# THE TRAGEDY OF FLIGHT: A COMPREHENSIVE CRASH ANALYSIS

**Project submitted to Bharathiyar University for Naan Mudhalvan scheme**

**for the award of the Degree of**

***B.Sc. MATHEMATICS***

**Submitted By**

**III B.Sc. Mathematics Students**


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**s**

## Under the guidance of

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**Assistant Professor**


***DEPARTMENT OF MATHEMATICS***

***CHIKKAIAH NAICKER COLLEGE***

***(Affiliated to Bharathiyar University)***

***ERODE – 638 004***


***APRIL 2023***

# 1. INTRODUCTION

## 1.1 OVERVIEW

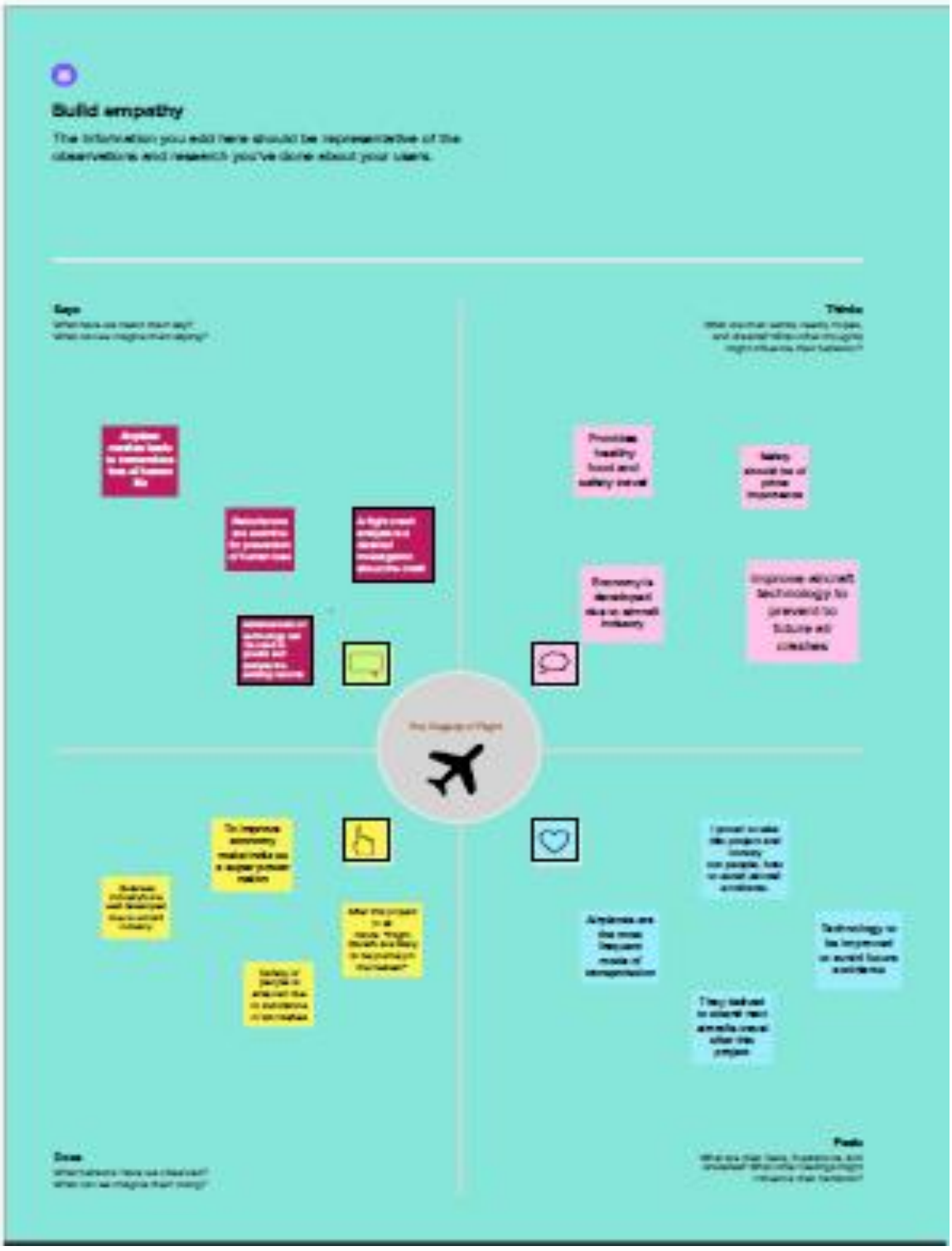
This project deals about ***The Tragedy of Flight: A Comprehensive Crash Analysis.*** The investigation include the **gathering, recording and analysis of all available information**, the issuance of safety recommendations; the determination of the causes, and the completion of a final report. Aviation accident analysis is an important part of aviation safety research. We used long-term sequence aviation accident statistics to **analyse the characteristics of historical aviation accidents and predict the future direction of aviation accidents.**

