NATURAL DISASTER INTENSITY ANALYSIS AND CLASSIFICATION USING ARTIFICIAL INTELLIGENCE

PROJECT REPORT

Submitted by

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Project Report

1. **INTRODUCTION**
   1.1 Project Overview

1.INTRODUCTION

1.1 Project Overview:

Natural Disasters are catastrophic events with atmospheric and historic origins (hurricanes, floods, tsunamis, earthquakes). That can cause fatalities, property damage and social environment disruption. Natural disasters are the results of a hazard overwhelming highly vulnerable community,often resulting in mortality and morbidity.Over the past decade,over 300 natural disasters occur yearly around the world affecting millions and cost billions.The disaster cycle is a framework used to base a coordinated plan to respond,recover,prevent,and prepare for a disaster.Access to clean water,proper sanitation,food/nutrition,shelter,and the threat of communicable diseases are concerns that have potential to be detrimental to the management of a natural disaster, slowing the recovery process. 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 Open CV window.

1.2 Purpose:

Basically the main objective of natural disaster management is to reduce the damage. However, there are several objectives that are integrated with it. Those are,

1. Identifying the hazard and its cause.

2. Reducing vulnerability and potential losses of hazard.Assessing,reviewing and controlling the risk

3. Applying efficient, effective, sustainable relief (food, shelter and money), medical and other facilities in disaster affected people thus they can survive.

4. Reducing the damage, death, sufferings and destruction of any natural and human induced disaster.

5. Giving protection to victims.
6. Increasing the strength among people to survive against disasters.

7. Building up capacity in every sector like- individual, social, economic, environmental, regional, national and international.

8. Ensuring the availability of local emergency equipment and transportation.

9 . Promote the culture of disaster risk prevention and mitigation at all levels.

2. LITERATURE SURVEY:

2.1 Existing problem:

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.

2.2 References:

]—Number of reported disasters by type.‖ [Online]. Available: https://ourworldindata.org/naturaldisasters.

[1] Tuswadi and T. Hayashi, —Disaster Prevention Education in Merapi Volcano Area Primary Schools: Focusing on Students‘ Perception and Teachers‘ Performance,‖ Procedia Environ. Sci., vol. 20, pp. 668– 677, 2014. [2] —2015_43291_Sendaiframeworkfordrren_Disaster Reduction 2015-2030,‖ 2015.

[3] S. Goswami, S.Chakraborty, S.Ghosh, A.Chakrabarti, and B.Chakraborty, —A review on application of data mining techniques to combat natural disasters,‖ Ain Shams Eng. J., vol. 9, no. 3, pp. 365–378, 2018.

[4] I. A. T. Hashem, I.Yaqoob, N.B. Anuar, S.Mokhtar, A.Gani, and S.Ullah Khan, —The rise of _big data‘ on cloud computing: Review and open research issues,‖ Inf. Syst., vol. 47, pp. 98–115, 2015.

[5] M. Yu, C. Yang, and Y. Li, —Big Data in Natural Disaster Management: A Review,‖ Geosciences, vol. 8, no. 5, p. 165, 2018.

[6] P. Sciences, —science direct,‖ 2018. [Online]. Available: https://www.sciencedirect.com/.

[7] Springer,—springeropen,‖Technolo,2018.[Online].
[8] Available: https://www.springeropen.com/journals.
[9] IEEE, —IEEE,‖ 2018. [Online]. Available: http://ieeexplore.ieee.org.

Google Scholar,—Google Scholar,‖ 2018. [Online]. Available: https://scholar.google.com/intl/en/scholar/about.html

2.3 Problem Statement Definition:

The purpose of the problem statement is to identify the issue that is a concern and focus it in a way that allows it to be studied in a systematic way. It defines the problem and proposes a way to research a solution, or demonstrates why further information is needed in order for a solution to become possible. Problem Statement is inclusive of below answers:

- Who does it affect/does not affect?
- What does it affect/does not affect?
- How does it affect/does not affect?
- When is it a problem/is not a problem.
- Where is it a problem/is not a problem.

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.

The natural disasters disturbs the ecosystem,both humans and animals.(WHO)

In a disaster, you face the danger of death or physical injury. You may also lose your home, possessions, and community. Such stressors place you at risk for emotional and physical health problems. Stress reactions after a disaster look very much like the common reactions seen after any type of trauma.(WHAT)

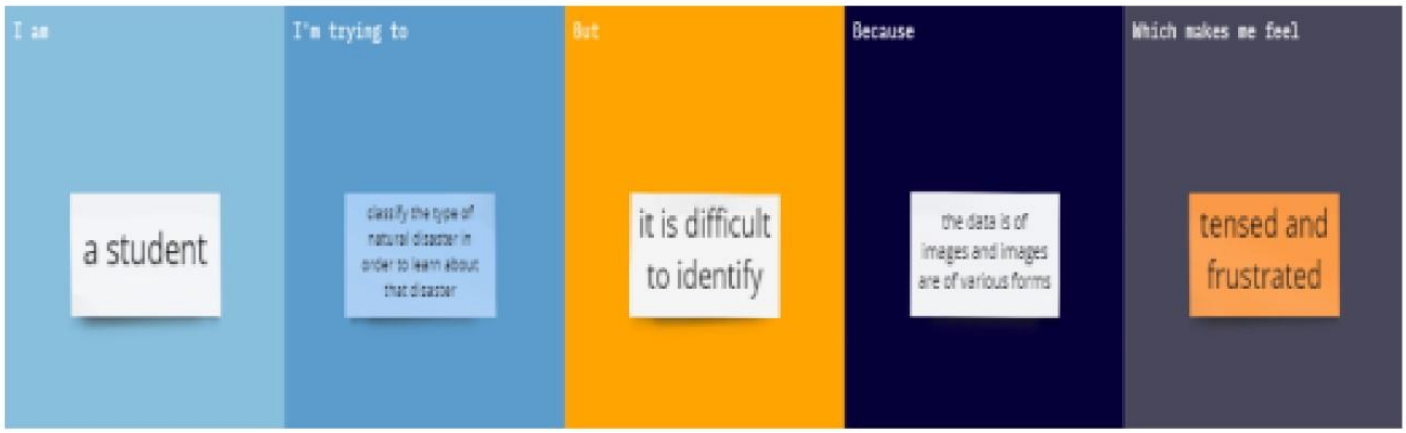
Wildlife can be killed by the force of the disaster or impacted indirectly through changes in habitat and food availability. Endangered species are especially vulnerable when habitat is destroyed. Water quality is impacted when sewage treatment facilities flood or debris enters reservoirs and waterways.(HOW)
Natural disasters generally constitute an emergency since they require immediate intervention due to their high impact on human health and safety; they affect the normal functioning of working infrastructure, interrupting normal day activities and representing a risk for residents and workers in affected areas.(WHEN)

An area is defined as a hazard prone area if the mortality risk is higher than a certain threshold. A cyclone is defined as a wind storm with a maximum speed of more than 64 knots per hour. The definition includes typhoons and hurricanes.(WHERE)

Problem statement(PS)	**I am (Customer)**	**I'm trying to**	**But**	**Because**	**Which makes me feel**

PS-1	A farmer	Increase the yield on my land	I couldn‘t	Of flooding in agricultural area crop damage & disease	Disappointed

PROBLEM STATEMENT 2:



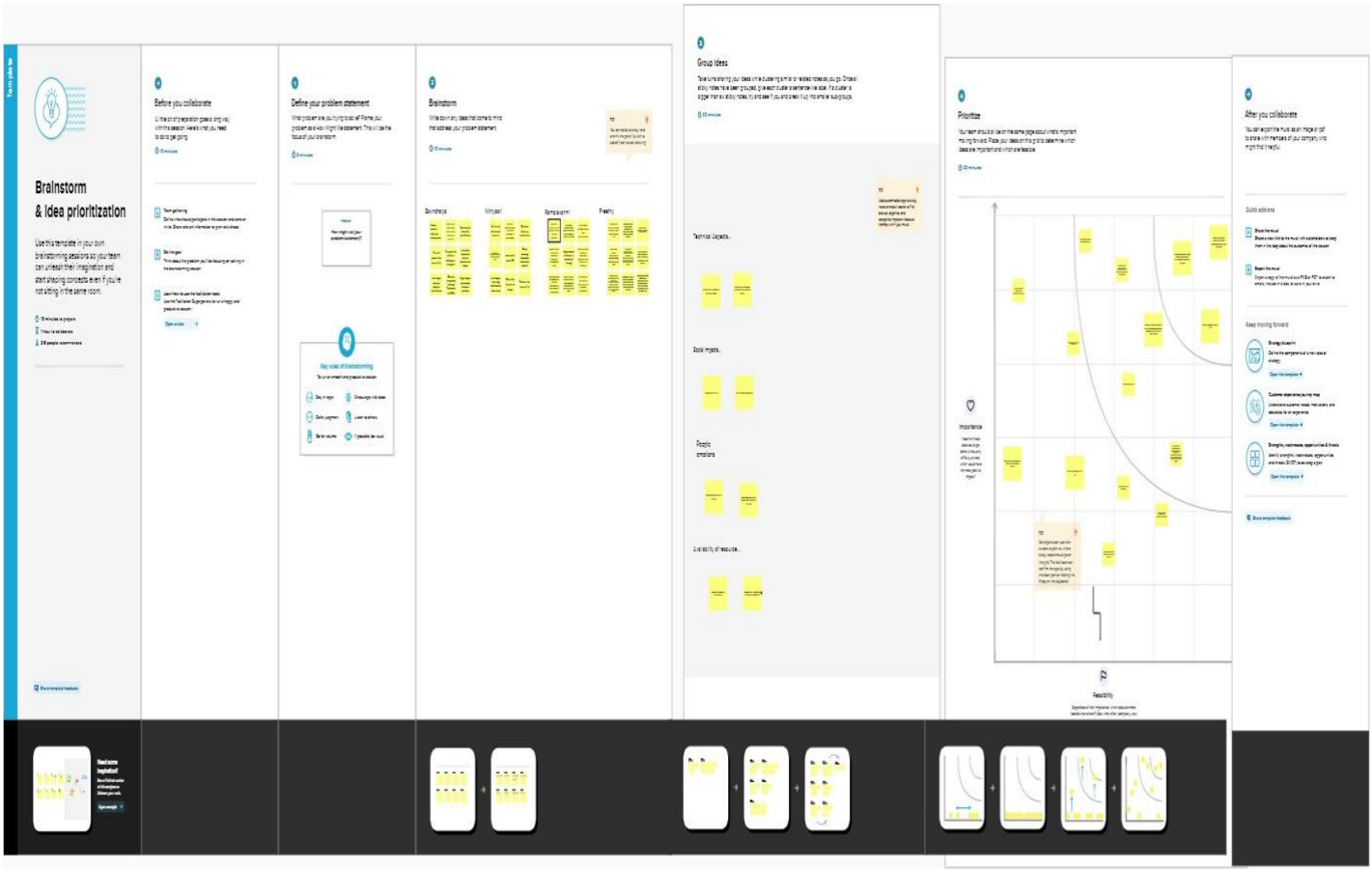
Problem Statement (PS)	Iam (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	An employee from NDRF	Classify the type of natural disaster	It is difficult to identify	The data is of images and images are of various forms	Tensed and frustrated
PS-2	A student	classify the type of natural disaster 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 Canvas:

An empathy map is **a collaborative tool teams can use to gain a deeper insight into their customers**. Much like a user persona, an empathy map can represent a group of users, such as a customer segment. The empathy map was originally created by Dave Gray and has gained much popularity within the agile community.

3.2 Ideation & Brainstorming:

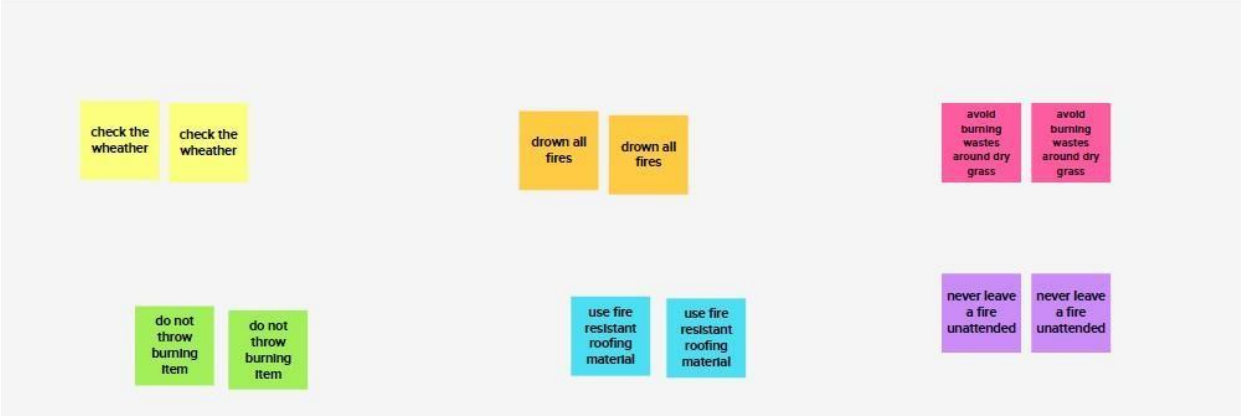

Brainstorm
& Idea prioritization
Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.
Before you collaborate
Define your problem statement
Brainstorm
Group ideas
Prioritize
After you collaborate

3

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 and break it up into smaller sub-groups.

