YENEPOYA INSTITUTE OF ARTS, SCIENCE, COMMERCE AND MANAGEMENT A CONSTITUENT UNIT OF YENEPOYA (DEEMED TO BE UNIVERSITY) BALMATTA, MANGALORE

A PROJECT REPORT ON

"SAFEWAY"

SUBMITTED BY

NANMA MANOJ M

22MSCCCD07

IV MSC (CYBERSECURITY, CLOUD COMPUTING AND DATA ANALYTICS)

UNDER THE GUIDANCE OF

Ms. CHAITRA NAGESH BHANDARY

LECTURER

DEPARTMENT OF COMPUTER SCIENCE

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF

MASTER OF COMPUTER SCIENCE

AUGUST 2024

DECLARATION

I hereby declare that this project report entitled “SafeWay” had been prepared by me towards the partial fulfillment of the requirement for the award of the Master of Computer Science at Yenepoya (Deemed to be University) for the academic year 2023-2024.

I also declare that this project is the result of my own effort and has not been submitted by any other university or an institution.

Place: Mangalore **Nanma Manoj M**

Date: 01-08-2024 **22MSCCCD07**

ACKNOWLEDGEMENT

The satisfaction that accompanies the completion of any task would be incomplete without mentioning the people who made it possible, whose constant guidance and encouragement crown all of the efforts with success. It is a privilege to express my gratitude and respect to all those who inspired and helped me in the completion of this project.

I would like to express our sincere gratitude to our Principal and Dean of Science Prof. (Dr.). Arun Bhagwath for giving us an opportunity to study in this trending field.

I express my deep gratitude to Vice Principal Dr. Shareena P, Dr. Jeevan Raj, and Mr. Narayan Sukumar for their guidance and constant encouragement during my Project.

I express my deep gratitude to HOD Dr. Rathnakar Shetty, Department of Computer Science for his guidance and constant encouragement

I would like to express my sincere gratitude to my internal guide, Ms Chaitra Nagesh Bhandary and my class advisor Ms. Ayshath Safwana for guiding supporting for completion of a Project.

And also I would like to thank our teaching and non-teaching staff of Yenepoya Institute Of Arts, Science, Commerce, And Management and also to my parents and friends who were directly or indirectly involved in the completion of our project.

NANMA MANOJ M

22MSCCCD07

ABSTRACT

SafeWay is an advanced system that improves traveler safety by offering up-to-date data on crime rates, accident locations, and places prone to natural disasters. SafeWay provides a user-friendly interface that utilizes advanced data analytics and machine learning to identify safety concerns, assisting travelers in making informed choices to steer clear of dangerous areas.SafeWay integrates extensive data sources and advanced technology to overcome the restrictions of traditional GPS systems and scattered safety resources. This platform's goal is to provide secure travel experiences with precise, current safety details.

INDEX

CHAPTER 1

1. INTRODUCTION

SafeWay is a data-driven technology that assures traveler safety.It utilizes the modern data analytics technique to map out crime hotspots , accident prone area and natural disaster prone areas into a user friendly interface.My mission and vision is to arm people with the accurate information that will help them to choose their travel decisions wisely. Whether you are traveling, vacationing or visiting a new place SafeWay gives you up-to-date information about crime , accident and emergency scenarios rate in different cities.This platform offers a dependable,accurate and easily available solution for improving personal safety of travelers by using advances technology .These advanced methodology makes this website useful to the users as it gives most recent and pertinent information in an understandable and practical manner.Thanks to SafeWay as users can avoid hazardous locations and travel with confidence that help them to navigate alternative routes. SafeWay helps users to travel more securely and navigate your travel safely.

Traveling alone comes with a lot of risk and hazards as the traveler might not know the local areas well. Even with today's GPS locating systems its difficult for users to obtain location specific , real-time crime and safety statistics, which makes traveling even more difficult.The only option left is untrustworthy travel guides since the resources available are frequently dispersed , out-of-date or challenging to understand. On top of this there are only few platforms that offer full safety insights and are easy to use and intuitive. With all these adversaries there sis a high chance that travelers will run into risky situations since there is a dearth of trustworthy and easily accessible safety information. As a result travelers deter from their traveling plans or even eventually ruin their trip plans.In such a case , my website which uses machine learning and data analytics technology is suggested as a solution.This platform provides a dependable and easily available solution for improving personal safety by integrating extensive data sources with state of the art technology.With this initiative you can travel with comfort and confidence knowing that you have access to most accurate , recent and useful information for your trip.

This new approach to traveling will help travelers to go about a comfortable and stress free itinerary.Moreover they don't have to pay form having any personal guides for their travel , all the needed information is available at the tip of their finger. This website integrates 3 ML models that helps to make accurate and pronounced prediction about the traveling location.My main mission with this project is to create a community of informed and vigilant travelers who can rely safely on a trusted website that delivers accurate and update information that helps tourists to travel around more safely.

1.1 PROJECT OBJECTIVE

The objective of the SafeWay project is to develop a comprehensive, data-driven platform that enhances the safety and security of travelers. By utilizing advanced data analytics and integrating various safety-related datasets, SafeWay aims to provide real-time, actionable information that empowers users to make informed travel decisions. The platform's main objectives are:

- Crime Hotspot Analysis : Identify and map out areas with high crime rates to inform travelers of potential risks.
- Natural Disaster Risk Assessment : Analyze and display regions prone to natural disasters such as earthquakes, floods, and hurricanes.
- Accident prone area analysis : Identify and highlight areas with high frequencies of traffic accidents.

CHAPTER 2

2. LITERATURE REVIEW

2.1 INTRODUCTION

A literature review is an extensive synopsis and evaluation of the scholarly publications and research that have already been done on a specific subject. It gives a comprehensive picture of the field's present level of knowledge by combining, locating and assessing the methods and results of earlier researches. This helps to form a theoretical framework for my project. It also help to identify research gaps and aids in justifying the applicability of a new study or project.

In context of this project a literature review is crucial for many reasons. Firstly it enables us to comprehend the state of art projects or papers in terms of data analytics , real-time crime mapping and other travel safety studies. Through an analysis of previous research paper you can pick up the efficient approaches and industry standards that can be included into SafeWay.For example, identify most reliable datasets source or the best algorithm / model for accurate prediction.Moreover you can find out the drawbacks of the existing system and researches ,which clearly justifies the creation of SafeWay.

Further , a review of literature helps us to uplift the validity of SafeWay's methodology and design. By citing prior researches one can show that the technology ,procedures and methodology used in SafeWay are supported by empirical data and have been effectively implemented in the past. This approach not only increases the legitimacy of the project but also lays down a strong foundation for the growth and improvement of possible scholarly contribution. All the thing considered , the literature evaluation plays a crucial role as it assures that the website development is based on a solid grasp of the most recent advancement in the field of data analytics and travel security.

2.1.1 TECHNOLOGY

- Data analytics : This is the systematic approach to examination of vast datasets to uncover patterns and drive useful insights relevant to users travel safety.In this project it includes analyzing crime rates, accident data and natural disaster occurrence. SafeWay helps users to make informed decision about their travels through processing and visualizing the accurate datasets , thus increasing the travel safety of the users.
- Machine Learning : It is integral to the websites predictive capabilities. The project uses models like random forest and gradient boosting to analyse the data and identify the trends and patterns in them to make accurate predictions about safety condition of the specific location.The Ml models are trained with the acquired datasets which helps to identify high risk areas, forecasting potential hazards and providing personalized safety recommendations to the users.
- Web Development : SafeWay uses HTML5,CSS JavaScript to produce a responsive and creative front-end. This ensurers that the website is user-friendly and accessible across multiple devices including desktops, tablets and smartphones. This designing part helps users to easily navigate through website and access the necessary information.Complex visualization concepts have been made easier by adding interactive maps and dashboards that enhances user experience.
- Integration of technologies : Flask helps use to combine data analytics, ML and web development together to yield an interactive and effective website.It's a backend framework that handles server-side operations, API requests and database interactions.Flask ensures that data move smoothly from analysis phase to the user interface by enabling seamless communication between the front-end and backend components of the system.For instance, when the user sends a request for fetching information about a specific location ,the flask handles the request and retrieves the relevant data from the database , processes it using ML models and sends the result back to the front end for display.

By efficiently combining these technology Safeway enhances travel safety by providing a robust, user-friendly and comprehensive platform.The amalgamation of ML, data analytics and intuitive web development combined with flask framework assures that the platform provides the user with timely, accurate and actionable data driven safety information in a user-friendly manner.

2.1.2 HARDWARE

- Processor : Intel Pentium Dual-Core or above.This project needs such a processor to make sure that the system handles the computational demands of running data analytics and ML algorithms.Such a processor helps to enhance performance and responsiveness as it provides parallel processing capabilities to carry out multiple tasks at the same time.
- Processor speed : 2GHz ,this helps to carry out complex calculations and operations smoothly.It allows the system to effectively and efficiently process huge datasets , perform real-time data analysis , and provide timely response to user requests.
- RAM : 2GB and above.Safeway platform requires a RAM that requires to support the multitasking and memory -intensive operations.For running multiple applications such as web server , database and machine learning models there should be adequate system RAM.
- Hard disk utilisation : minimum 40GB and above.In order to store the operating system , development tools, libraries and datasets the project needs at least 40 GB Hard disk.Adequate storage is needed to store database files, ML models and application code to make sure that the platform runs properly.
- Input Devices : Mouse , keyboard, these standard devices are needed for developers to interact with the system , compose code and test the code .These are crucial for coding , testing and debugging .

By following these hardware requirements , it ensures the efficient development and deployment of a robust and reliable safety platform for users that can be used to get accurate information related to the specific traveler needs.

2.1.3 OPERATING SYSTEM

Windows operating system gives great compatibility with a variety of hardware ans software. This assures smooth integration with various tools and technology used in this platform.This user friendly interface helps developers to easily handle the system.

2.1.4 APPLICATIONS

- PyCharm : It's an IDE designed specially for python development.In this project PyCharm helps me to code various python components , including the server backend using Flask and the model algorithms.It ensures high code quality using advanced features like code completion,debugging and version control integration.
- Google Colab : For this project colab helped me to build and evaluate machine learning models.This platform helps to handle huge datasets and process it smoothly.It helps to ensure that the models achieve the accuracy and performance needed by allowing quick experimentation and iteration.
- SQL log : It's a RDBMS .In this project , SQL log helps to store and manage location names and corresponding latitude and longitude.This type of database helps to efficiently store , query and retrieve relevant data during analytics phase.
- XAMPP : It provides a complete setup for building , testing and deploying web apps.It provides Safeway with a local server environment where developers could test the platform before deploying it ti a production server.This helps to fully test the platform in a controlled environment , thus helping us to identify and mitigate issues before the actual deployment.

All of these tools combined ensures that the project development processes is streamlined and ensure proper data management thus achieving high accuracy both in the aspects of data analytics and machine learning model components.