## 1.2 PURPOSE

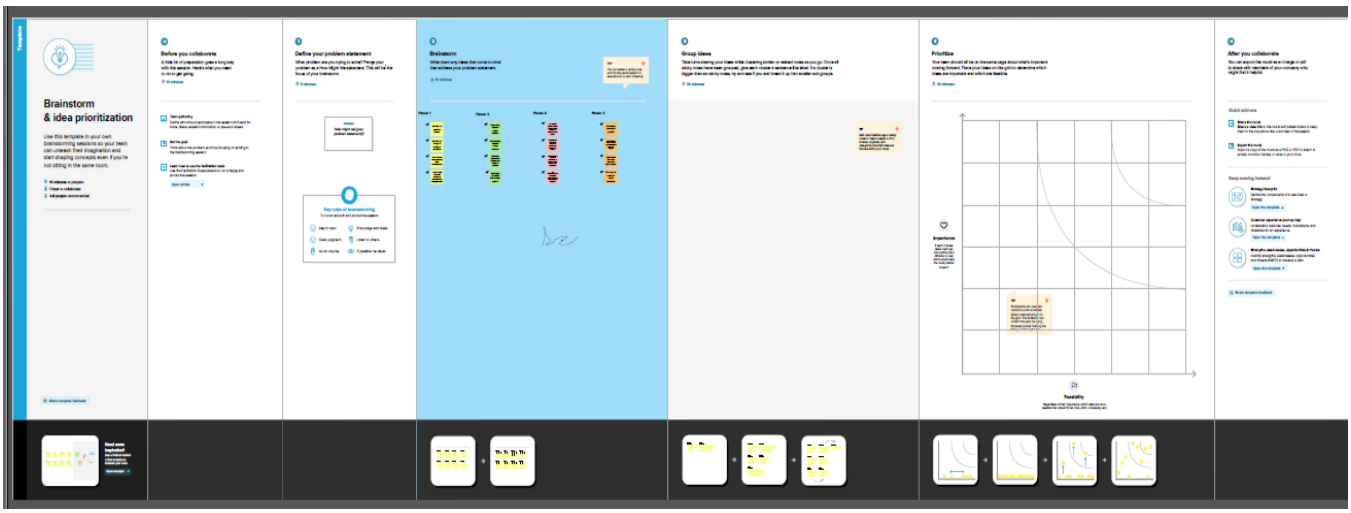
Aviation accident analysis is performed to determine the cause of errors once an accident has happened. In the modern aviation industry, it is also used to analyze a database of past accidents in order to prevent an accident from happening.

# 2. PROBLEM DEFINITION & DESIGN THINKING

## 2.1EMPATHY MAP



## 2.2 IDEATION & BRAINSTORMING MAP




# 3. RESULT

## WEB INTEGRATION

# DASHBOARD

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Comparing Aboard vs Fatilites vs Ground
Date
Max accidents based on years
Measure Names
Aboard
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Count of airplan..
Fatalities
Ground
Accidents happened in1972 (MAX ACCIDENTS) based on months
Date
January
February
March
April
May
June
July
August
September
October
November
December
Location - Split 1
Brazil
Colombia
Alaska
California
Russia
France
Canada
England
Highest No. of accident happened by Operators
Top 3 flights which have max accident history
Type
Douglas DC-4
Douglas C-47
Douglas C-47A
de Havilland C..
Douglas DC-3
Count of airplane_crash.csv
1
20
Top 10 locations which had more accidents
Location - Split 1
Count of ai..
Accidents based on regions
© 2023 Mapbox © OpenStreetMap
Operator, Measure Names
Aeroflot, avg(0...
Military - U.S. ...
Air France, avg(..
Air Taxi, avg(0.0)
Deutsche Lufth..
Count of airplane_crash.csv
534