⏱ 20 minutes

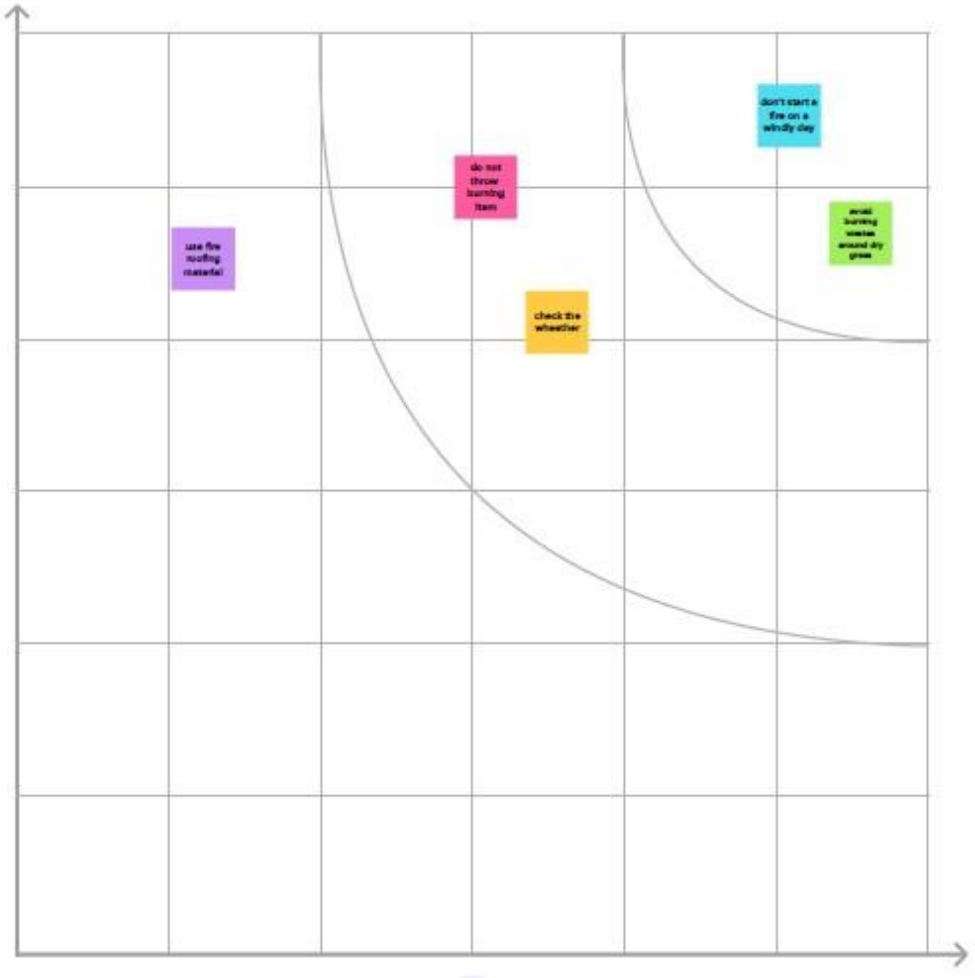


4

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



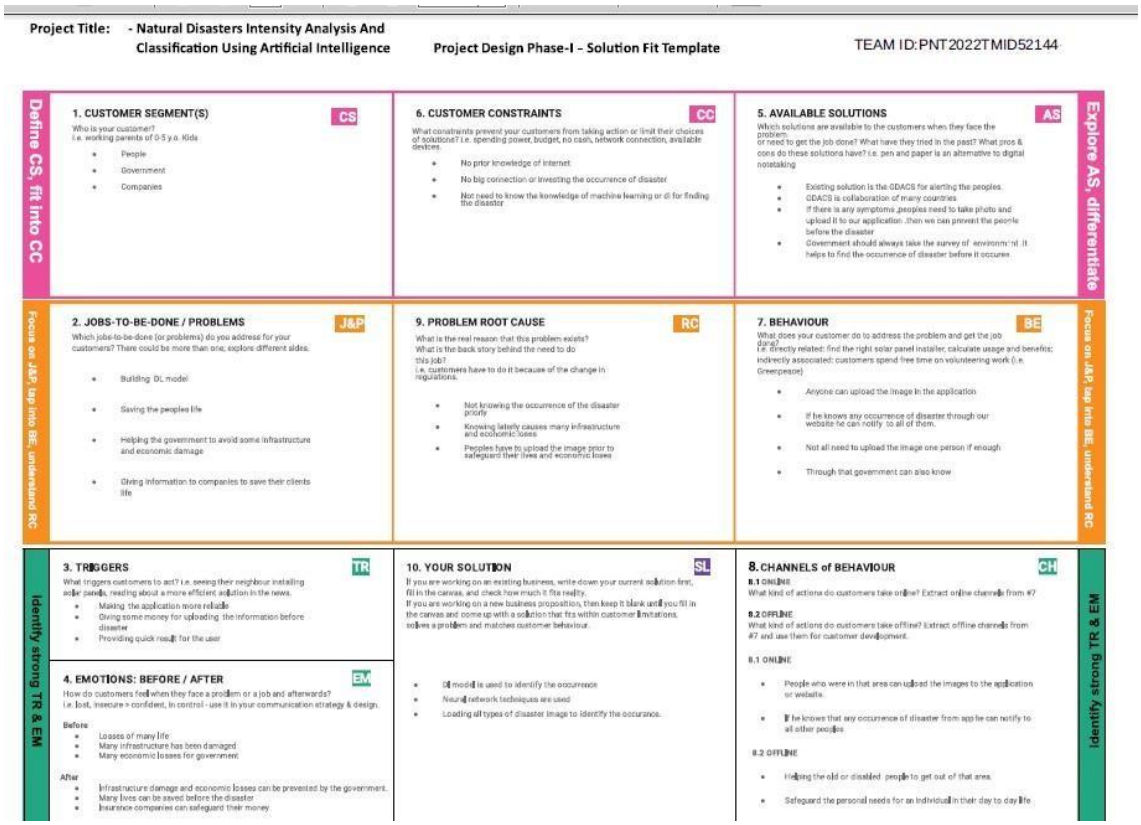
3.3 Proposed solution:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	★ Integrating frontier technologies including Artificial Intelligence into existing emergency system can harness the potential of existing data streams and improves hazard mitigation and disaster management
2.	Idea / Solution description	★ AI shows great potential to support data collection and monitoring , the reconstruction and forecasting of extreme events , and effective and accessible communication before and during a disaster

3.	Novelty / Uniqueness	★ Response of During Disaster : • Search and recuse to identity affected people • Assess initial damage • Provide first-aid and humanitarian assistance • Open and manage shelters ★ Recovery of After Disaster : • Debris removal • Precise damage assessment • Infrastructure destruction and reconstruction • Restore the livelihood • Community development
4.	Social Impact / Customer Satisfaction	★ AI impact on society : • 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

3.4 Problem Solution fit:



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 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

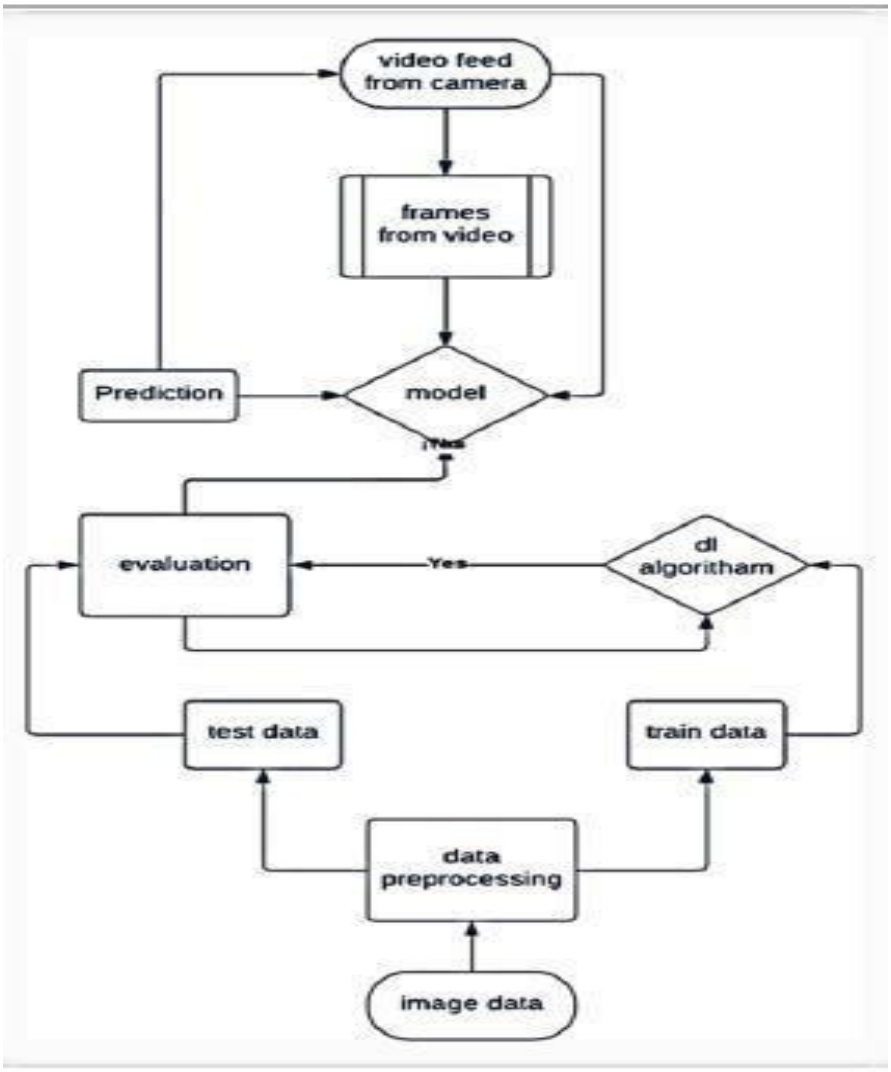
		integrated web camera should be high enough to capture the video Frames.
FR-6	User Interface	Maximizing the interaction in Web Designing Service.

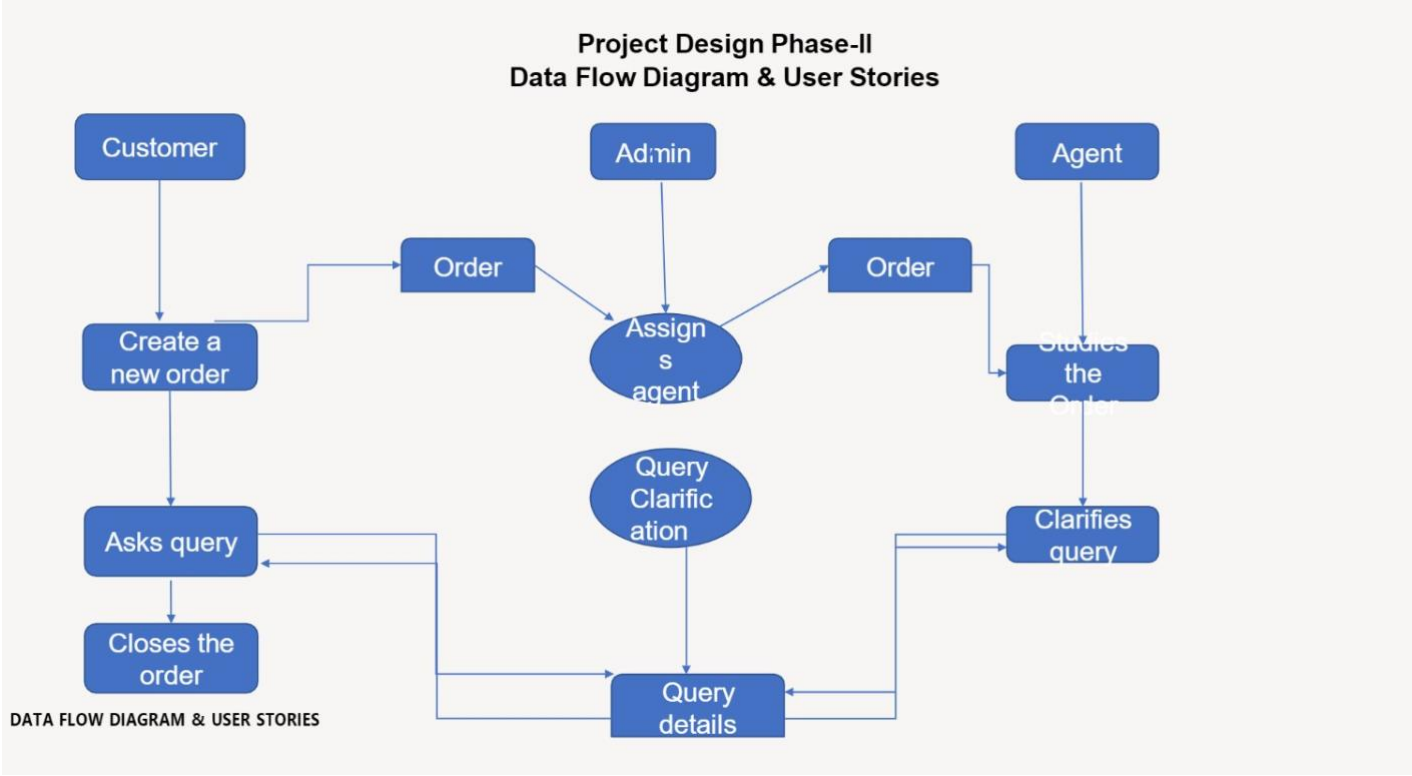
4.2 Non-functional Requirements:

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-[1]	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.

