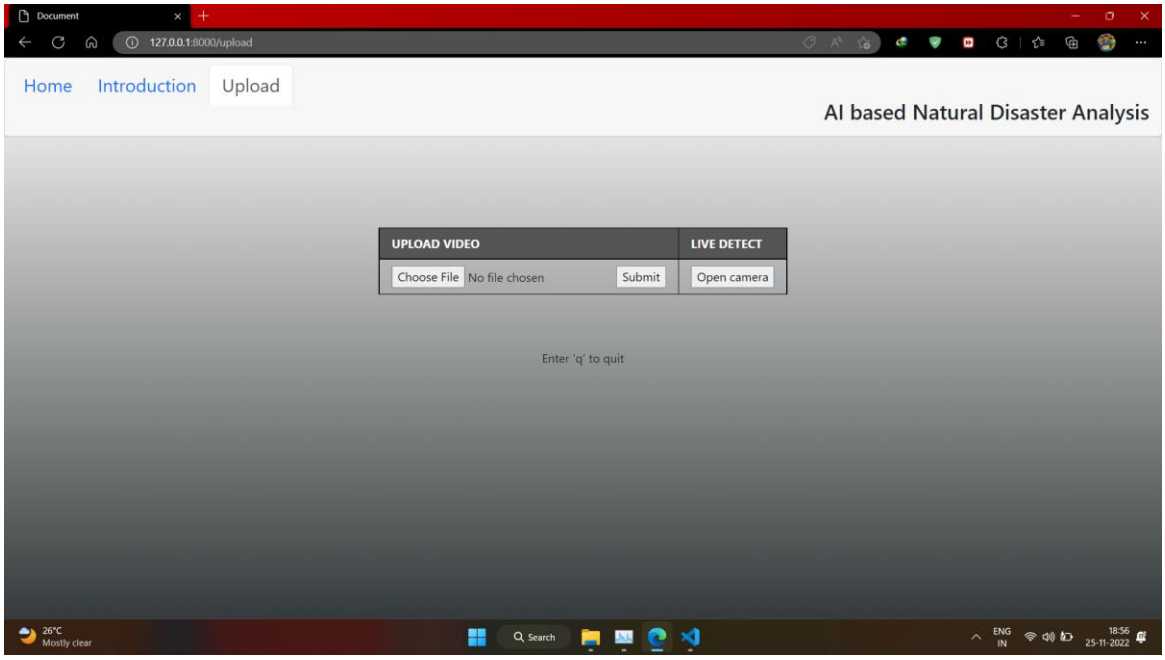
Home Page



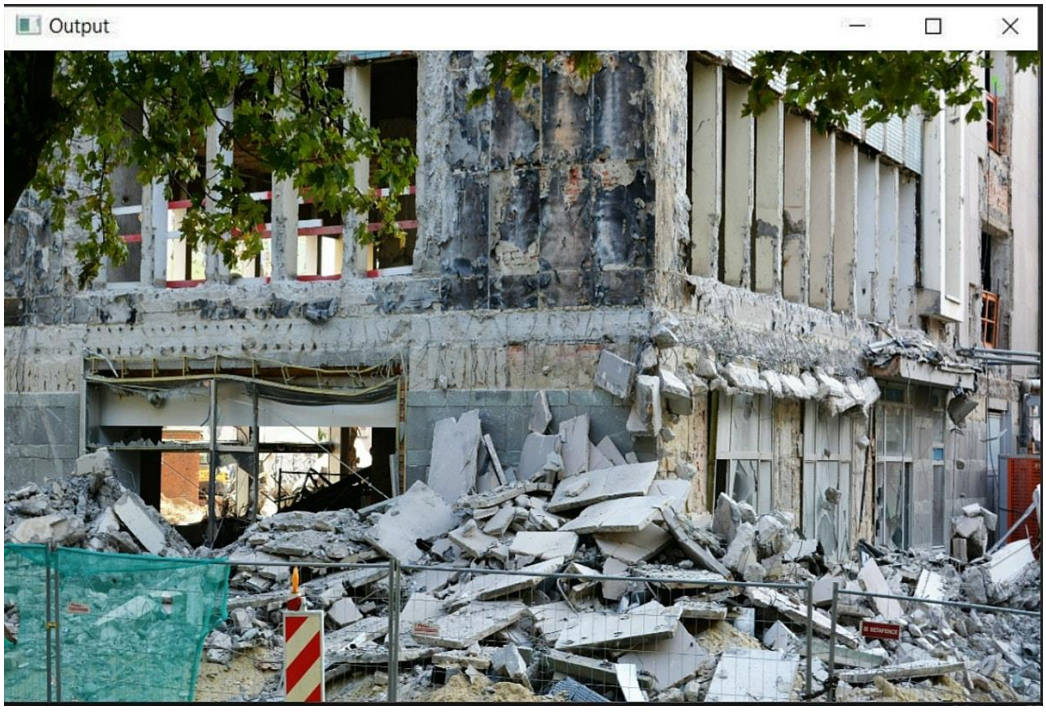
Intro Page



Upload Page



Result Page



10 ADVANTAGES AND DISADVANTAGES

10.1 Advantages

1. By predicting the occurrence of natural disasters, we can save thousands of lives and take appropriate measures to reduce property damage.