# STORY

Story 1

| Comparing Aboard vs Fatalities vs Ground | Max Accidents based on years | Accidents happened in 1972 (MAX ACCIDENT.. | Highest No. of accident happened by.. | Top 10 locations which had more accidents | Top 3 flights which have max accident his.. | Accidents based on re.. |
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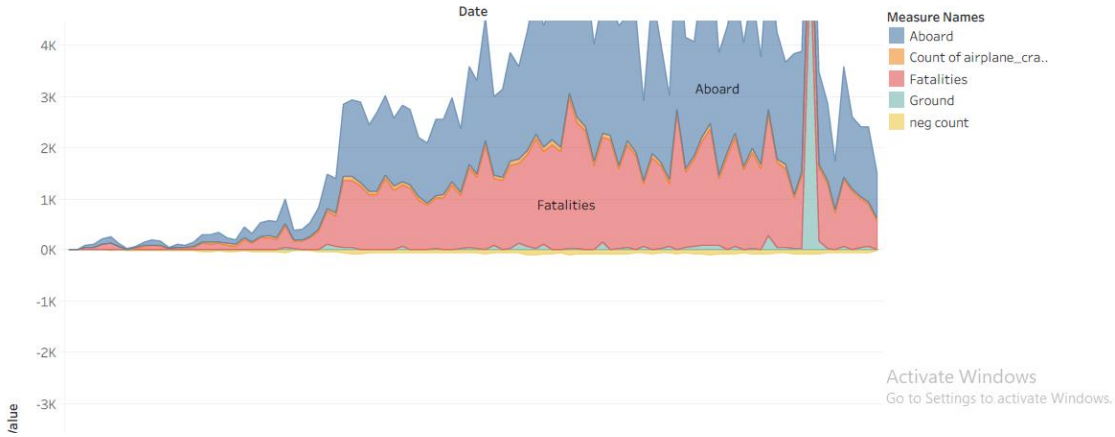


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# 4. ADVANTAGES & DISADVANTAGES

Aircraft accident investigation involves the collection and analysis of various data in order to draw conclusions and make safety recommendations that will prevent aircraft accidents caused by similar causes in the future. Therefore, a properly conducted investigation is a key to prevent future accidents.

## Benefits of an Accident Investigation.

- Understanding the events that led up to an accident can help to determine the cause. Each accident should be treated as a learning opportunity.
- Once the cause of the accident is determined, corrective actions can be taken to prevent the same or similar losses from occurring again.
- Discovering patterns in accidents may help determine if procedures need to be altered to keep people and property safe.
- Sharing information and discoveries helps to prevent future accidents and can reduce risks for others.

## An Investigation Involve.

1. **Gathering Information.**
2. **Identify the cause.**
3. **Examine your data.**
4. **Respond accordingly.**

## Benefits of Accident Prevention.

1. Healthy and safe working conditions.
2. Better morale.
3. Reduced injuries and illness associated costs.
4. Increased productivity.
5. Reduced rates for workers' compensation insurance. (the lower the number of claims the better)

# ADVANTAGES OF AIRCRAFT ACCIDENT ANALYSIS:

1. **Identification Of Causes:**

   One of the biggest advantages of aircraft accident analysis is that it helps to identify the causes of the crash. By examining the wreckage and gathering data from the flight data recorder and cockpit voice recorder, investigators can piece together what happened during the flight and determine what factors contributed to the crash.

2. **Safety Improvements:**

   Another advantage of aircraft accident analysis is that it can lead to improvements in safety. By identifying the causes of a crash, aviation experts can recommend changes to regulations, training programs, and equipment that can help prevent similar accidents from occurring in the future.

3. **Preventive Measures:**

   Aircraft accident analysis can help to identify potential problems and risks before they become accidents. For example, if a recurring maintenance issue is identified as a contributing factor to a crash, airlines can take corrective action to prevent similar problems from occurring in other planes.

4. **Lessons Learned:**

   Aircraft accident analysis provides valuable lessons for pilots, aviation professionals, and manufacturers. By studying the causes and factors that contribute to a crash, the industry can improve safety procedures and protocols, which can ultimately save lives.

5. **Increased Public Confidence:**

   A thorough and transparent aircraft accident investigation can help to restore public confidence in the aviation industry. It shows that the authorities and industry are taking steps to understand and address the

causes of the accident, and are committed to preventing similar events from happening again in the future.