2.1.5 TOOLS

- Google Maps API : The main features of the platform , ie mapping and geolocation services are provides by Google maps API. It helps the platform with integrating interactive maps fro visualization of crime hot spots,accident prone areas and natural disaster prone area.
- PyCharm : It's an IDE designed specially for python development.In this project PyCharm helps me to code various python components , including the server backend using Flask and the model algorithms.It ensures high code quality using advanced features like code completion,debugging and version control integration.
- Google Colab : For this project colab helped me to build and evaluate machine learning models.This platform helps to handle huge datasets and process it smoothly.It helps to ensure that the models achieve the accuracy and performance needed by allowing quick experimentation and iteration.
- SQL log : It's a RDBMS .In this project , SQL log helps to store and manage location names and corresponding latitude and longitude.This type of database helps to efficiently store , query and retrieve relevant data during analytics phase.
- XAMPP : It provides a complete setup for building , testing and deploying web apps.It provides Safeway with a local server environment where developers could test the platform before deploying it ti a production server.This helps to fully test the platform in a controlled environment , thus helping us to identify and mitigate issues before the actual deployment.
- Python : This is the main programming language used for data analytics and machine learning in this project.I have utilized libraries like pandas,NumPy and scikit-learn to process data and build the models.Python is the apt programming language that can handle the projects data-intensive processes.
- HTML5,CSS3,JavaScript : SafeWay's front-end is developed using these technologies.For the structuring part HTML is used , CSS is used for the styling part and JavaScript enables interactivity and dynamic content.These technology combined ensure that the website is interactive and visually appealing.

- Flask : In Safeway this lightweight web framework for python helps to develop backend services and APIs .This helps the developers to integrate the backend and front-end, handle requests , process data and finally display the result to user in a user-friendly way.

2.2 LITERATURE REVIEW

The main objective of this study is to help police departments analyze crime patterns by using various visualizations on Google map API, including point feature and image feature techniques. Through this study, the police department was be able to access information on patterns of crime, which allowed them to easily identify the when and where for deploying officers for help. This also improved the community's awareness of different crimes happening in the region by displaying instances of crime, areas with high crime rates, and patterns of criminal activity. Overall the study shows the efficiency of the Google map API in mapping crime [1].

The Secure Framework approach in street security offers important opportunities to effectively address street injury, achieve lasting reductions in deaths and severe injuries, and tackle the possible decline in road safety. Taking everything into account, it is being carried out to a significantly limited extent. This paper aims to review explanations of, and strategies for implementing, a Secure Framework by examining and regularly reviewing existing Secure Framework guidelines and national strategies. These examples show how the Secure Framework is used, revealing how it has led to shortcomings in street safety efforts and affected the goal of achieving zero street accidents (also known as vision zero) [2].

This effective survey aims to strengthen the current evidence and explore studies further.Focusing on executing the SSA. Through a meticulous and rigorous observation method, they have discovered studies that examine various aspects of the SSA, including safe road design, speed control, safe vehicles, and post-accident care. Their aim is to provide insight into the effectiveness of the SSA in reducing traffic accidents and injuries through a thorough analysis of the results of these studies. Furthermore, this study examines the obstacles and requirements linked to the

implementation of the SSA. It examines the organization's activities, systems, and partnerships that support the implementation of SSA standards. Gaining insight into the obstacles and enablers of implementing this approach will help in creating evidence-based strategies to enhance traffic safety nationwide [3].

The article discusses how the effectiveness of responding to transportation incidents during emergencies relies on the technical condition and accessibility of emergency vehicles. An evaluation has been announced to test the effectiveness of methods in delivering and maintaining emergency response vehicles. The goal is to find the best way to acquire and maintain emergency-rescue vehicles by considering factors such as operability and availability, including options like purchasing new vehicles or repairing current ones [4].

This article explores the utilization of spatial data for disaster management, including both natural and man-made incidents. Comparing studies highlight the importance of utilizing remote-sensing (RS), Geographic Information Systems (GIS), and Global Navigation Satellite Systems (GNSS) data in natural disaster management. The sharing of spatial information is investigated in the context of establishing Spatial Data Infrastructures (SDIs) for widespread disasters. Several instances of utilizing SDI in disaster management are examined, highlighting the need for collaboration among organizations and governments to facilitate the exchange of information and improve proactive and emergency plans. Additionally, the study explores how citizens can participate in disaster management by using volunteered geographic data (VGI) applications to provide strategic information. A proposal was made to showcase the importance of the issues discussed in the article by demonstrating all the spatial data-sharing perspectives [5].

Clearly, the era of big data has presented new opportunities for natural disaster management, mainly due to the various possibilities it offers in visualizing, analyzing, and predicting natural disasters. From this perspective, vast amounts of data have significantly altered how human societies adopt disaster management strategies to reduce human suffering and financial losses. In today's heavily technology-dependent world, computer specialists and policymakers aim to optimize big data utilization in disaster management by collecting data from various sources and storing it effectively

for use in different disaster response stages. This paper aimed to conduct a thorough study of the role of big data in disaster management, emphasizing the current state of technology in providing effective solutions. The study has showcased the findings of several researchers on various scientific and technological perspectives that impact the effectiveness of big data in supporting disaster response. This paper examines the significant big data sources, their accomplishments in various disaster management phases, and emerging technological trends in utilizing this untapped ecosystem of Big Data for monitoring and detecting natural hazards, reducing their impacts, aiding in relief efforts, and supporting recovery and reconstruction processes within this context [6].

AA&P, established in 1969, is a significant academic journal that serves as a key platform for researchers in the field of road safety. In honor of its 50th anniversary of sharing exceptional and insightful studies, a comprehensive statistical and visual analysis of AA&P publications from 1969 to 2018 was carried out. It has been demonstrated that the annual amount of AA&P's deliveries has grown rapidly as AA&P has led the way in street safety advancements and spreading awareness. Upon identifying key source nations and organizations, center creators, highly referenced published documents, and influential publications with strong reputation, they determined that AA&P's main areas of focus include the impact of risk and hazard perception on driving behavior, analyzing crash frequency modeling, intentional driving violations and impaired driving behavior, epidemiology, evaluation, and prevention of road traffic injuries, and analyzing crash injury severity modeling. Moreover, the influential research articles that have significantly aided in progressing research and steering AA&P in different paths - especially those centered on both crash frequency and crash injury severity modeling studies were identified. In conclusion, a revised Haddon network is suggested to contribute new insights to the evolving field of road safety studies by integrating various interconnected transportation systems effectively [7].

23% of global road traffic deaths are pedestrians. While multiple research papers have made contributions to the analysis of pedestrian safety, they have not offered a complete overview of advancements in the research field and trends in publications. The large number of papers in the pedestrian research field makes it challenging to

detect trends and insights. This research addresses the gap by conducting a scientometric analysis of pedestrian safety research listed in the Web of Science. The range includes 2594 articles released from 2010 to 2021 in the English language. This research examined the yearly publications and citation patterns, most cited papers, impactful papers within three years of publication, authors involved, funding sources, and journals involved. The differences in pedestrian death rates between regions were also examined in relation to research. The findings indicated reduced research output in low and middle-income nations despite experiencing a high number of pedestrian fatalities. Afterwards, the primary groups of keywords or leading subjects were recognized and analysis of topics was used to determine the development of research. Four groups of keywords were found, including "analyzing crash severity in vehicle-to-pedestrian incidents", "simulating pedestrian movements and decisions", "enhancing vehicle systems to decrease impact injuries", "studying pedestrian behavior at crosswalks and intersections with signals". This research provides a comprehensive knowledge map on pedestrian safety analysis, including publication patterns, study progression, and areas for further research to inform future work in this field [8].

Activity accidents cause the deaths of many individuals and the loss of property. Therefore,Conducting research and reflections is crucial to reducing the risk of accidents and understanding the underlying reasons result in their happening. The state of the pavement is a crucial factor in causing accidents.Some observations have shown the impact of pavement failures like rutting and surface roughness and enhance safety measures for activities by reducing friction and increasing resistance against sliding. The purpose of this analysis was to identify and gather the most important Conduct a thorough examination of papers using the Web of Science (WOS), and then assess the data using VOSviewer program, and also familiarize oneself with nearly all countries and publications that have released the relevant asphalt .The state of road accidents, along with the individuals responsible and their teamwork. In addition to understanding the keywords .In order to benefit from these studies, we need to understand the reasons behind accidents so that analysts can investigate this topic Examine and treat them, and advance the development of roads using advanced analysis and assistance methods that ensure security of operations [9].

Clients who reside on the streets in low- and middle-income countries (LMICs) make up a disproportionately high percentage of street injury data. Although many high-income nations (HICs) have seen a decrease in deaths on their roads, there has been limited progress in low- and middle-income countries (LMICs). Additionally, when it comes to research, most of the street safety data has been coming from coordination of HICs. Increase research on road safety in LMICs is crucial due to the substantial variations in driving culture, legislation, and law enforcement compared to HICs provide the necessary local data and implement strategies that address their safety concerns and improve their practices. In order to promote this, the examination of street security practices in LMICs includes analyzing their specific characteristics and distinguishing them from typical academic literature on the subject. Despite the majority of road traffic deaths and injuries occurring in low- and middle-income countries, less than 10% of street safety research has been carried out in these locations. Research conducted through questionnaires on the socio-psychological aspects of driving, cycling, and walking, as well as the analysis of measurable data on street accidents, have been the main focus of researchers in LMICs in recent years. This study also highlights areas of street safety research that are not adequately represented in LMIC studies. The study of original designs and collaboration in LMIC is also analyzed at the national, organizational, and individual levels. This endeavor is thought to enhance studies on road safety in LMICs and fill current knowledge gaps, while also acknowledging the contributions of road safety researchers in LMICs and encouraging greater international collaboration in this field [10].

CHAPTER 3

3. SOFTWARE REQUIREMENTS

3.1 INTRODUCTION

Software requirements maps out the features , abilities and limitations of a software system. They describes the tasks the software needs to do, the condition under which it should function and any drawbacks it may have.Specifying the requirements are very important in the development process as it helps to ensure that the end product meets users expectations.

3.2 REQUIREMENTS SPECIFICATIONS

1) Capability and Characteristics :

- Key features : SafeWay's software requirements include functionalities like live crime mapping, accident rate and disaster rate determination.Clearly stating these requirements helps the platform to provide the necessary features and components that the user needs to make well data-driven decisions.
- User Interface and Experience : These requirements contains specifications , such as a prediction display and an interactive map.This guarantees that SafeWay is designed to offer a smooth and interactive user erperience.

2) Efficiency and ability to handle increased demand:

- Performance Criteria : Specifications establish measures of performance like time for response and reliability of the system. For SafeWay, this means making sure the platform can efficiently manage large amounts of traffic and data, delivering real-time updates promptly.
- Scalability ; Scalability refers to how the system should expand as the number of users or the amount of data increases. It is essential for SafeWay to uphold performance and responsiveness while its user base grows.

3) Incorporation and Compatibility:

- Google APIs : Specifications outline how SafeWay incorporates third-party APIs such as Google Maps API and Google Places API. Ensuring that these requirements are clearly defined guarantees seamless integration and optimal functionality of external resources on the platform.
- System Compatibility: Compatibility with various operating systems and devices is essential for system requirements. This guarantees that the SafeWay platform can be accessed on different platforms, such as web browsers and mobile devices.

Effectively defining and documenting these software specifications helps to deliver a reliable , efficient and user friendly website that is developed and deployed according to the users needs and expectations.

CHAPTER 4

4. IMPLEMENTATION

4.1 INTRODUCTION

Implementation is the phase in the software development cycle where the system is actually built.In the process of implementation the design specifications are converted into functional software elements.This phase includes actual coding part,combing different modules , testing each modules and how they interact with each other, therefore confirming that the system functions properly.