[1] .1 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.

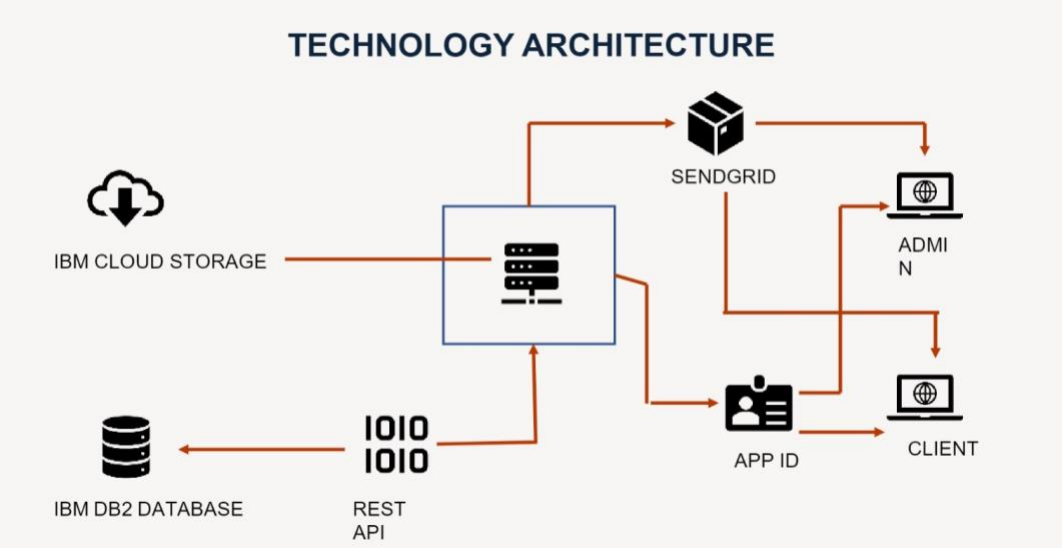

video feed from camera
frames from video
Prediction
model
evaluation
Yes
dl algoritham
test data
train data
data preprocessing
image data



5.2 Solution & Technical 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.



S.NO	COMPONENT	DESCRIPTION	TECHNOLOGY
1.	User Interface	How user interacts with application e.g. Web UI, Mobile App, Chatbot etc.	HTML, CSS, JavaScript / Angular Js / React Js etc.
2.	Application Logic-1	Logic for a process in the application	Python
3.	Application Logic-2	Logic for a process in the application	IBM Watson STT service
4.	Application Logic-3	Logic for a process in the application	IBM Watson Assistant
5.	Database	Data Type, Configurations etc.	MySQL etc
6.	Cloud Database	Database Service on Cloud	IBM DB2, IBM Cloudant etc.
7.	File Storage	File storage requirements	IBM Block Storage or Other Storage Service or Local Filesystem
11.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration :	Local, Cloud Foundry, Kubernetes, etc.

5.3 User Stories:

Sprint	**Function al 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	J.Sowndarya S. Preethy M.Ramalakshmi S.Nithyasri

Sprint-2	Registration	USN – 2	As a user, registering into the product using avalid username and password	3	Medium	J.Sowndarya S.Preethy M.Ramalakshmi S.Nithyasri
Sprint-1	Authentication	USN – 3	As a user, I adept to logging into the system with credentials	4	High	J.Sowndarya S.Preethy M.Ramalakshmi S.Nithyasri
Sprint-2	Authentication	USN - 4	As a user, I adept to logging into the system	2	High	J.Sowndarya S.Preethy M.Ramalakshmi S.Nithyasri

			with OTP			
Sprint-1	Designation of Region	USN – 5	selecting the region of interest to be monitored and analyzed	3	High	J.Sowndarya S.Preethy M.Ramalakshmi S.Nithyasri

User Stories

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a customer, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
	login	USN-2	As a customer, I can login to the application by entering correct email and password.	I can access my account/dashboard.	High	Sprint-1
	Dashboard	USN-3	As a customer, I can see all the orders raised by me.	I get all the info needed in my dashboard.	Low	Sprint-2
	Order creation	USN-4	As a customer, I can place my order with the detailed description of my query	I can ask my query	Medium	Sprint-2
	Address Column	USN-5	As a customer, I can have conversations with the assigned agent and get my queries clarified	My queries are clarified.	High	Sprint-3
	Forgot password	USN-6	As a customer, I can reset my password by this option incase I forgot my old password.	I get access to my account again	Medium	Sprint-4
	Order details	USN-7	As a Customer ,I can see the current stats of order.	I get abetter understanding	Medium	Sprint-4
Agent (web user)	Login	USN-1	As an agent I can login to the application by entering Correct email and password.	I can access my account / dashboard.	High	Sprint-3
	Dashboard	USN-2	As an agent, I can see the order details assigned to me by admin.	I can see the tickets to which I could answer.	High	Sprint-3
	Address column	USN-3	As an agent, I get to have conversations with the customer and clear his/er dobuts	I can clarify the issues.	High	Sprint-3
	Forgot password	USN-4	As an agent I can reset my password by this option in case I forgot my old password.	I get access to my account again.	Medium	Sprint-4

6 . PROJECT PLANNING & SCHEDULING:

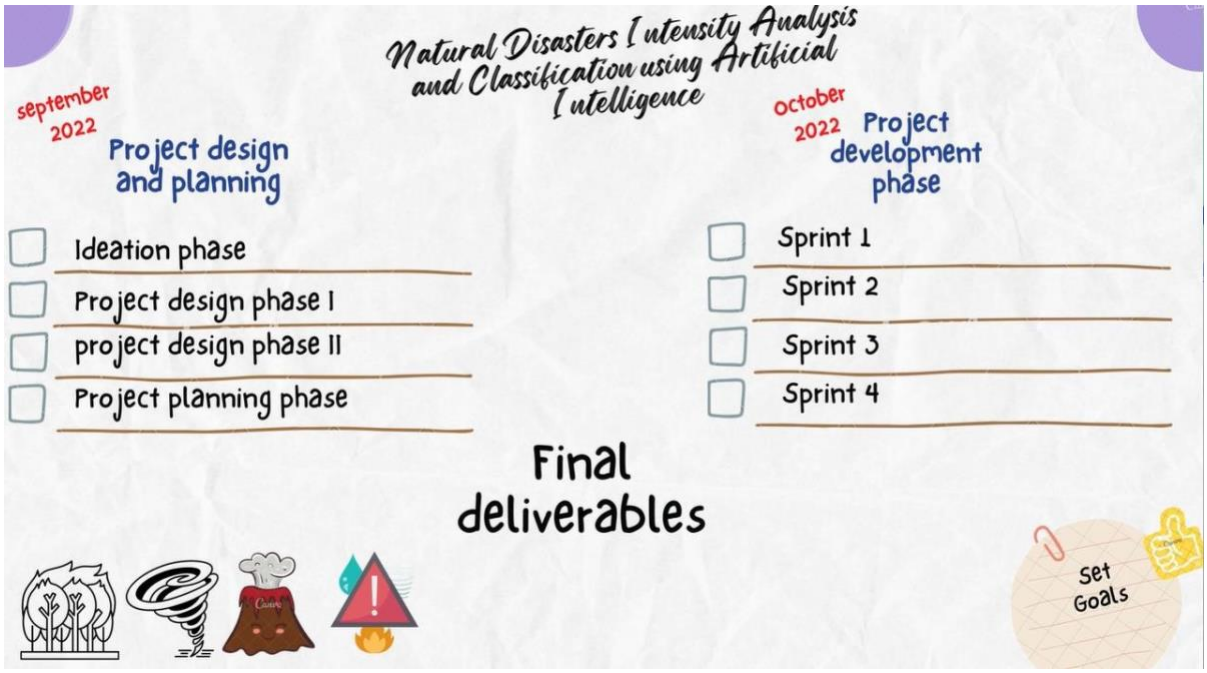
6.1 Sprint Planning and Estimation:

Sprint	Functional Requirement (Epic)	User story Number	User story / Task	Story points	Priority	Team members
Sprint-2	Accumulation of required Data	USN – 7	Gathering data and detailed report on past event analysis	3	Low	J.Sowndarya S.Preethy M.Ramalakshmi S.Nithyasri

Sprint-4	Organizing Unstructured data	USN – 8	Choosing a required algorithm for specific analysis	2	High	J.Sowndarya S.Preethy M.Ramalakshmi S.Nithyasri
Sprint-2	Algorithm selection	USN – 9	Choosing a required algorithm for specific analysis	6	High	J.Sowndarya S.Preethy M.Ramalakshmi S.Nithyasri
Sprint-3	Prediction and analysis of data	USN – 10	Predicting and visualizing the data effectively	36	High	J.Sowndarya S.Preethy M.Ramalakshmi S.Nithyasri
Sprint-4	Report generation	USN – 11	Generating a clear and detailed	3	High	J.Sowndarya S.Preethy M.Ramalakshmi S.Nithyasri
			report on product data analysis			

SPRINT PLAN

1. Identify the Problem
2. Prepare a Abstract, Problem Statement
3. List a required object needed
4. Create a Code and Run it
5. Make a Prototype
6. Test with the created code and check the designed prototype is
7. Solution for the Problem is Found!!



6.2 Sprint Delivery Schedule:

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

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	User Panel	USN-1	The user will login into the website and gothrough the services available on the webpage	20	High	NITHYASRI S PREETHY S RAMALAKSHMI M SOWNDHARYA J
Sprint-2	Admin panel	USN-2	The role of the admin is to check out the database about the availability and have a trackof all the things that the users are going to service	20	High	PREETHY S SOWNDHARYA J
Sprint-3	Chat Bot	USN-3	The user can directly talk to Chatbot regarding the services. Get the recommendations based on information provided by the user.	20	High	NITHYASRI S SOWNDHARYA J
Sprint-4	final delivery	USN-4	Container of applications using docker kubernetes and deployment the application.Create the documentation and final submit the application	20	High	RAMALAKSHMI M SOWNDHARYA J

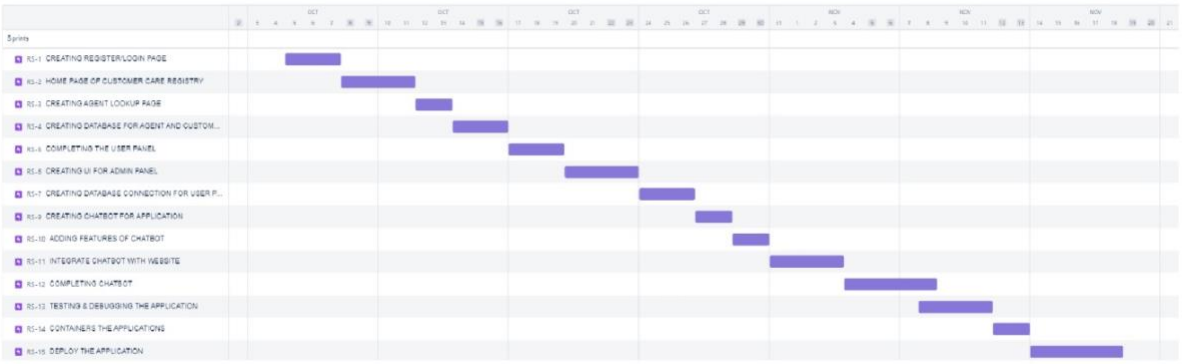
Project Tracker, Velocity & Burndown Chart: (4 Marks)

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	20	6 Days	24 Oct 2022	29 Oct 2022		29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022		05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022		12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022		19 Nov 2022

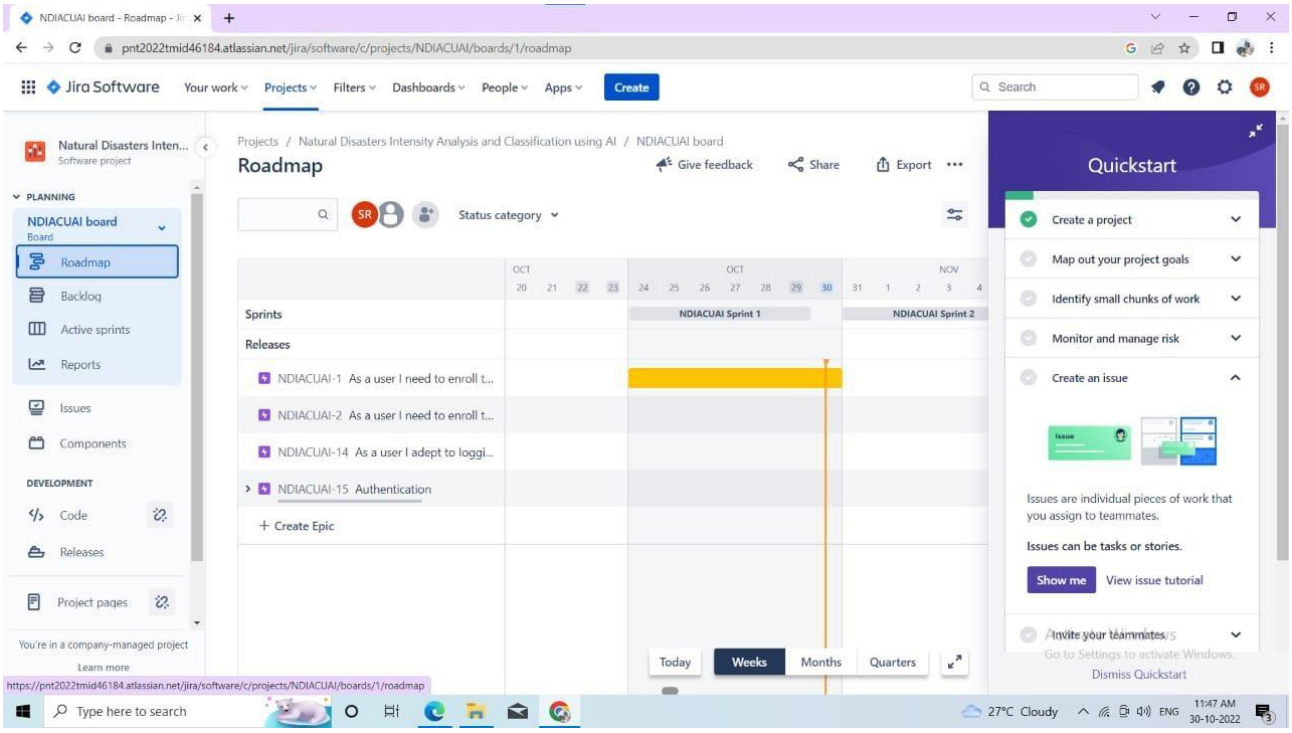
Velocity:
Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