## DISADVANTAGES OF AIRCRAFT ACCIDENT ANALYSIS:

1. **Time-Consuming:**

   Investigating an aircraft accident can be a time-consuming process, requiring extensive analysis of data and documentation. The process can take months or even years to complete, which can be frustrating for the families of the victims and the airlines involved.

2. **Expensive:**

   Aircraft accident analysis can be expensive, as it involves the use of specialized equipment and personnel with expertise in aviation and engineering. The cost of the investigation is usually borne by the government or the airline, and can run into millions of dollars.

3. **Emotions:**

   Aircraft accidents can be emotionally charged events, and the investigation can be complicated by conflicting accounts from witnesses and survivors. In some cases, the investigation can become politicized or controversial, which can further complicate the process.

4. **Limitations Of Technology:**

   While technology has advanced greatly in recent years, there are still limitations to what can be determined from an aircraft accident investigation. For example, the flight data recorder and cockpit voice recorder may not provide a complete picture of what happened during the flight, and other factors such as weather conditions or mechanical failures may be difficult to determine.

5. **Legal Implications:**

In some cases, aircraft accident investigations can have legal implications, particularly if the crash results in lawsuits or criminal charges. This can complicate the investigation process, as investigators must balance the need for transparency with the legal requirements of the case.

6. **Emotional Toll:**

Aircraft accident investigations can be emotionally challenging for everyone involved, from the families of the victims to the investigators themselves. It can be difficult to remain objective in the face of such tragedy, and investigators must be prepared to handle the emotional toll of the investigation.

## POWERPLANT FAILURE

(a) Fuel System.
(b) Cooling System.
(c) Ignition System.
(d) Lubrication System.
(e) Engine Structure.
(f) Propeller & Propeller Accessories.
(g) Engine Control System (Throttle Rod, Etc.)
(h) Miscellaneous.
(i) Undetermined.

## STRUCTURAL FAILURE

(a) Flight Control System.
(b) Movable Surfaces.
(c) Stabilizing Surfaces.

(d) Wings, Struts, & Braking.

(e) Landing Gear.

(f ) Wheels, Tiers, & Brakes.

(g) Seaplane Float or Boat.

(h) Fuselage, Engine Mount, & Fittings.

(i) Tail Skid or Wheel Assembly.

(j) Arresting Appliances on Aircraft.

(k) Miscellaneous.

(l) Undetermined.

## 5. APPLICATIONS

Aircraft accident analysis is the process of investigating and examining an aircraft accident or incident to determine the cause or causes and contributing factors. The information gathered from these investigations is then used to develop and implement strategies to prevent similar accidents from occurring in the future. Here are some applications of aircraft accident analysis:

1. **IMPROVING SAFETY:**

The primary goal of aircraft accident analysis is to identify the causes of accidents and develop strategies to prevent them from occurring again. This information is used to improve safety procedures, regulations, and training to reduce the risk of future accidents.

## 2. REGULATORY COMPLIANCE:

Aviation regulatory bodies use accident analysis to identify areas of non-compliance with safety regulations and to enforce compliance.

## 3. DESIGN IMPROVEMENT:

Aircraft accident analysis can be used to identify design flaws or deficiencies that may have contributed to an accident. This information is used to improve the design of aircraft and aviation systems to enhance safety.

## 4. INSURANCE CLAIMS:

Aircraft accident analysis is used to determine liability in insurance claims related to aviation accidents.

## 5. LEGAL PROCEEDINGS:

Accident analysis findings can be used as evidence in legal proceedings related to aviation accidents, such as criminal investigations or civil lawsuits.

## 6. TRAINING AND EDUCATION:

The findings of aircraft accident analysis are used to develop training programs and educational materials for pilots, air traffic controllers, and other aviation professionals.

## 7. PUBLIC AWARENESS:

The results of aircraft accident analysis are often communicated to the public to raise awareness of aviation safety issues and to promote a culture of safety within the aviation industry.

## MAIN CAUSES OF AIR ACCIDENTS:

i. Sabotage
ii. Bird strike
iii. Mechanical Failure
iv. Bad Weather
v. Fuel Starvation
vi. Hijacking
vii. Improper loading of aircraft
viii. Improper maintenance procedures
ix. Design flaw
x. Lightening, and
xi. Pilot shoot by passenger

## 6. CONCLUSION

Air travel safety is definitely a data-driven activity. Although the number of aircrafts in operation is constantly on the rise, accident rates are falling making air transport the safest of all means of transportation. Improvements bear fruit, and the usefullness of aircraft monitoring and redundancies can be witnessed everyday. The increase in flight length also contributes to explain the drop in the number of plane crashes. Since accidents mainly occur during the take-off and landing phases, a long-haul aircraft performing only one or two long cycles a day is indeed less likely to be involved in an accident then a short range aircraft performing ten short cycles a day.