4.2 IMPLEMENTATION STEPS

1) Building data analytics model

- Machine learning model used : Random forest and gradient boosting regressor.
  - Random forest : It's a flexible machine learning approach for classification and regression applications.In this project is is used as a model for predicting the crime and accident hot-spots. During training the method creates a number of decision trees and it outputs a the class that is the mean prediction pr mode of the classes of the individual trees . By using an ensemble approach , one can reduce overfitting and increase prediction accuracy.
  - Gradient boosting : A potent machine learning method for regression and classification applications.It produces models in a step-by-step fashion, trying to fix the mistakes of the earlier models. Gradient boosting has a reputation for being extremely accurate and adaptable to complicated datasets.
- Platform used : Google colab.For this project colab helped me to build and evaluate machine learning models.This platform helps to handle huge datasets and process it smoothly.It helps to ensure that the models have desired accuracy and performance as it enables rapid experimentation and iteration.
- Building model : colab was used fro feature engineering , model training and data pre-processing.
- Checking accuracy : The accuracy of each model was checked to make sure that it satisfies the required performance standards.

2) Front-end

- Tools : PyCharm.It's an IDE designed specially for python development.In this project PyCharm helps me to code various python components , including the server backend using Flask and the model algorithms.It ensures high code quality using advanced features like code completion,debugging and version control integration.
- Technologies : HTML5,CSS3,JavaScript .SafeWay's front-end is developed using these technologies.For the structuring part HTML is used , CSS is used for the styling part and JavaScript enables interactivity and dynamic content.These technology combined ensure that the website is interactive and visually appealing.
- Google maps API : The main features of the platform , ie mapping and geolocation services are provides by Google maps API. It helps the platform with integrating interactive maps fro visualization of crime hot spots,accident prone areas and natural disaster prone area.

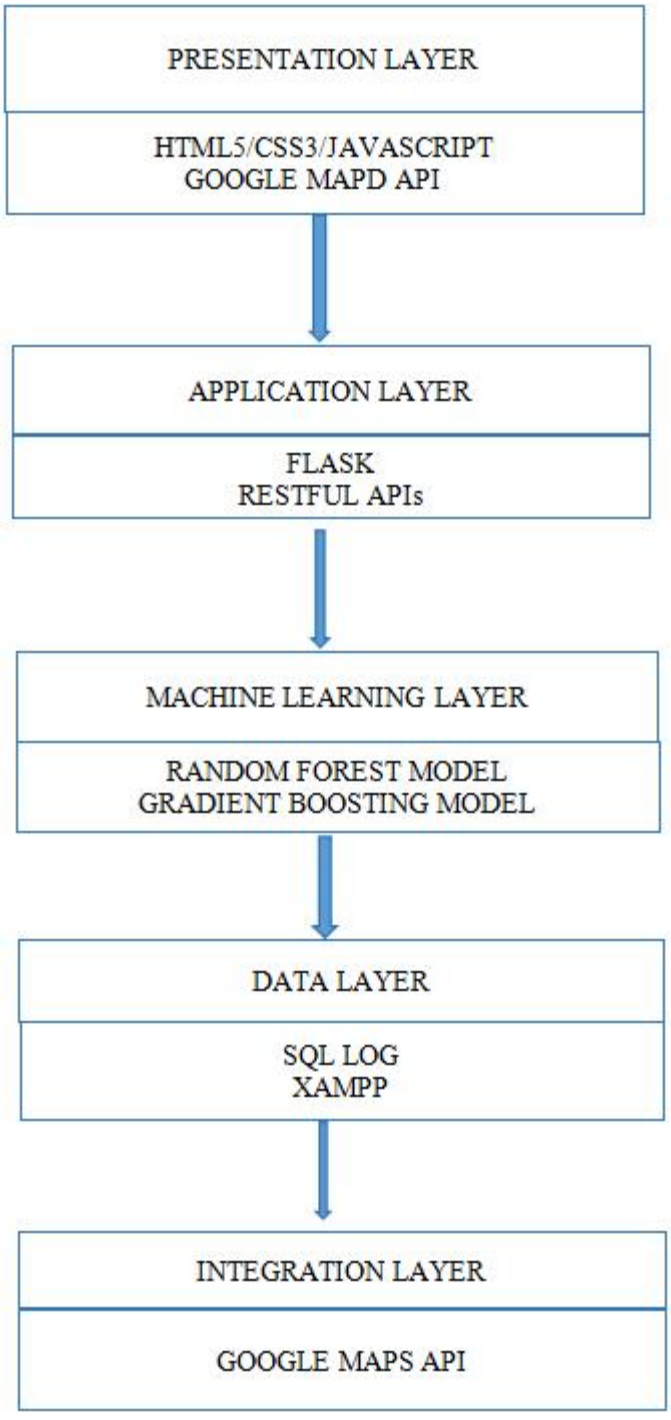
3) Backend

- Database used : SQL LOG. It's a RDBMS .In this project , SQL log helps to store and manage location names and corresponding latitude and longitude.This type of database helps to efficiently store , query and retrieve relevant data during analytics phase.
- Framework used : Flask ,In Safeway this lightweight web framework for python helps to develop backend services and APIs .This helps the developers to integrate the backend and front-end, handle requests , process data and finally display the result to user in a user-friendly way.

4) Coordination and implementation

- Integrating components :
  - Front -end and backend : ensure smooth connection between them
  - API calls : designed to retrieve information from database and display it instantly on the maps.
- Optimization and testing :
  - Testing performance : confirm the functionality of the program in various scenarios.

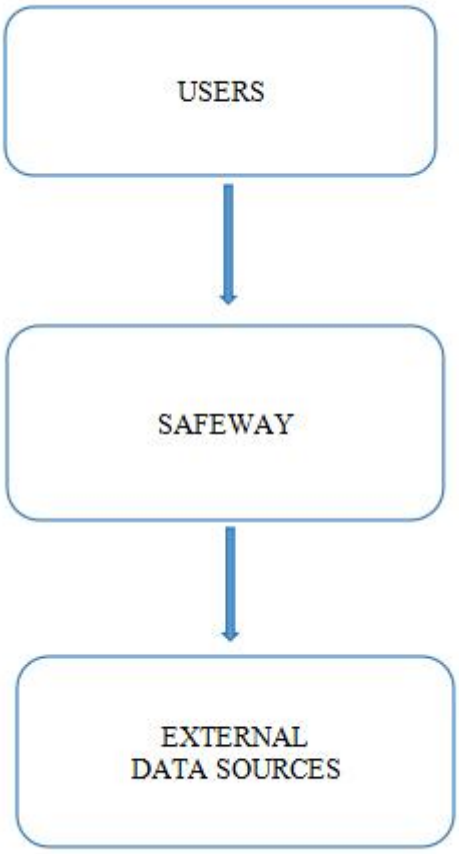
4.3 SYSTEM ARCHITECTURE



4.4 DATA FLOW DIAGRAM

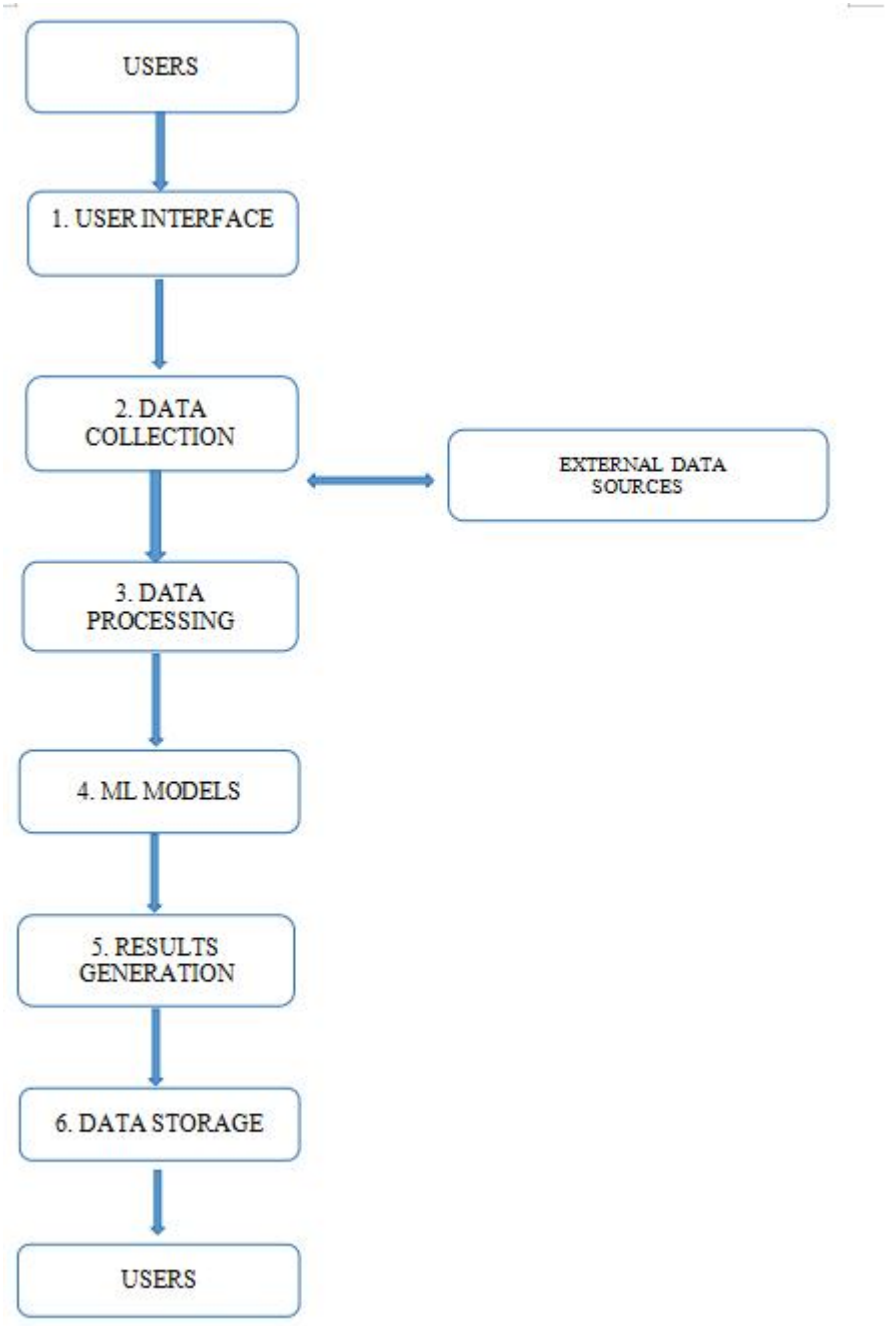
4.4.1 LEVEL 0 DFD

This provides a birds eye view of the whole system,basically its shows interaction between external entities an the SafeWay system.