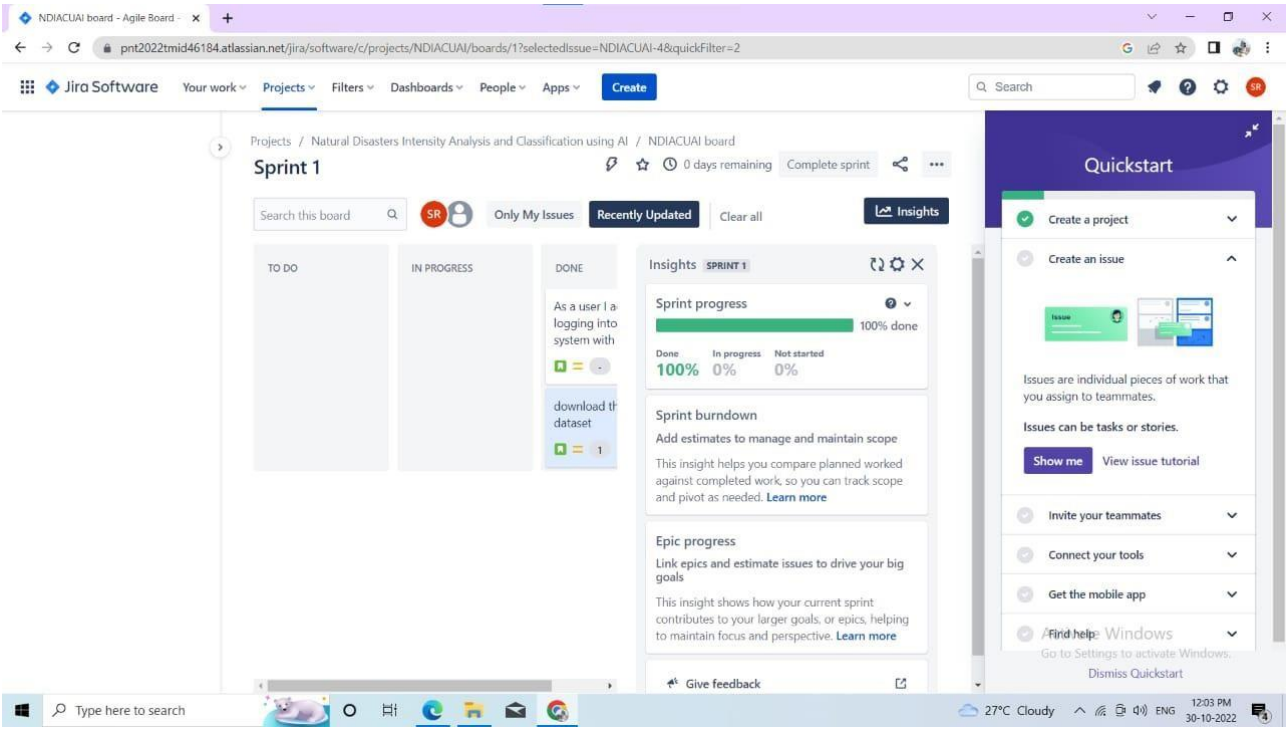
$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

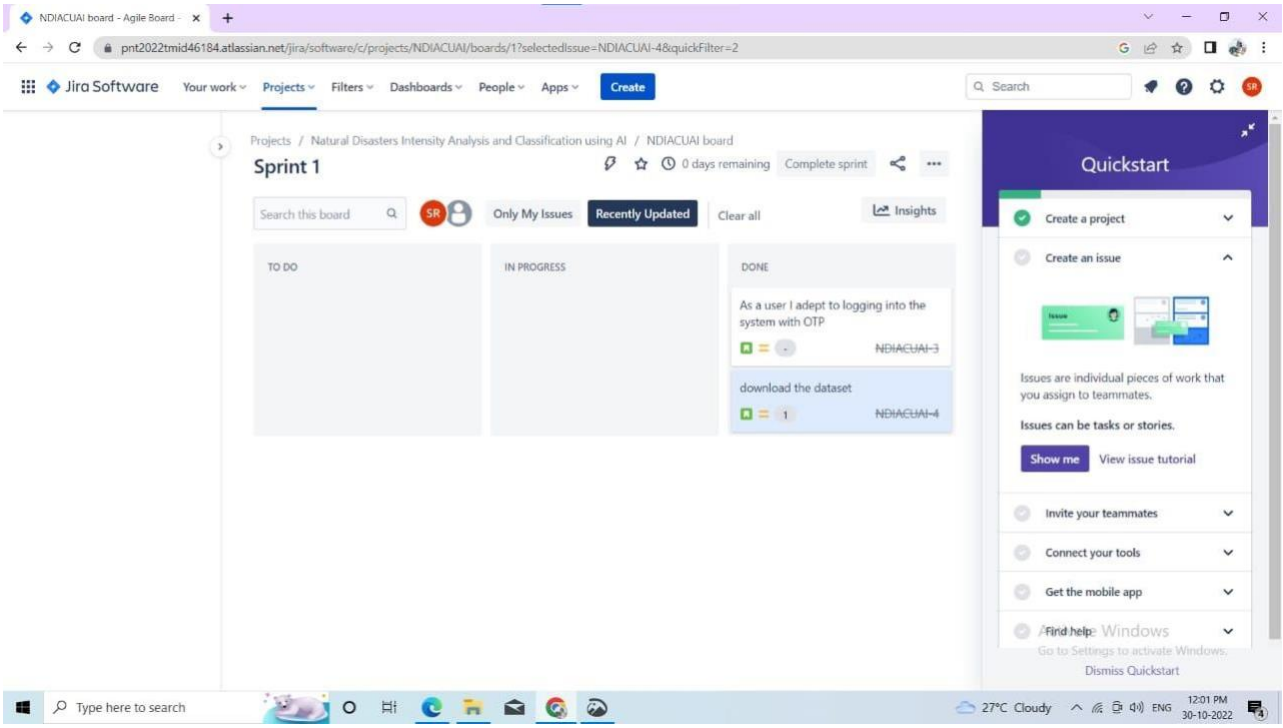
BURNDOWN CHART



6.3 Reports from JIRA:







7. CODING & SOLUTIONING

7.1 Feature 1:

Source Code:

home.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">

            <title>About Page</title>

            <style>

            /* ul {
          list-style-type: none;
          margin: 0;
          padding: 0px;
          overflow: hidden;
          position: fixed;
          background-color: aliceblue;
```

```
  }*/


li {
float: left;


  }


li a {
  displ
  ay:
  block
  ;
color:darkblue;
font-size:20px;
text-align: center;
padding: 10px 20px;
text-decoration: none;


  }


  .active{
background-color: gray;
color: white;


  }
li a:hover {
color: white;


  }


  #navbar{


position: fixed;
margin: 0;
padding: 0px;
top: 0;
overflow: hidden;
transition: top 0.3s;
list-style-type: none;


  }
img {
max-width: 20%;
height: auto;
box-sizing: border-box;



  }


  .img1 {
max-width: 100%;
height: auto;
transform: translate(350px, -250px);
box-sizing: border-box;




  }


  .img2 {
max-width: 100%;
height: auto;
transform: translate(700px, -500px)


  }
```

```
  .img3 {
max-width: 100%;
height: auto;
transform: translate(350px, -250px)




  }



h1{
text-align: left;

  }

  </style>

  </head>

  <body style= "margin:0;background-attachment:fixed;background: linear-gradient(to bottom,#967dcb 0%,#c391a8
  100%);backgroundrepeat:no-repeat;background-size:cover;">


  <!--#################### Nav bar ####################-->

  <!--<div class="bg-image" style="background-image:
  url('https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.rawpixel.com%2Fsearch%2Fmedicine&psig=AOvVaw0ZWZpbDixLLBHyPL95-
  J9r&ust=1667986349057000&source=images&cd=vfe&ved=0CA0QjRxqFwoTCMi9pMGjnvsCFQAAAAAdAAAAABAJ');height:100vh;"></div>-->

  <div id = "navbar">

  <ul style = "list-style-type: none;">

  <li><a href="intro.html">Introduction</a></li>

  <li><a href="upload.html">Open Web Cam</a></li>

  </ul>

  </div>



  <h1 style = "z-index:-1;top:60px;padding:50px;position:relative;color:rgb(255, 255, 255);">AI based Natural Disaster
  Analysis</h1>



  <div class="container">

  <p style = "padding:50px;font-size:x-large;font-family:sans-serif;text-align:justify;width:70%">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.<!--22-->

  </p>

  </div>
```

```
  <!--<img class="my-image" src = "{{url_for('static', filename='img/docs.jpg')}}"/>-->

  <div class="img">

  <h1>Earthquake</h1>

  <img src = "Earthquake.jpg">

  <div class="img1">

  <h1>cyclone</h1>

  <img src = "cyclone.jpg">

  </div>

  <div class="img2">

  <div class="imageColumn">

  <h1>Flood</h1>

  <img src = "Flood.jpg">

  </div>

  <div class="img3">

  <h1>wildfire</h1>

  <img src = "wildfire.jpg">

  </div>



  <script>
var prevScrollpos = window.pageYOffset;
window.onscroll = function() {
var currentScrollPos = window.pageYOffset;
if (prevScrollpos > currentScrollPos) {
document.getElementById("navbar").style.top = "0";

  } else {
document.getElementById("navbar").style.top = "-70px";

  }
prevScrollpos = currentScrollPos;

  }



  </script>

  </body>

  </html>
```

7.2 Feature 2:

Intro.html:

```
<html>

        <head>

        <meta charset="utf-8">

        <title>www.vijayakumar.com</title>

        </head>

        <font color="#A6ACAF" size="5">

        <marquee><b><i>THANKS FOR WATCHING</i></b></marquee>

        </font>

        <br />



        <font face="cinzel" size="4">

        </font>

        <br /><br /><br /><br />

        <br />

        <br />
        <div id = "navbar">
        <ul style = "list-style-type: none;">
        <li><a href="{{ url_for('home') }}">Home</a></li>
        <li><a href="{{ url_for('Introduction') }}">Introduction</a></li>
        <li><a href="{{ url_for('Open Web Cam') }}">Open Web Cam</a></li>
```


<body style="background-color:aquamarine;">

<h1 align="center">

AI based Natural disaster analysis

China, India and the United States are among the countries of the world most affected by natural disasters.

</h1>

<h3 align="center">

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.

<hr width="1500px">

<b>

<font face="cinzel" size="4">