- Update current in the government organization.
- Predictions and warnings can also reduce damage and economic losses.
- AI can help detect and prepare for extreme weather and other hazards. A team at Lancaster University created a disaster mapping and damage detection system that allows rescue teams to prioritize designated areas in their relief efforts.
- Technology has enabled governments to look into measures that were not possible before. With efficient geo-location and scanning technologies, it is beneficial for the government to predict the area of impact before a disaster. Big data and other technologies also help in early information.
- So, errors are reduced and the chance of reaching accuracy with a greater degree of precision is a possibility. Example: In Weather Forecasting using AI they have reduced the majority of human error.
- It improves work efficiency so reduce the duration of time to accomplish a task in comparison to humans.

10.2 DISADVANTAGES

- Getting outfitted costs, a lot of money.
- Issues with basic necessities.
- Robots are one use of artificial intelligence that are replacing jobs and raising unemployment.
- Machines can only do jobs for which they are created programmed; if they are asked to complete anything else, they frequently fail or produce useless results, which can create serious problems.

11.CONCLUSION

Several researchers have tried to employ various deep learning techniques for detection. List natural catastrophes Deep learning algorithms for

natural disaster detection still have a number of concerns with noise and severe class imbalances. We suggested a multi-layered deep convolutional neural network for natural disaster identification and intensity classification to overcome these issues. The suggested method consists of two blocks: the first block is used to identify natural disasters, and the second block is used to address concerns with unequal class representation. Average statistical values for the outcomes were determined, and they were as follows for the proposed model: sensitivity, 97.54%; specificity, 98.22%; accuracy rate, 99.92%; precision, 97.79%; and F1-score, 97.97%. Due to its multi-layered nature, the proposed model outperformed other cutting-edge techniques in terms of accuracy. So, the suggested approach performs noticeably better at identifying and categorizing natural disasters, but it can be used for a variety of natural disaster detection procedures in the future

12 FUTURE SCOPE

Google's pilot effort in Patna, India, to use artificial intelligence to monitor floods, was a success last year. With an accuracy of over 90%, they were able to foresee floods and the areas that would be impacted by the natural calamity. It was made feasible by a mix of information from government organizations that supply on-the ground data, including measurements taken with on-the-ground measuring devices and satellite photographs of flood-prone locations. To forecast the flow of water, they performed hundreds of thousands of simulations using its machine learning (ML) models. By using AI, disaster management organizations can deploy robots, sensors, and drones in the future to offer precise information on damaged structures and landscapes, impending floods, and safer rescue missions. Smart technology must be included into our neighbourhood communities. The degree of the harm can be decreased with an immediate response and technological remedies. However, there are some restrictions and mistakes with AI because it is based on machine codes. However, combining human empathy with vigilance could be extremely beneficial in the realm of crisis management

CHAPTER 13

13.1 Source Code

App.py :

```
from flask import Flask,render_template,request
import cv2
from tensorflow.keras.models import load_model
import tensorflow
import numpy as np

app = Flask(__name__,template_folder="templates")
model=load_model("analysis.h5")
#print(model)

@app.route('/',methods=['GET'])
def index():
  return render_template('home.html')

@app.route('/home',methods=['GET'])
def home():
  return render_template('home.html')

@app.route('/intro',methods=['GET'])
def intro():
  return render_template('intro.html')

@app.route('/upload',methods=['GET'])
def upload():
  return render_template('upload.html')

@app.route('/uploader',methods=['GET','POST'])
def uploader():
  if request.method == "POST":
    f = request.files['filename']
    f.save("videos/save.mp4")
  cap=cv2.VideoCapture("videos/save.mp4")
  while(True):
```

```
    _,frame = cap.read()
    frame=cv2.flip(frame,1)
    while(True):
      (grabbed,frame) = cap.read()
      if not grabbed:
        break
      output = frame.copy()
      frame = cv2.cvtColor(frame,cv2.COLOR_BGR2RGB)
      frame = cv2.resize(frame,(64,64))
      x=np.expand_dims(frame,axis=0)
      result = np.argmax(model.predict(x),axis=1)
      index=['Cyclone','Earthquake','Flood','Wildfire']
      result = str(index[result[0]])
      #print(result)
      cv2.putText(output,"activity:
{}".format(result),(10,120),cv2.FONT_HERSHEY_PLAIN,1,(0,25,255
),1)
      cv2.imshow("Output",output)
    if cv2.waitKey(0) & 0xFF==ord('q'):
      break
  print("[INFO]cleaning up...")
  cap.release()
  cv2.destroyAllWindows()
  return render_template("upload.html")

@app.route('/livecam',methods=['GET','POST'])
def livecam():
    cap=cv2.VideoCapture(0)
    while(True):
        (grabbed,frame) = cap.read()
        if not grabbed:
            break
        output = frame.copy()
        frame = cv2.cvtColor(frame,cv2.COLOR_BGR2RGB)
        frame = cv2.resize(frame,(64,64))
        x=np.expand_dims(frame,axis=0)
        result = np.argmax(model.predict(x),axis=-1)
        index=['Cyclone','Earthquake','Flood','Wildfire']
        result = str(index[result[0]])
        #print(result)
```

```
        cv2.putText(output,"activity:
{}".format(result),(10,120),cv2.FONT_HERSHEY_PLAIN,1,(0,25,255
),1)
        cv2.imshow("Output",output)
        if cv2.waitKey(0) & 0xFF==ord('q'):
            break

    print("[INFO]cleaning up...")
    cap.release()
    cv2.destroyAllWindows()
    return render_template("upload.html")


if __name__ == '__main__':
  app.run(host='0.0.0.0',port=8000,debug=False)
```

GitHub :

https://github.com/IBM-EPBL/IBM-Project-22656-1659855783

Project Demo Link :

https://www.youtube.com/embed/wnHpjPpZIz8