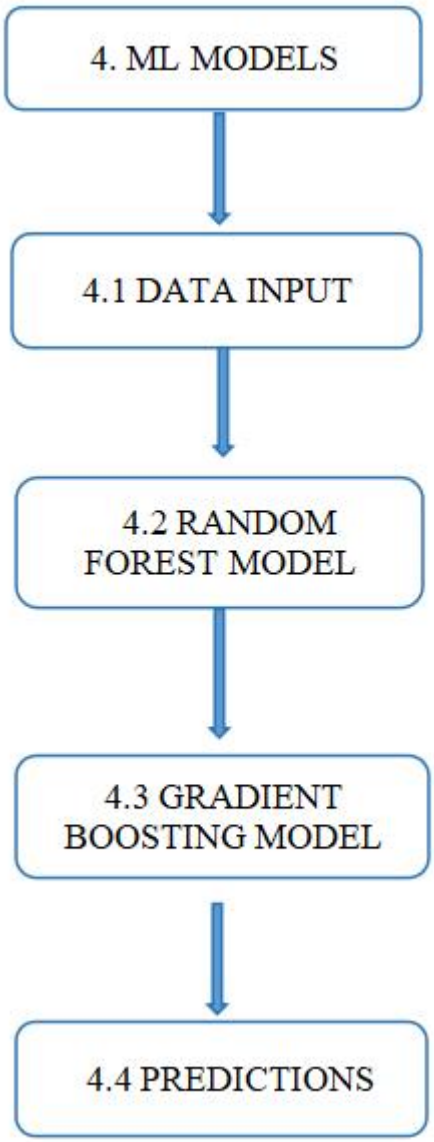
4.4.2 LEVEL 1 DFD

- This level breaks down the entire system into important processes and displays how data flows between them.

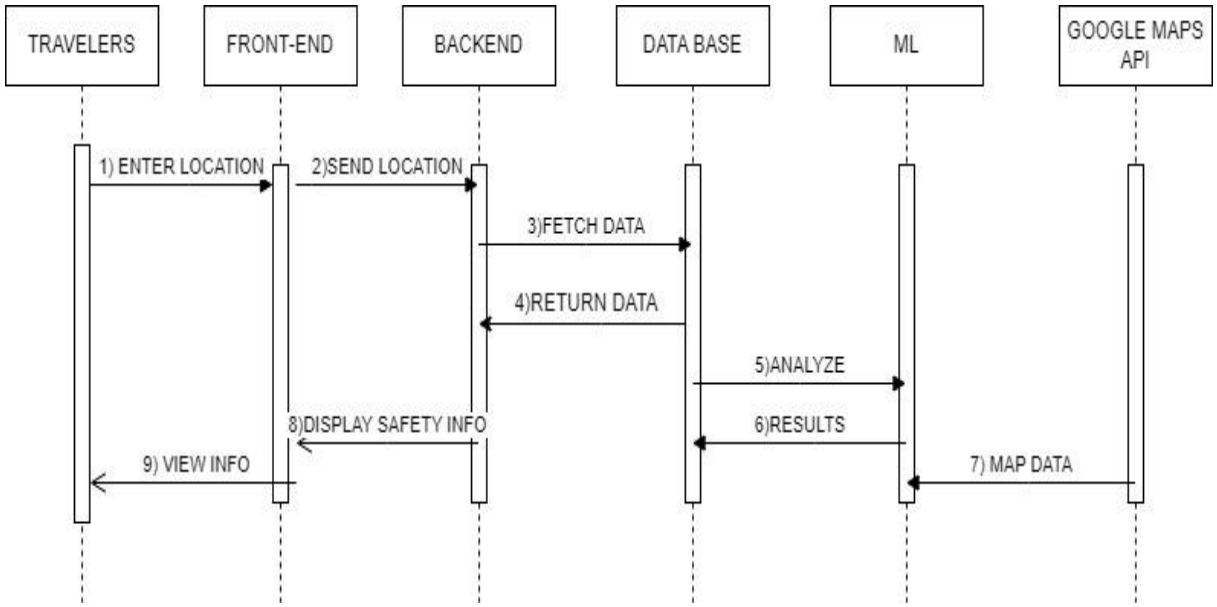


4.4.3 LEVEL 2 DFD

- This diagram provides detailed information of particular processes .

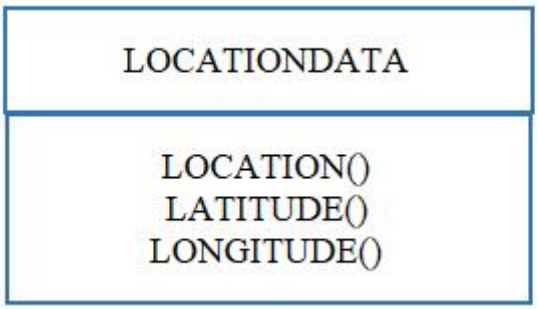


4.5 SEQUENCE DIAGRAM



4.6 ER CLASS DIAGRAM

- Entity-Relationship diagram for this project contains a single table that holds data about location and the corresponding latitude and longitude.



CHAPTER 5

5. CODING

5.1 INTRODUCTION

The SafeWay platform is developed through a series of phases , one among them is coding.Coding helps to convert algorithms and designs into working software.An overview of the coding process , including the chosen programming language and the actual code implementation , is given in this part.The main aim is to make sure that the platform meets the intended functionality , is manageable and runs smoothly.

5.2 PROGRAMMING PRACTICE

In a project programming practices means the methodologies and standards that are followed during the coding phase to yield a high-quality code.In my project several best practices are applied:

- Organized Code : The code-base is logically structured by incorporating separate modules for tasks such as data pre-processing , machine learning models and web development.This makes the code easier to mangae and maintain.

- Documentation and commenting code : In order to explain the functionality of different functions and sections if the code, proper commenting and documenting approach is taken.This approach helps in understanding the code and functionality when referred in the future.

- Handling Error : Using appropriate error handling methods to manage exceptions and to make sure that the application runs smoothly.

- Testing : Unit testing is done in order to check the functionality of individual modules and integration testing is done to see the overall functionality of all modules together.Testing helps to find errors and fix them earlier in the development phase itself.

5.3 CODING

5.3.1 code.py

```
from flask import *
from src.db import *
from src.result import *
from src.result1 import *
from src.result2 import *

app = Flask(__name__)

@app.route('/')
def index():
   return render_template('index.html')

@app.route('/services')
def services():
   return render_template('services.html')

@app.route('/about')
def about():
   return render_template('about.html')

@app.route('/result')
def result():
   return render_template('result.html')

@app.route('/landslide', methods=['POST'])
def landslide():
   pls = request.form['place']
```

```
q = "SELECT * FROM `location` WHERE `location`=%s"
res = selectone(q, pls)
print(res)

lat = res['lati']
longi = res['longi']

ress = predict_landslide_count(lat, longi)
ress1 = predict_crime_count(lat, longi)
ress2 = predict_crash_count(lat, longi)
score=(ress+ress1+ress2)/3
if score >= 15:
   res = "Very Unsafe"
elif score >= 10:
   res = "UnSafe"
elif score >= 4:
   res = "Moderate"
elif score >= 2:
   res = "Safe"
else:
   res = "Very safe"
print(res)
print(score)

return render_template('predict.html',
                       place=pls,
                       lati=lat,
                       longi=longi,
                       land_slide=ress,
                       crime=ress1,
                       crash=ress2,
                       safety_level=res,
```

```
                    safety_score=score)

if __name__ == '__main__':
    app.run()
```

5.3.2 index.html

```
<html lang="en">
<head>
    <!-- Required meta tags -->
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">

    <meta name="author" content="Untree.co">
    <link rel="shortcut icon" href="static/favicon.png">

    <meta name="description" content="" />

    <meta name="keywords" content="bootstrap, bootstrap5" />

    <link rel="preconnect" href="https://fonts.googleapis.com">
    <link rel="preconnect" href="https://fonts.gstatic.com" crossorigin>
    <link
href="https://fonts.googleapis.com/css2?family=Brygada+1918:ital,wght@0,400;0,6
00;0,700&family=Inter:wght@400;700&display=swap" rel="stylesheet">

    <link rel="stylesheet" href="static/fonts/icomoon/style.css">
    <link rel="stylesheet" href="static/fonts/flaticon/font/flaticon.css">

    <link rel="stylesheet" href="static/css/tiny-slider.css">
    <link rel="stylesheet" href="static/css/aos.css">
```

```
    <link rel="stylesheet" href="static/css/flatpickr.min.css">
    <link rel="stylesheet" href="static/css/glightbox.min.css">
    <link rel="stylesheet" href="static/css/style.css">
    <link rel="stylesheet"
href="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/css/bootstrap.min.css"
integrity="sha384-
Gn5384xqQ1aoWXA+058RXPxPg6fy4IWvTNh0E263XmFcJlSAwiGgFAW/dAiS6JXm"
crossorigin="anonymous">

    <title>SafeWay &amp;mdash; Free Bootstrap 5 Website Template by Untree.co </title>
</head>
<body>

    <div class="site-mobile-menu site-navbar-target">
        <div class="site-mobile-menu-header">
            <div class="site-mobile-menu-close">
                <span class="icofont-close js-menu-toggle"></span>
            </div>
        </div>
        <div class="site-mobile-menu-body"></div>
    </div>

    <nav class="site-nav mt-3">
        <div class="container">
            <div class="site-navigation">
                <div class="row">
                    <div class="col-6 col-lg-3">
                        <a href="/" class="logo m-0 float-start">SafeWay</a>
                    </div>
                    <div class="col-lg-6 d-none d-lg-inline-block text-center nav-center-
wrap">
                        <ul class="js-clone-nav text-center site-menu p-0 m-0">
```

```
                    <li class="active"><a href="/">Home</a></li>
                    <li><a href="/about">About us</a></li>
                    <li><a href="/services">Services</a></li>
                  </ul>
                </div>
                <div class="col-6 col-lg-3 text-lg-end">
                  <a href="#" class="burger ms-auto float-end site-menu-toggle js-menu-toggle d-inline-block d-lg-none light" data-toggle="collapse" data-target="#main-navbar">
                    <span></span>
                  </a>
                </div>
              </div>
            </div>
          </div>
        </nav>

        <div class="hero overlay">
          <div class="img-bg rellax">
            <img src="static/images/hero_1.jpg" alt="Image" class="img-fluid">
          </div>

          <div class="container">
            <div class="row align-items-center justify-content-start">
              <div class="col-lg-5">
                <h1 class="heading" data-aos="fade-up">Safe Way: Safe Travel, Smart Travel.</h1>
                <p class="mb-5" data-aos="fade-up">The world is vast and full of incredible experiences, but the true joy of travel comes from exploring it with a sense of safety and well-being, ensuring every moment is savored and every journey is memorable.</p>
                <p class="my-4" data-aos-delay="300" data-toggle="modal" data-
```

```
target="#exampleModal"><a href="/result" class="btn btn-primary"
style="background-color: darkorange; border-color: darkorange;">Discover
more</a></p>
            </div>
          </div>
      </div>
    </div>




    <!-- Preloader -->
    <div id="overlayer"></div>
    <div class="loader">
      <div class="spinner-border text-primary" role="status">
        <span class="visually-hidden">Loading...</span>
      </div>
    </div>



    <script src="static/js/bootstrap.bundle.min.js"></script>
    <script src="static/js/tiny-slider.js"></script>
    <script src="static/js/aos.js"></script>
    <script src="static/js/navbar.js"></script>
    <script src="static/js/counter.js"></script>
    <script src="static/js/rellax.js"></script>
    <script src="static/js/flatpickr.js"></script>
    <script src="static/js/glightbox.min.js"></script>
    <script src="static/js/custom.js"></script>

    <script>
      function initMap() {
```

```
        // Initialize the map, if needed
    }

    function getCoordinates() {
        const location = document.getElementById('location').value;

        if (!location) {
            alert('Please enter a location.');
            return;
        }

        const geocoder = new google.maps.Geocoder();

        geocoder.geocode({ 'address': location }, function(results, status) {
            if (status === 'OK') {
                const latitude = results[0].geometry.location.lat();
                const longitude = results[0].geometry.location.lng();

                // Fill the latitude and longitude fields
                document.getElementById('latitude').value = latitude;
                document.getElementById('longitude').value = longitude;
            } else {
                alert('Geocode was not successful for the following reason: ' + status);
            }
        });
    }
</script>

<script src="https://code.jquery.com/jquery-3.2.1.slim.min.js" integrity="sha384-
KJ3o2DKtIkvYIK3UENzmM7KCkRr/rE9/Qpg6aAZGJwFDMVNA/GpGFF93hXpG5KkN"
crossorigin="anonymous"></script>
```

```
    <script
src="https://cdn.jsdelivr.net/npm/popper.js@1.12.9/dist/umd/popper.min.js"
integrity="sha384-
ApNbgh9B+Y1QKtv3Rn7W3mgPxhU9K/ScQsAP7hUibX39j7fakFPskvXusvfa0b4Q"
crossorigin="anonymous"></script>
    <script
src="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/js/bootstrap.min.js"
integrity="sha384-JZR6Spejh4U"></script>
</body>
</html>
```