```
<a href ="#">About Us|

<a href ="#">Contact Us |

<a href ="#"> Privacy Policy |

<a href ="#"> Terms |
```

Open web cam.html:

```
<!DOCTYPE
html>

  <html>

  <head>

  <meta name="viewport" content="width=device-width, initial-scale=1">

  <style>

  .alert {
padding: 20px;
background-color: #f44336;
color: white;

  }



  .closebtn {
margin-left: 20px;
color: white;
font-weight: bold;
float: center;
font-size: 22px;
line-height: 20px;
cursor: pointer;
transition: 0.3s;

  }



  .closebtn:hover {
color: black;

  }

  </style>

  </head>

  <body>
```

```
<h2>Alert Messages</h2>

<p>Click on the "x" symbol to close the alert message.</p>

<div class="alert">

<span class="closebtn" onclick="this.parentElement.style.display='none';">&times;</span>

<strong>Danger!</strong> Emergency pull

</div>

</body>

</html>

<div id = "navbar">

<ul style = "list-style-type: none;">

<li><a href="intro.html">Introduction</a></li>

<li><a href="{{ url_for('Open Web Cam') }}">Open Web Cam</a></li>

</ul>

</div>

<h1 style = "z-index:-1;top:60px;padding:50px;position:relative;color:rgb(255, 255, 255);">AI based Natural Disaster Analysis</h1>

<div class="container">

</p>

</div>

<!--<img class="my-image" src = "{{url_for('static', filename='img/docs.jpg')}}"/>-->