5.3.3 result.py

```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.ensemble import GradientBoostingRegressor
from sklearn.preprocessing import StandardScaler
import joblib

# Load the dataset
file_path =
'C:\\Users\\Acer\\PycharmProjects\\pythonProject1\\src\\static\\dataset\\Global_L
andslide_Catalog_Export.csv'
landslide_data = pd.read_csv(file_path)

# Drop rows with null values
landslide_data = landslide_data.dropna(subset=['latitude', 'longitude'])



# Filter relevant columns
landslide_data = landslide_data[['latitude', 'longitude']]
```

```
# Aggregate the data to count landslides per location
landslide_rate = landslide_data.groupby(['latitude',
'longitude']).size().reset_index(name='Landslide_Count')

# Normalize the features (latitude and longitude)
scaler = StandardScaler()
landslide_rate[['latitude', 'longitude']] =
scaler.fit_transform(landslide_rate[['latitude', 'longitude']])



# Split the data into training and testing sets
X = landslide_rate[['latitude', 'longitude']]
y = landslide_rate['Landslide_Count']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
random_state=42)

# Initialize and train the model
model = GradientBoostingRegressor(n_estimators=100, random_state=42)
model.fit(X_train, y_train)

# Save the model for future use
# joblib.dump(model, 'landslide_rate_gb_model.pkl')

# Load the model (if needed later)
model =
joblib.load('C:\\Users\\Acer\\PycharmProjects\\\pythonProject1\\src\\landslide_rat
e_gb_model.pkl')

# Function to predict landslide count
def predict_landslide_count(lat, lon):
    prediction = model.predict([[lat, lon]])
```

```
    print(prediction)
    return prediction[0]
```

5.3.4 result1.py

```
import pandas as pd

# Load the dataset
file_path =
'C:\\Users\\Acer\\PycharmProjects\\pythonProject1\\src\\static\\dataset\\Crime_D
ata_from_2020_to_Present.csv'
crime_data = pd.read_csv(file_path)

# Filter relevant columns
crime_data = crime_data[['LAT', 'LON']]

# Aggregate the data to count crimes per location
crime_rate = crime_data.groupby(['LAT',
'LON']).size().reset_index(name='Crime_Count')

from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestRegressor
import joblib

# Split the data into training and testing sets
X = crime_rate[['LAT', 'LON']]
y = crime_rate['Crime_Count']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
random_state=42)

# Initialize and train the model
model = RandomForestRegressor(n_estimators=100, random_state=42)
```

```
model.fit(X_train, y_train)

# Save the model for future use
joblib.dump(model, 'crime_rate_model.pkl')

import joblib

# Load the model
# model = joblib.load('crime_rate_model.pkl')

# Function to predict crime count
def predict_crime_count(lat, lon):
    prediction = model.predict([[lat, lon]])
    return prediction[0]

# Example usage

#lat=input("enter lat :")
#lon=input("enter lon :")

# lat, lon = 34.0522, -118.2437  # Example coordinates (Los Angeles)
#predicted_crime_count = predict_crime_count(lat, lon)
#print(f'Predicted Crime Count for location ({lat}, {lon}): {predicted_crime_count}')
```

5.3.5 result2.py

```
import pandas as pd

# Load the dataset
file_path =
'C:\\Users\\Acer\\PycharmProjects\\pythonProject1\\src\\static\\dataset\\Traffic_C
rashes_-_Crashes.csv'
crash_data = pd.read_csv(file_path)

# Drop rows with null values
crash_data = crash_data.dropna(subset=['LATITUDE', 'LATITUDE'])



# Filter relevant columns
crash_data = crash_data[['LATITUDE', 'LONGITUDE']]

# Aggregate the data to count crimes per location
crash_rate = crash_data.groupby(['LATITUDE',
'LONGITUDE']).size().reset_index(name='Crash_Count')

from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestRegressor
import joblib

# Split the data into training and testing sets
X = crash_rate[['LATITUDE', 'LONGITUDE']]
y = crash_rate['Crash_Count']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
random_state=42)

# Initialize and train the model
```

```
model = RandomForestRegressor(n_estimators=100, random_state=42)
model.fit(X_train, y_train)

# Save the model for future use
joblib.dump(model, 'crash_rate_model.pkl')

import joblib

# Load the model
#model = joblib.load('crash_rate_model.pkl')

# Function to predict crime count
def predict_crash_count(LATITUDE, LONGITUDE):
    prediction = model.predict([[LATITUDE, LONGITUDE]])
    return prediction[0]
```

5.3.6 result.html

```
<!doctype html>
<html lang="en">
<head>
    <!-- Required meta tags -->
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">

    <meta name="author" content="Untree.co">
    <link rel="shortcut icon" href="favicon.png">

    <meta name="description" content="Safe travel with SafeWay - your partner in
smart and secure journeys." />
    <meta name="keywords" content="safe travel, secure travel, travel services, travel
```

```
safety, bootstrap, bootstrap5" />

    <link rel="preconnect" href="https://fonts.googleapis.com">
    <link rel="preconnect" href="https://fonts.gstatic.com" crossorigin>
    <link
href="https://fonts.googleapis.com/css2?family=Brygada+1918:ital,wght@0,400;0,6
00;0,700&family=Inter:wght@400;700&display=swap" rel="stylesheet">

    <link rel="stylesheet" href="fonts/icomoon/style.css">
    <link rel="stylesheet" href="fonts/flaticon/font/flaticon.css">
    <link rel="stylesheet" href="css/tiny-slider.css">
    <link rel="stylesheet" href="css/aos.css">
    <link rel="stylesheet" href="css/flatpickr.min.css">
    <link rel="stylesheet" href="css/glightbox.min.css">
    <link rel="stylesheet" href="css/style.css">
    <link rel="stylesheet"
href="https://unpkg.com/bootstrap@4.0.0/dist/css/bootstrap.min.css"
integrity="sha384-
Gn5384xqQ1aoWXA+058RXPxPg6fy4IWvTNh0E263XmFcJlSAwiGgFAW/dAiS6JXm"
crossorigin="anonymous">

    <title>SafeWay &amp;mdash; Analyze Travel</title>
</head>
<body>

    <div class="site-mobile-menu site-navbar-target">
        <div class="site-mobile-menu-header">
            <div class="site-mobile-menu-close">
                <span class="icofont-close js-menu-toggle"></span>
            </div>
        </div>
        <div class="site-mobile-menu-body"></div>
```

```
  </div>

  <div class="hero overlay">


    <div class="container">
      <div class="row align-items-center justify-content-center">
        <div class="col-lg-6">
          <h1 class="heading text-center" data-aos="fade-up">Travel
Analysis</h1>
          <p class="text-center mb-5" data-aos="fade-up">Enter your travel details
below to analyze your journey.</p>

          <form action="/landslide" method="post" id="travel-form">
            <div class="form-group">
              <label for="location" class="col-form-label">Enter Location:</label>
              <input type="text" name="place" class="form-control"
id="location" >
<!--                 onchange="getCoordinates()"-->
<!--                 onclick="analyzeTravel()"-->
<!--                 <button type="button" class="btn btn-primary"
style="background-color: darkorange; border-color: darkorange;" >Enter</button>--
>
            </div>
            <div class="form-group">
              <label for="date" class="col-form-label">Date of Traveling:</label>
              <input type="date" class="form-control" id="date" min="2024-06-
22">
            </div>
<!--              <div class="form-group">-->
<!--                <label for="latitude" class="col-form-label">Latitude:</label>-->
<!--                <input name="latitude" type="text" class="form-control"
```

```
id="latitude" readonly>-->
<!--                </div>-->
<!--                <div class="form-group">-->
<!--                  <label for="longitude" class="col-form-label">Longitude:</label>-
->
<!--                  <input name="longitude" type="text" class="form-control"
id="longitude" readonly>-->
<!--                </div>-->
                <div class="text-center">
                  <button type="submit" class="btn btn-primary" style="background-
color: darkorange; border-color: darkorange;">Predict</button>
                </div>
              </form>
            </div>
          </div>
        </div>
      </div>

    <!-- Google Maps JavaScript API -->
    <script src="https://maps.googleapis.com/maps/api/js?key=AIzaSyCyCy-
IKBh3cJrSbAigz902KYb0zHjTmQY&libraries=places=initMap" async defer></script>
    <script src="https://code.jquery.com/jquery-3.2.1.slim.min.js" integrity="sha384-
KJ3o2DKtIkvYIK3UENzmM7KCkRr/rE9/Qpg6aAZGJwFDMVNA/GpGFF93hXpG5KkN"
crossorigin="anonymous"></script>
    <script
src="https://cdn.jsdelivr.net/npm/popper.js@1.12.9/dist/umd/popper.min.js"
integrity="sha384-
ApNbgh9B+Y1QKtv3Rn7W3mgPxhU9K/ScQsAP7hUibX39j7fakFPskvXusvfa0b4Q"
crossorigin="anonymous"></script>
    <script src="https://unpkg.com/bootstrap@4.0.0/dist/js/bootstrap.min.js"
integrity="sha384-
JZR6Spejh4U02d8jOt6vLEHfe/JQGiRRSQQxSfFWpi1MquVdAyjUar5+76PVCmYl"
```

```
crossorigin="anonymous"></script>
    <script src="js/bootstrap.bundle.min.js"></script>
    <script src="js/tiny-slider.js"></script>
    <script src="js/aos.js"></script>
    <script src="js/navbar.js"></script>
    <script src="js/counter.js"></script>
    <script src="js/rellax.js"></script>
    <script src="js/flatpickr.js"></script>
    <script src="js/glightbox.min.js"></script>
    <script src="js/custom.js"></script>

    <script>
        function initMap() {
            // Initialize the map, if needed
        }

        function getCoordinates() {
            const location = document.getElementById('location').value;

            if (!location) {
                alert('Please enter a location.');
                return;
            }

            const geocoder = new google.maps.Geocoder();

            geocoder.geocode({ 'address': location }, function(results, status) {
                if (status === 'OK') {
                    const latitude = results[0].geometry.location.lat();
                    const longitude = results[0].geometry.location.lng();

                    // Fill the latitude and longitude fields
```

```
                document.getElementById('latitude').value = latitude;
                document.getElementById('longitude').value = longitude;
            } else {
                alert('Geocode was not successful for the following reason: ' + status);
            }
        });
    }

    function analyzeTravel() {
        const location = document.getElementById('location').value;
        const date = document.getElementById('date').value;
        const latitude = document.getElementById('latitude').value;
        const longitude = document.getElementById('longitude').value;

        if (location && date && latitude && longitude) {
            alert(Analyzing travel to ${location} on ${date} (Latitude: ${latitude},
Longitude: ${longitude}).);
        } else {
            alert('Please fill out all fields.');
        }
    }
  </script>
</body>
</html>
```

5.3.7 predict.html

```
<!doctype html>
<html lang="en">
<head>
  <!-- Required meta tags -->
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">

  <meta name="author" content="Untree.co">
  <link rel="shortcut icon" href="favicon.png">

  <meta name="description" content="Safe travel with SafeWay - your partner in smart and secure journeys." />
  <meta name="keywords" content="safe travel, secure travel, travel services, travel safety, bootstrap, bootstrap5" />

  <link rel="preconnect" href="https://fonts.googleapis.com">
  <link rel="preconnect" href="https://fonts.gstatic.com" crossorigin>
  <link href="https://fonts.googleapis.com/css2?family=Brygada+1918:ital,wght@0,400;0,600;0,700&family=Inter:wght@400;700&display=swap" rel="stylesheet">

  <link rel="stylesheet" href="fonts/icomoon/style.css">
  <link rel="stylesheet" href="fonts/flaticon/font/flaticon.css">
  <link rel="stylesheet" href="css/tiny-slider.css">
  <link rel="stylesheet" href="css/aos.css">
  <link rel="stylesheet" href="css/flatpickr.min.css">
  <link rel="stylesheet" href="css/glightbox.min.css">
  <link rel="stylesheet" href="css/style.css">
  <link rel="stylesheet"
```

```
href="https://unpkg.com/bootstrap@4.0.0/dist/css/bootstrap.min.css"
integrity="sha384-
Gn5384xqQ1aoWXA+058RXPxPg6fy4IWvTNh0E263XmFcJlSAwiGgFAW/dAiS6JXm"
crossorigin="anonymous">

 <style>
  .hero {
     background-image: url('static/images/hero_1.jpg');
     background-size: cover;
     background-position: center;
     background-repeat: no-repeat;
     min-height: 100vh;
     position: relative;
     display: flex;
     align-items: center;
  }

  .hero.overlay::before {
     content: "";
     position: absolute;
     top: 0;
     left: 0;
     right: 0;
     bottom: 0;
     background: rgba(0, 0, 0, 0.5);
  }

  .hero .container {
     position: relative;
     z-index: 1;
  }
```

```
    .hero h1, .hero p {
        color: white;
    }

    .rounded-map {
        border-radius: 15px;
        overflow: hidden;
        box-shadow: 0 4px 6px rgba(0, 0, 0, 0.1);
    }

    #map {
        height: 400px;
        width: 100%;
    }

    #predictions-text {
        color: white;
        background-color: rgba(0, 0, 0, 0.6);
        padding: 20px;
        border-radius: 10px;
    }
</style>

    <title>SafeWay &mdash; Predictions</title>
</head>
<body>

    <div class="site-mobile-menu site-navbar-target">
        <div class="site-mobile-menu-header">
            <div class="site-mobile-menu-close">
                <span class="icofont-close js-menu-toggle"></span>
            </div>
```

```
      </div>
      <div class="site-mobile-menu-body"></div>
    </div>
<div class="hero overlay">
    <div class="container">
      <div class="row align-items-center justify-content-center">
        <div class="col-lg-6">
          <h1 class="heading" data-aos="fade-up">Travel Predictions</h1>
          <p class="mb-5" data-aos="fade-up">Predictions for your travel:</p>
          <h4 style="color: white;">Safety Level :{{ safety_level }}</h4>
         <div id="predictions-text">
                <p>Location: {{ place }}</p>
                <p>Landslide Risk: {{ land_slide }}</p>
                <p>Crime Risk: {{ crime }}</p>
                <p>Crash Risk: {{ crash }}</p>
                <p>Safety Score: {{ safety_score }} </p>
                <p>Safety Level: {{ safety_level }}</p>
          </div>
        </div>
        <div class="col-lg-6">
          <div id="map" class="rounded-map"></div>
        </div>
      </div>
    </div>
</div>
    <!-- Google Maps JavaScript API -->
    <script src="https://maps.googleapis.com/maps/api/js?key=AIzaSyCyCy-
IKBh3cJrSbAigz902KYb0zHjTmQY&libraries=places=initMap" async defer></script>
    <script src="https://code.jquery.com/jquery-3.2.1.slim.min.js" integrity="sha384-
KJ3o2DKtIkvYIK3UENzmM7KCkRr/rE9/Qpg6aAZGJwFDMVNA/GpGFF93hXpG5KkN"
crossorigin="anonymous"></script>
    <script
```

```
src="https://cdn.jsdelivr.net/npm/popper.js@1.12.9/dist/umd/popper.min.js"
integrity="sha384-
ApNbgh9B+Y1QKtv3Rn7W3mgPxhU9K/ScQsAP7hUibX39j7fakFPskvXusvfa0b4Q"
crossorigin="anonymous"></script>
   <script src="https://unpkg.com/bootstrap@4.0.0/dist/js/bootstrap.min.js"
integrity="sha384-
JZR6Spejh4U02d8jOt6vLEHfe/JQGiRRSQQxSfFWpi1MquVdAyjUar5+76PVCmYl"
crossorigin="anonymous"></script>
   <script src="js/bootstrap.bundle.min.js"></script>
   <script src="js/tiny-slider.js"></script>
   <script src="js/aos.js"></script>
   <script src="js/navbar.js"></script>
   <script src="js/counter.js"></script>

   <script src="js/flatpickr.js"></script>
   <script src="js/glightbox.min.js"></script>
   <script src="js/custom.js"></script>
   <script src="js/custom.js"></script>

   <!-- Add this line -->
   <script src="js/predictions.js"></script>
  <script src="js/glightbox.min.js"></script>
   <script src="js/custom.js"></script>

   <script>
let map;
let marker;

const data = {{ safety_level|tojson }};
       console.log(data);

const data1 = {{ safety_score|tojson }};
```

```
        console.log(data1);

function initMap() {
    map = new google.maps.Map(document.getElementById('map'), {
        center: {lat: 40.7128, lng: -74.0060},
        zoom: 10,
        styles: [
            {
                "featureType": "all",
                "elementType": "geometry.fill",
                "stylers": [{"weight": "2.00"}]
            },
            // ... (include all the style objects I provided earlier)
        ]
    });
}

function displayPredictions(location, date, latitude, longitude) {
    const crimeRate = Math.random() * 10;
    const accidentRate = Math.random() * 5;
    const crisisRate = Math.random() * 3;

    const predictionsTextElement = document.getElementById('predictions-text');
    predictionsTextElement.innerHTML = `
        <p>Predicted travel to ${location} on ${date}:</p>
<!--        <p>Latitude: ${latitude}, Longitude: ${longitude}</p>-->
        <p>Crime Rate: ${crimeRate.toFixed(2)}</p>
        <p>Accident Rate: ${accidentRate.toFixed(2)}</p>
        <p>Crisis Rate: ${crisisRate.toFixed(2)}</p>

    `;
```

```
    // Initialize map
    initMap();

    // Update map
    const position = new google.maps.LatLng(parseFloat(latitude),
parseFloat(longitude));
    map.setCenter(position);

    // Remove existing marker if any
    if (marker) {
        marker.setMap(null);
    }

    // Add new marker
    marker = new google.maps.Marker({
        position: position,
        map: map,
        title: location
    });

    // Add circle overlays for each rate
    addRateCircle(position, crimeRate, '#FF0000', 'Crime Rate');
    addRateCircle(position, accidentRate, '#0000FF', 'Accident Rate');
    addRateCircle(position, crisisRate, '#00FF00', 'Crisis Rate');
}

function addRateCircle(position, rate, color, label) {
    const circle = new google.maps.Circle({
        strokeColor: color,
        strokeOpacity: 0.8,
        strokeWeight: 2,
        fillColor: color,
```

```
        fillOpacity: 0.35,
        map: map,
        center: position,
        radius: rate * 1000, // Scale the rate to a visible size on the map
        title: label
    });

    const infoWindow = new google.maps.InfoWindow({
        content: `${label}: ${rate.toFixed(2)}`
    });

    circle.addListener('mouseover', function() {
        infoWindow.setPosition(this.getCenter());
        infoWindow.open(map);
    });

    circle.addListener('mouseout', function() {
        infoWindow.close();
    });
}

window.onload = function() {
    const location = "New York City";
    const date = "2024-07-20";
    const latitude = "40.7128";
    const longitude = "-74.0060";
    displayPredictions(location, date, latitude, longitude);
};
</script>
</body>
</html>
```

CHAPTER 6

6. TESTING

1) Unit testing : Its is a form of software testing that involves testing individual units/components of a software. The goal is to confirm that every component of the software functions according to the intended design.

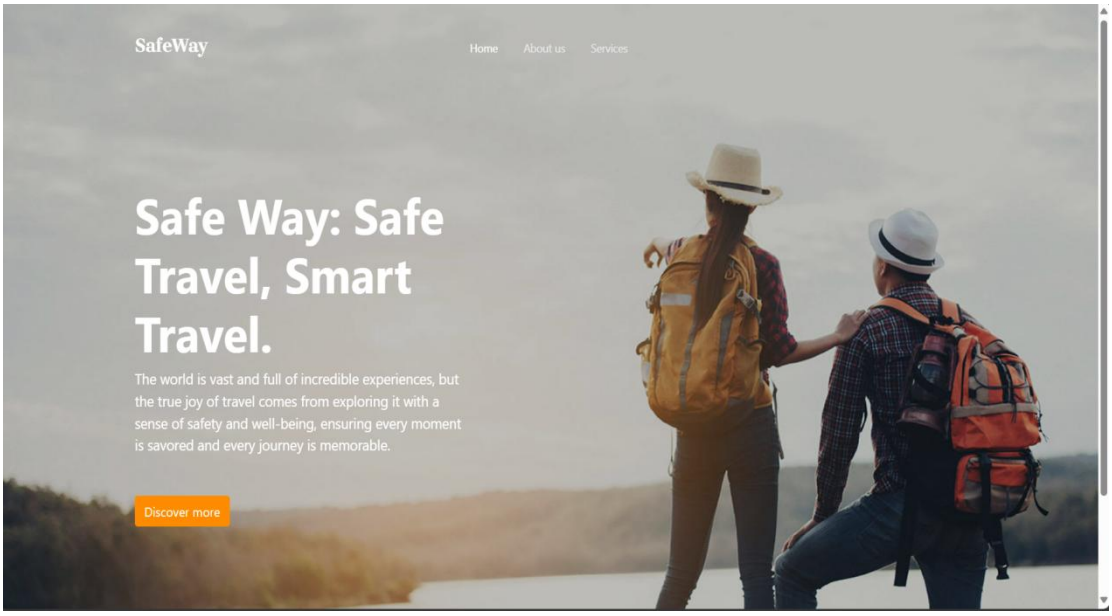
2) Black box testing : This test involves testers checking the app features against the user specifications during functional testing.This verifies if the code functionalities are met.