<div class="img">
```

```
<div class="imageColumn">

<div class="img">

<h1>AI based Natural disaster Analysis</h1>

<p><img src ="Emergency pull.jpg"width="1600" height="800"></p>

</div>



</script>


</body>


</html>
```

7.3 Database Schema(if Applicable):

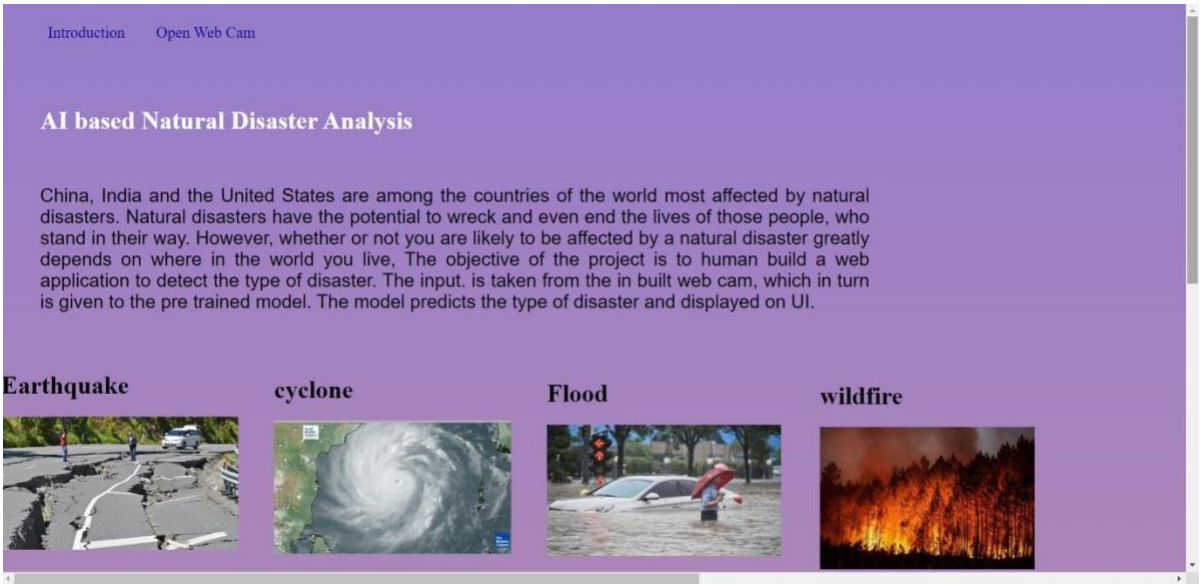
A convolutional neural network is a class of artificial neural networks. It is a Deep Learning algorithm that can take in an input image, assign importance to various objects in the image and be able to differentiate one from the other. The pre-processing required in a ConvNet is much lower as compared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

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. 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 modeling and forecasting.

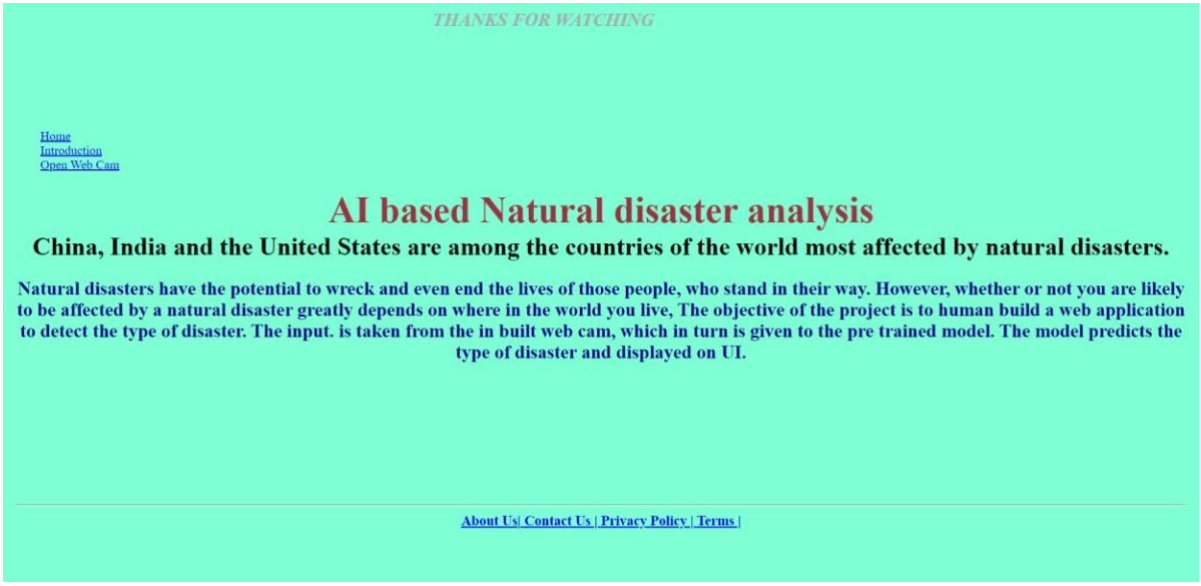
8. TESTING

8.1 Test Cases

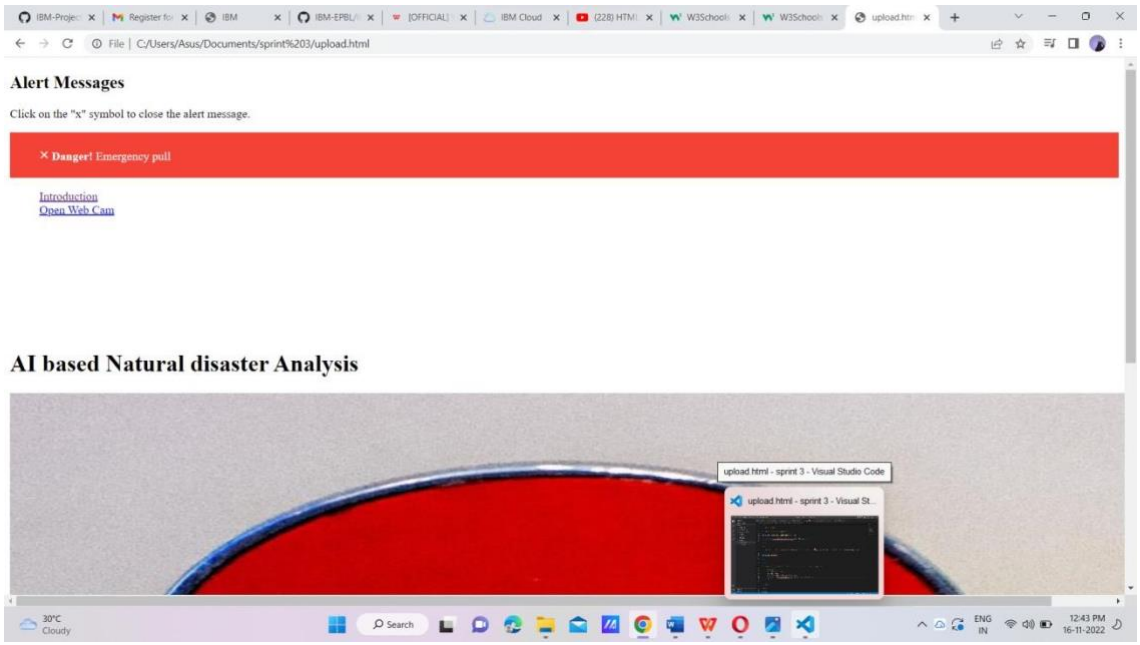
Home.html:



Intro.html:



Open web cam.html:



				Date	11-Nov-22								
				Team ID	PNT2022TMID28524								
				Project Name	Project - Natural Disaster Intensity Analysis and Classification using Artificial Intelligence								
				Maximum Marks	4 marks								
Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID	Executed By
HomePage_TC_OO1	UI	Home Page	Verify user is able to see the home page and other tabs , when user entered into the website	internet and device	1. Enter URL and click go 2. click the tabs in the Navigation Bar	URL FOR THE WEBSITE	Website should be visible	Working as expected	Pass	NA	N	NA	Mathankumar S Logesh R Logeshwaran S Pavithra V
HomePage_TC_OO2	UI	Home Page	verify user is able to see the results tab		1. Enter URL and click go 2. Click on results tab and check whether the user is able to see the flag card with open button	URL FOR THE WEBSITE	Application should show below UI elements: A. Header with live stream b. a camera glyphicon c. a button named open	Working as expected	Pass	NA	N	NA	Mathankumar S Logesh R Logeshwaran S Pavithra V
HomePage_TC_OO3	Functional	Home page	Verify user is able to click the button on the result tab		1. Enter URL and click go 2. Click on results tab and check whether the user is able to click the button named open	URL FOR THE WEBSITE	User should click the button named open	Working as expected	Pass	NA	N	NA	Mathankumar S Logesh R Logeshwaran S Pavithra V
HomePage_TC_OO4	Functional	access camera	Verify user is able to see that the camera is accessible and open when the button is clicked		1.Enter URL and click go 2.click on results tab 3.click open button	URL FOR THE WEBSITE	Application should able to access the camera and see the livestream	Working as expected	Pass	NA	N	NA	Mathankumar S Logesh R Logeshwaran S Pavithra V
Camera_TC_OO4	Functional	camera	Verify user is able to capture the image from live stream		1.Enter URL and click go 2.Click on results tab 3.click open button 4.camera is opened 5.click q button to capture image	URL FOR THE WEBSITE	Application should able to capture image from livestream	Working as expected	Pass	NA	N	NA	Mathankumar S Logesh R Logeshwaran S Pavithra V
Prediction_TC_OO5	Functional	output window	Verify user is able to see the predicted results in the window		when the image is captured again click q button to see the results	URL FOR THE WEBSITE	Application should show the predicted results from the image captured	Working as expected	Pass	NA	N	NA	Mathankumar S Logesh R Logeshwaran S Pavithra V

8.2 User Acceptance Testing:

This document serves as a quick reference for the Deep Learning Fundus Image Analysis for Early Detection of Diabetic Retinopathy project's test coverage and open issues as of the project's release for user acceptance testing.

Defect Analysis:-

This shows how many bugs were fixed or closed at each severity level and how they were fixed.

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	4	5	2	3	14
Duplicate	1	0	3	1	5
External	2	3	0	1	6
Fixed	9	2	4	15	30
Not Reproduced	0	0	1	0	1
Skipped	1	0	1	1	3
Won't Fix	0	5	2	1	8
Totals	17	14	13	22	64

Test-Case Analysis

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

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	9	0	0	9
Client Application	40	0	0	40
Security	3	0	0	3
Out-source Shipping	3	0	0	3
Exception Reporting	8	0	0	8
Final Report Output	4	0	0	4
Version Control	2	0	0	2

9. RESULTS:

9.1 Performance Metrics:

S.No.	Parameter	Values(Percentage)
1.	Model Summary	-96%
2.	Accuracy	Training Accuracy - 96.5% Validation Accuracy -92.3%
3.	Confidence Score (Only Yolo Projects)	Class Detected - Nil Confidence Score - Nil

Our Project marks the successive performance by implementing in order to be cost effective and more reliable to use and to predict the future from the natural disaster that we are ahead of. The successive way includes the objectives, activities and the approaches for the project. It mainly includes the trained dataset which gives an excessive measure of success which helps to overcome the future from this natural disaster.

10. ADVANTAGES AND DISADVANTAGES

ADVANTAGES:

- The use of AI to forecast natural disasters would save millions of lives. Furthermore, the information evaluated by AI-powered systems can aid in understanding the scale and patterns of

natural catastrophes such as floods, earthquakes, and tsunamis, which would aid in improved infrastructure development in disaster-prone areas.

- Disaster management plays an integral role in keeping communities safe. 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

DISADVANTAGES:

- A forest fire is a natural disaster that cannot be forecasted.

- Sometimes the prediction may fail and result in huge loss.

11. CONCLUSION

Natural disasters inflict severe damage on almost the entire spectrum of social and natural habitats, ranging from housing and shelter, water, food, health, sanitation, and waste management to information and communication networks, supply of power and energy, and transportation infrastructure. The major challenges faced in all disasters include pre-disaster early warning infrastructure; the supply of food and clean drinking water; health and sanitation; information and communication; power and energy for lighting and cooking; waste collection and disposal, including rapid disposal of dead bodies of humans and animals; disaster-proof housing and shelter; emergency and post-disaster shelters; rescue and relief operations; and transport infrastructure. Though it is not possible to prevent most of the disasters, still their effects can be alleviated or mitigated in magnitude by anticipated preparedness. Advanced disaster management technology could provide a critical support system for disaster management authorities at times of disaster-related crises. Such a technology also provides important inputs for any disaster management plan of action in modern times. Communities and individuals have to be educated on pre-disaster planning and preparedness. Awareness must be created amongst masses, for which first-aid training at grass roots level is essential. There should be a National Disaster Plan that defines the tasks of the communities and local health personnel.

For the evaluation of the model ROC and 30% landslide point‘s residual was used. The results showed that the accuracy of the model was estimated by ANFIS in the study area of 77.48% (good accuracy); this data-mining method depends on the number of pairs of training, experimental and fuzzy data used in the research, and, in particular, by increasing the number of fuzzy rules of the process, more accurate simulation can be provided. So far, different methods have been proposed for landslide susceptibility zonation. The accuracy or the error of each of these methods, as well as the use and comparison of each of these methods, requires knowledge of the foundations on which the methods are based. So far, different approaches to landslide susceptibility zonation have been proposed, but what is certain is that all these methods can provide accurate results with minimal data and costs and at very low levels. Combining these models with GIS and RS systems not only increases the accuracy of dealing with complex issues and uncertainties, but also leads to the emergence and development of new theories and methods in a variety of issues.

12. FUTURE SCOPE

The term ―Natural Disaster‖ encompasses the complete realm of disaster-related activities. Traditionally people tend to think of disaster management only in terms of the post-disaster actions taken by relief and reconstruction officials; yet disaster management covers a much broader scope, and many modern disaster managers may find themselves far more involved in pre-disaster activities than in post-disaster response. Those are:

1. The refugee field of disaster management is highly specialized and requires not only many development skills but also a broader awareness of political, legal, and humanitarian issues.

2. DM aims and objectives, elements, Natural/man-made Disasters, Victims, Relief Systems.

3. Phases of Disaster Response/Relief Operations, Government‘s Role.

To Safeguard and make available vital materials, supplies and equipment to ensure the safety and recovery of records from predictable disasters.To reduce the risk of disasters caused by human error, deliberate destruction, and building or equipment failures. Be better prepared to recover from a major natural catastrophe.

In this project we help to build preparedness for threats and hazards by providing a low-risk, cost effective environment to: Test and validate plans, policies, procedures and capabilities. Identify resource requirements, capability gaps, strengths, areas for improvement, and potential best practices. Disaster management aims to reduce, or avoid, the potential losses from hazards, assure prompt and appropriate assistance to victims of disaster, and achieve rapid and effective recovery. Disaster Risk Management includes the sum total of all activities, programmes and measures which can be taken up before, during and after a disaster with the purpose to avoid a disaster, reduce its impact or recover from its losses.

13.APPENDIX

GITHUB LINK: https://github.com/IBM-EPBL/IBM-Project-41934-1660646242.git

VIDEO DEMO LINK: https://youtu.be/-k6zZm06R38