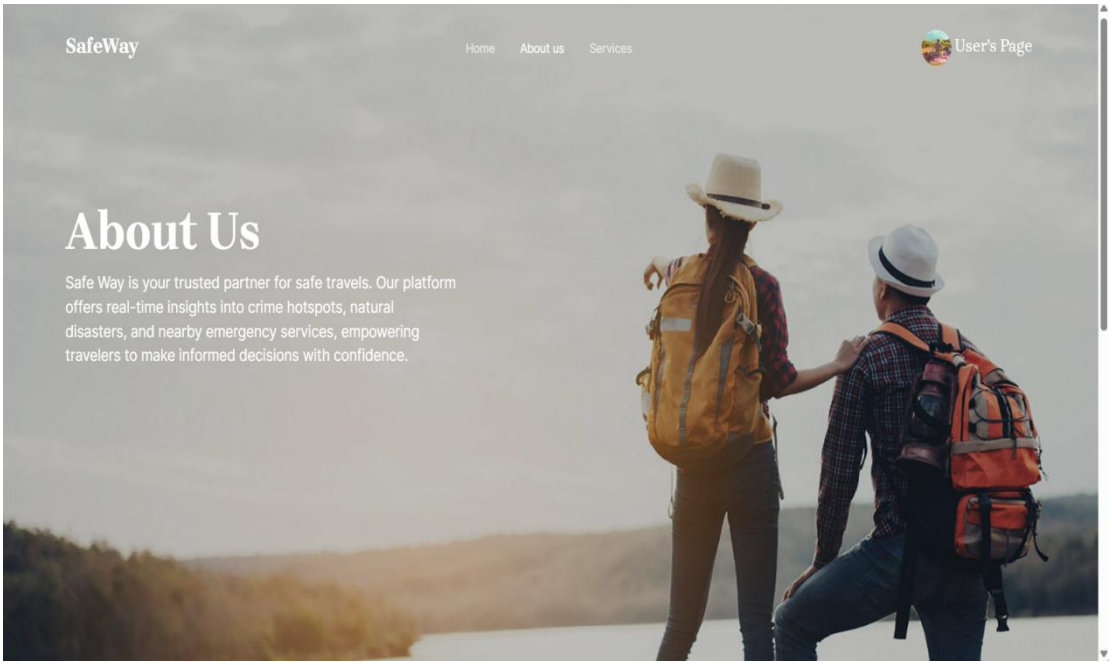
3) Group testing : In this separate units are merged and tested together.The goal of this testing is to verify that the communication between combined units are proper or not .

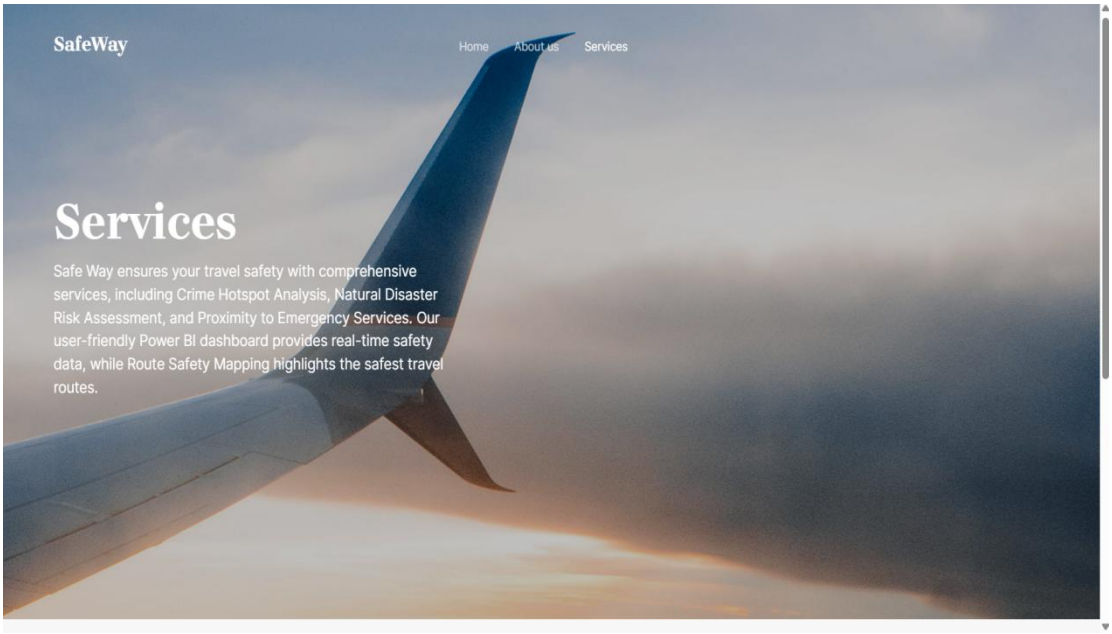
4) Testing of component integration : This is done to uncover flaws in the connections and communications between integrated components.

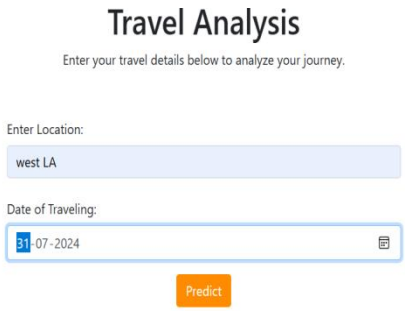
CHAPTER 7

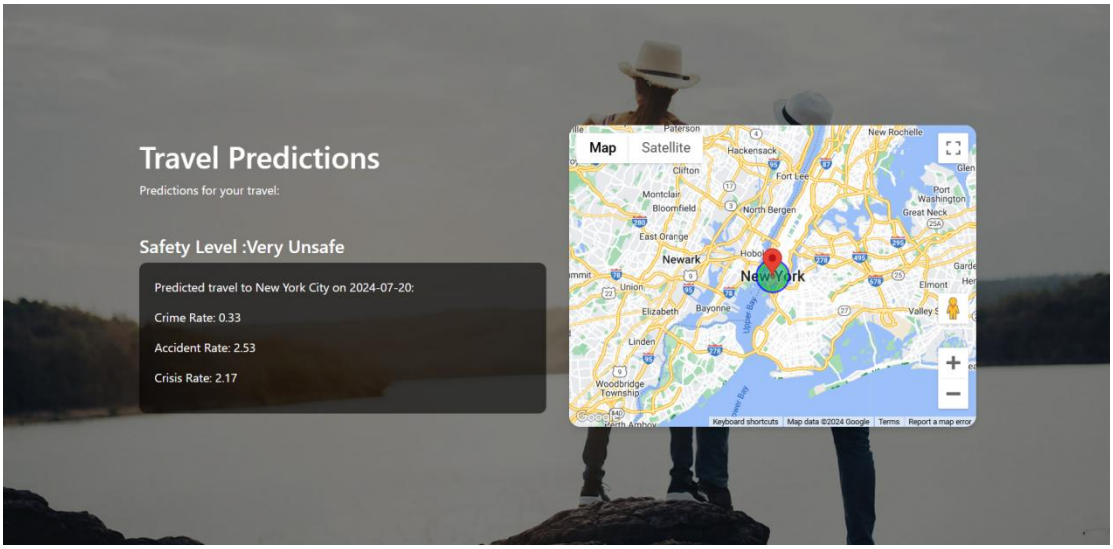
7. INPUT AND OUTPUT






SafeWay
Home
About us
Services
Services
Safe Way ensures your travel safety with comprehensive services, including Crime Hotspot Analysis, Natural Disaster Risk Assessment, and Proximity to Emergency Services. Our user-friendly Power BI dashboard provides real-time safety data, while Route Safety Mapping highlights the safest travel routes.


Travel Analysis
Enter your travel details below to analyze your journey.
Enter Location:
west LA
Date of Traveling:
31-07-2024
Predict



Travel Analysis

Enter your travel details below to analyze your journey.

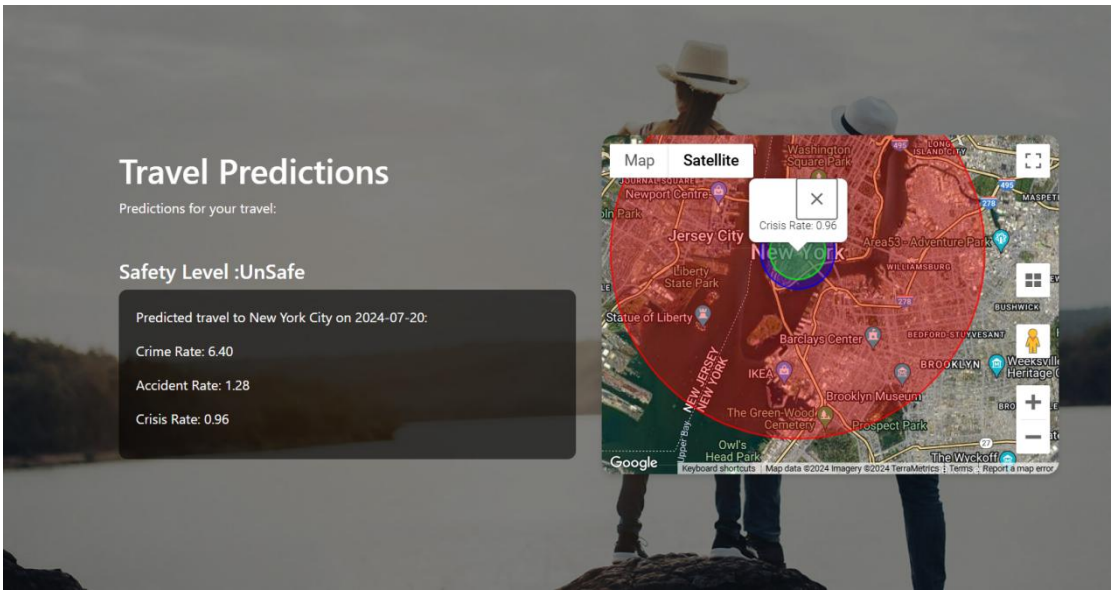
Enter Location:

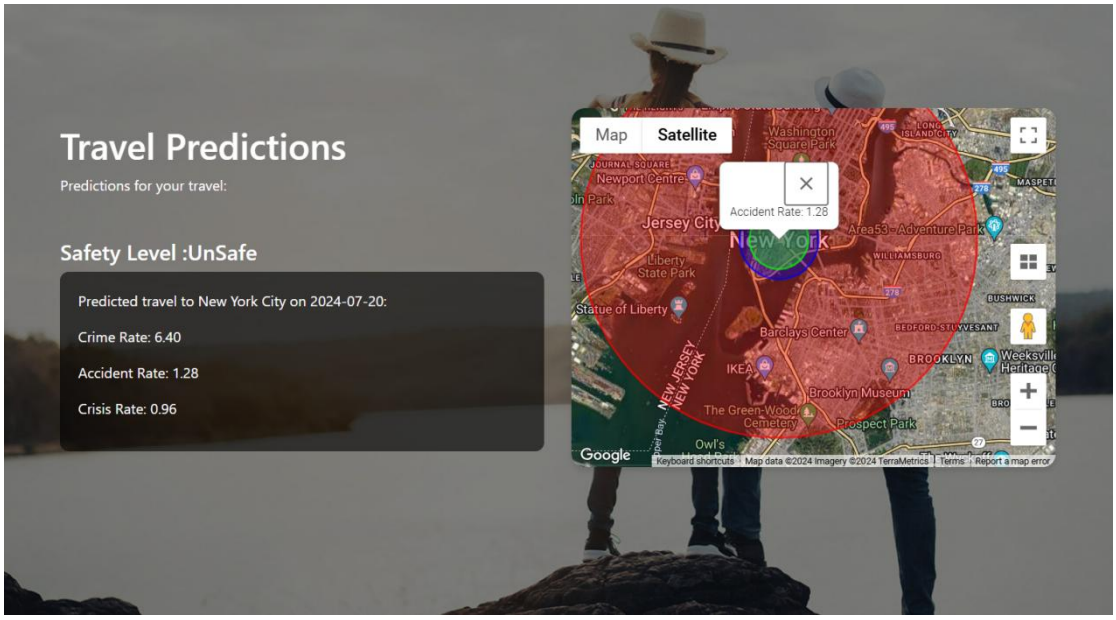
Rampart

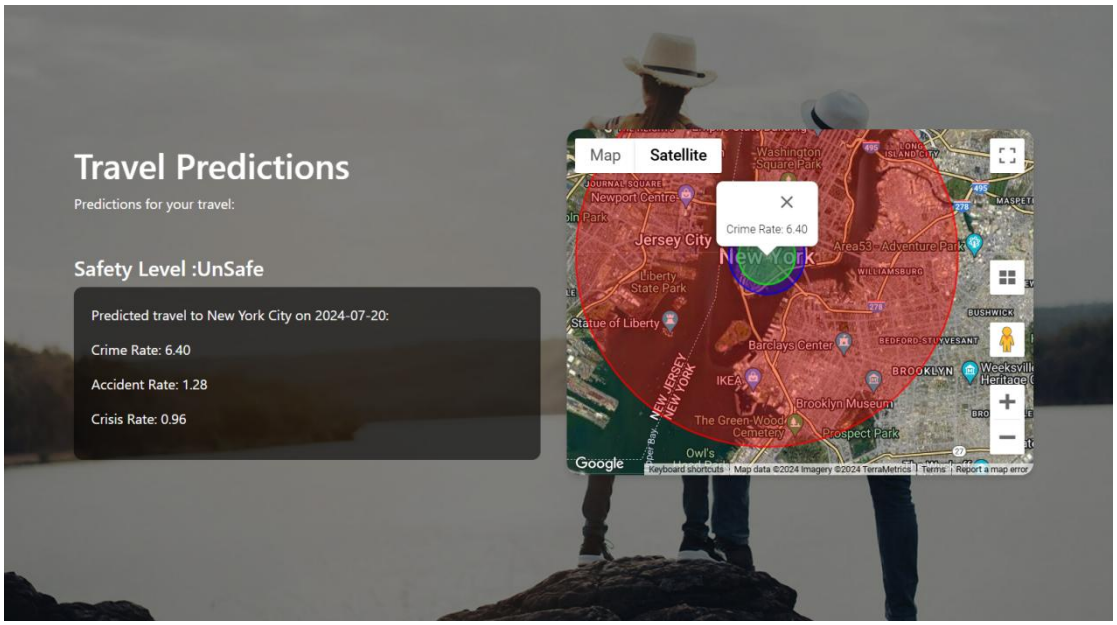
Date of Traveling:

31-07-2024

Predict


Travel Predictions
Predictions for your travel:
Safety Level :UnSafe
Predicted travel to New York City on 2024-07-20:
Crime Rate: 6.40
Accident Rate: 1.28
Crisis Rate: 0.96
Map
Satellite
Crisis Rate: 0.96
Jersey City
New York
Liberty State Park
Statue of Liberty
Barclays Center
IKEA
Brooklyn Museum
The Green-Wood Cemetery
Prospect Park
Owl's Head Park
Google


Travel Predictions
Predictions for your travel:
Safety Level :UnSafe
Predicted travel to New York City on 2024-07-20:
Crime Rate: 6.40
Accident Rate: 1.28
Crisis Rate: 0.96
Map
Satellite
Accident Rate: 1.28
Jersey City
New York
Liberty State Park
Statue of Liberty
Barclays Center
IKEA
Brooklyn Museum
The Green-Wood Cemetery
Prospect Park
Google


Travel Predictions
Predictions for your travel:
Safety Level :UnSafe
Predicted travel to New York City on 2024-07-20:
Crime Rate: 6.40
Accident Rate: 1.28
Crisis Rate: 0.96
Map
Satellite
Crime Rate: 6.40
Jersey City
New York
Liberty State Park
Statue of Liberty
Barclays Center
IKEA
Brooklyn Museum
The Green-Wood Cemetery
Prospect Park
Google

CHAPTER 8

8. SCOPE FOR FUTURE WORK

1) Improved integration of data
   - New source of data : include traffic information , weather forecasts , health recommendations and report on political stability.
2) Improving the user experience
   - Mobile application : create a mobile application for access while on the go.
3) Social and community aspects
   - Content generated by user : permit user to provide observations, safety recommendations and experiences.
   - Integration with social media : Permit the dissemination of safety -related information on social media.
4) International growth
   - Provide multilingual support by making the platform available in many languages.
   - International data units : Increase coverage to other nations.

CHAPTER 9

9. CONCLUSION

The SafeWay project is a major advancement in using data analytics and technology to improve travelers safety. By combing advanced data analytics with user friendly interface , SafeWay offers real-time insights on crime hotspots, accident -prone areas and natural disaster risks. This interactive platform gives users timely and accurate information that can help them to make wise choices regarding their trips.

SafeWay's main characteristics are analyzing crime hotspots , assessing risk from natural disasters and accident rates of a particular location, these features intent to provide a comprehensive understanding of safety conditions. SafeWay uses advanced technologies like Random Forest and Gradient Boosting for data analysis, along with Flask for front-end and backend integration.In addition to this SafeWay uses Google API to generate interactive maps.

Through continuous and consistent implementation and upgradation SafeWay strives to offer users a precise travel safety information.This project focuses on how data driven solutions can solve real-world problems and shows us how technology can enhance safety and security in daily life.

In summary, Safeway achieves its main objectives of improving travel safety and also establishes a new benchmark for utilizing data and technology to develop significant , effective solutions. While the platform expands and extends its reach, it will keep offering important tools for global travelers , promoting a safer and more knowledgeable global society.

CHAPTER 10

10.REFERENCES

[1] A. M. Gelera and E. S. Dajao, "Crime Mapping Approach for Crime Pattern Identification: A Prototype for the Province of Cavite," *Springer Singapore,* vol. 2, no. 1, pp. 899-909, 2021.

[2] R. F. S. Job, J. Truong and C. Sakashita, "The Ultimate Safe System: Redefining the Safe System Approach for Road Safety," *Sustainability,* vol. 14(5), no. 2, p. 2978, 2022.

[3] M. N. Khan and S. Das, "Advancing traffic safety through the safe system approach: A systematic review," *Accident Analysis & Prevention,* vol. 199, p. 107518, 2024.

[4] A. Matyeey, A. Maksimov and S. Vodney, "Methods improving the availability of emergency-rescue services for emergency response to transport accidents," *Transportation Research Procedia,* vol. 36, pp. 507-513, 2018.

[5] L. A. Manfre, E. Hirata, J. B. Silva, E. J. Shinohara, M. A. Giannotti, P. C. Larocca and A. J. Quintanilha, "An analysis of geospatial technologies for risk and natural disaster management," *ISPRS International Journal of Geo-Information,* vol. 1, no. 2, pp. 166-185, 2012.

[6] M. Yu, C. Yang and Y. Li, "Big data in natural disaster management: a review," *Geosciences,* vol. 8, no. 5, p. 165, 2018.

[7] X. Zou, H. L. Vu and H. Huang, " Fifty years of accident analysis & prevention: A bibliometric and scientometric overview," *Accident Analysis & Prevention,* vol. 144, p. 105568, 2020.

[8] W. Ma, P. K. Alimo, L. Wang and M. Abdel-Aty, "Mapping pedestrian safety studies between 2010 and 2021: A scientometric analysis," *Accident Analysis & Prevention,* vol. 174, p. 106744, 2022.

[9] M. G. Al-Zubaidi, H. Zubaidi and B. H. , " A review into studies related to the effect of the pavement surface condition on traffic safety: A scientometric analysis," *Al-Qadisiyah Journal for Engineering Sciences,* vol. 16, no. 3, pp. 169-179, 2023.

[10] M. Haghani, A. Behnood, V. Dixit and O. Oviedo-Trespalacios, "Road safety

research in the context of low-and middle-income countries: Macro-scale literature analyses, trends, knowledge gaps and challenges," *Safety Science,* vol. 146, p. 105513, 2022.

ANNEXURE

iThenticate

Similarity Report ID: oid:3618:63689949

PAPER NAME

IN PARTIAL FULFILLMENT OF THE REQU IREMENT FOR THE AWARD OF THE DEG REE OF MASTER OF COMPUTER SCIENC E

AUTHOR

NANMA MANOJ M

WORD COUNT

5842 Words

CHARACTER COUNT

33061 Characters

PAGE COUNT

63 Pages

FILE SIZE

6.2MB

SUBMISSION DATE

Jul 31, 2024 11:21 AM GMT+5:30

REPORT DATE

Jul 31, 2024 11:22 AM GMT+5:30

5% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

- 4% Internet database
- 3% Publications database
- Crossref database
- Crossref Posted Content database
- 0% Submitted Works database

Excluded from Similarity Report

- Bibliographic material
- Quoted material
- Cited material
- Small Matches (Less then 14 words)
- Manually excluded text blocks

iThenticate

Similarity Report ID: oid:3618:63689949

5% Overall Similarity

Top sources found in the following databases:

- 4% Internet database
- 3% Publications database
- Crossref database
- Crossref Posted Content database
- 0% Submitted Works database

TOP SOURCES

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1	researchgate.net Internet	1%
2	mdpi.com Internet	1%
3	Md Nasim Khan, Subasish Das. "Advancing traffic safety through the s... Crossref	<1%
4	pubmed.ncbi.nlm.nih.gov Internet	<1%
5	inscricao.faculdadeitop.edu.br Internet	<1%
6	qjes.qu.edu.iq Internet	<1%
7	coursehero.com Internet	<1%
8	Suchita Arora, Sunil Kumar, Sandeep Kumar. "Chapter 56 Artificial Intel... Crossref	<1%

Sources overview

iThenticate

Similarity Report ID: oid:3618:63689949

Excluded from Similarity Report

- Bibliographic material
- Cited material
- Manually excluded text blocks
- Quoted material
- Small Matches (Less then 14 words)

EXCLUDED TEXT BLOCKS

YENEPOYA INSTITUTE OF ARTS, SCIENCE, COMMERCEAND MANAGEMENT A CO...

Bhagwan Narayan Rekadwad, Wen-Jun Li, Juan M. Gonzalez, Rekha Punchappady Devasya et al. "Extremop...

DEPARTMENT OF COMPUTER SCIENCEIN PARTIAL FULFILLMENT OF THE REQUI...

www.coursehero.com