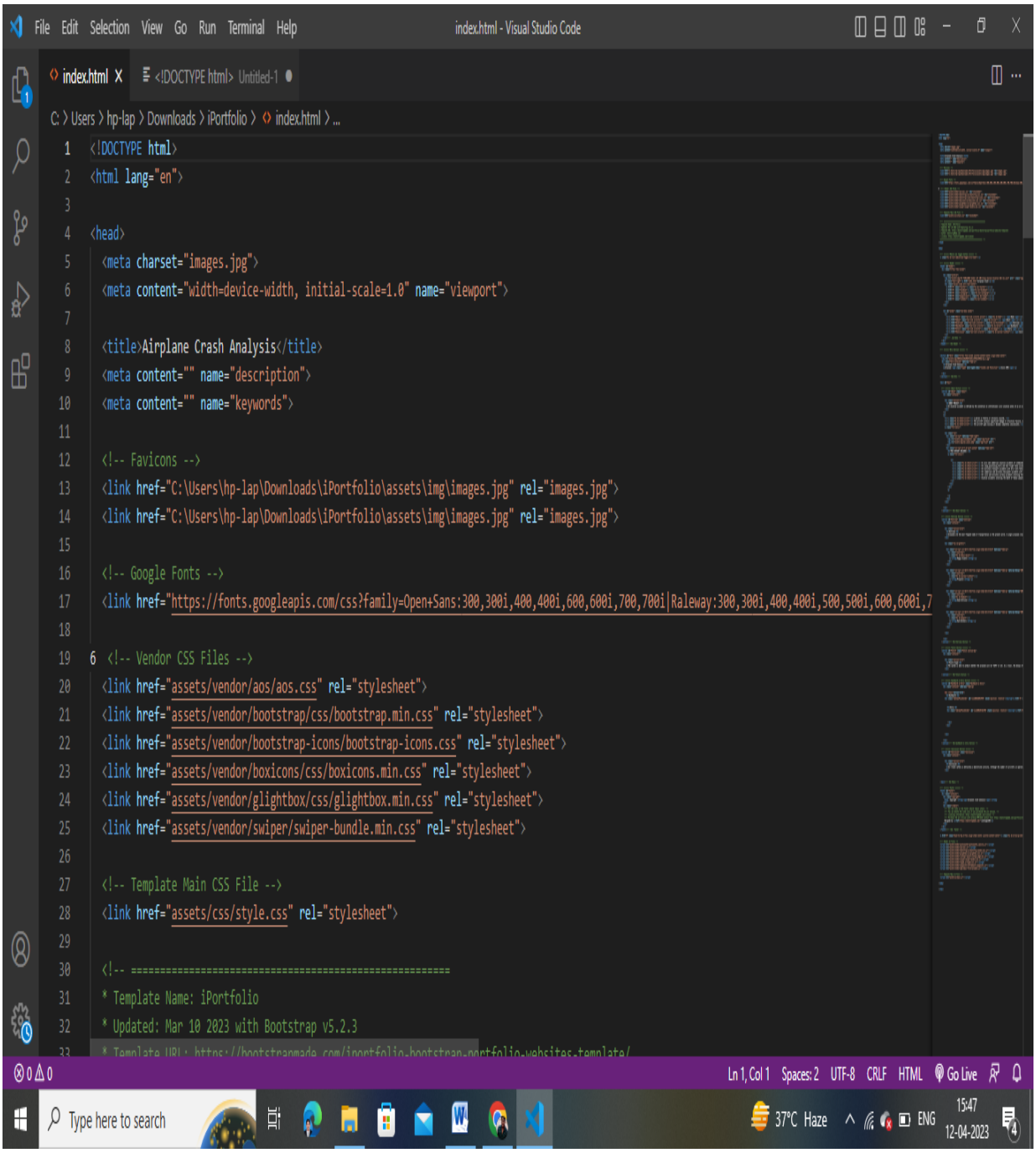
## 7. FUTURE SCOPE

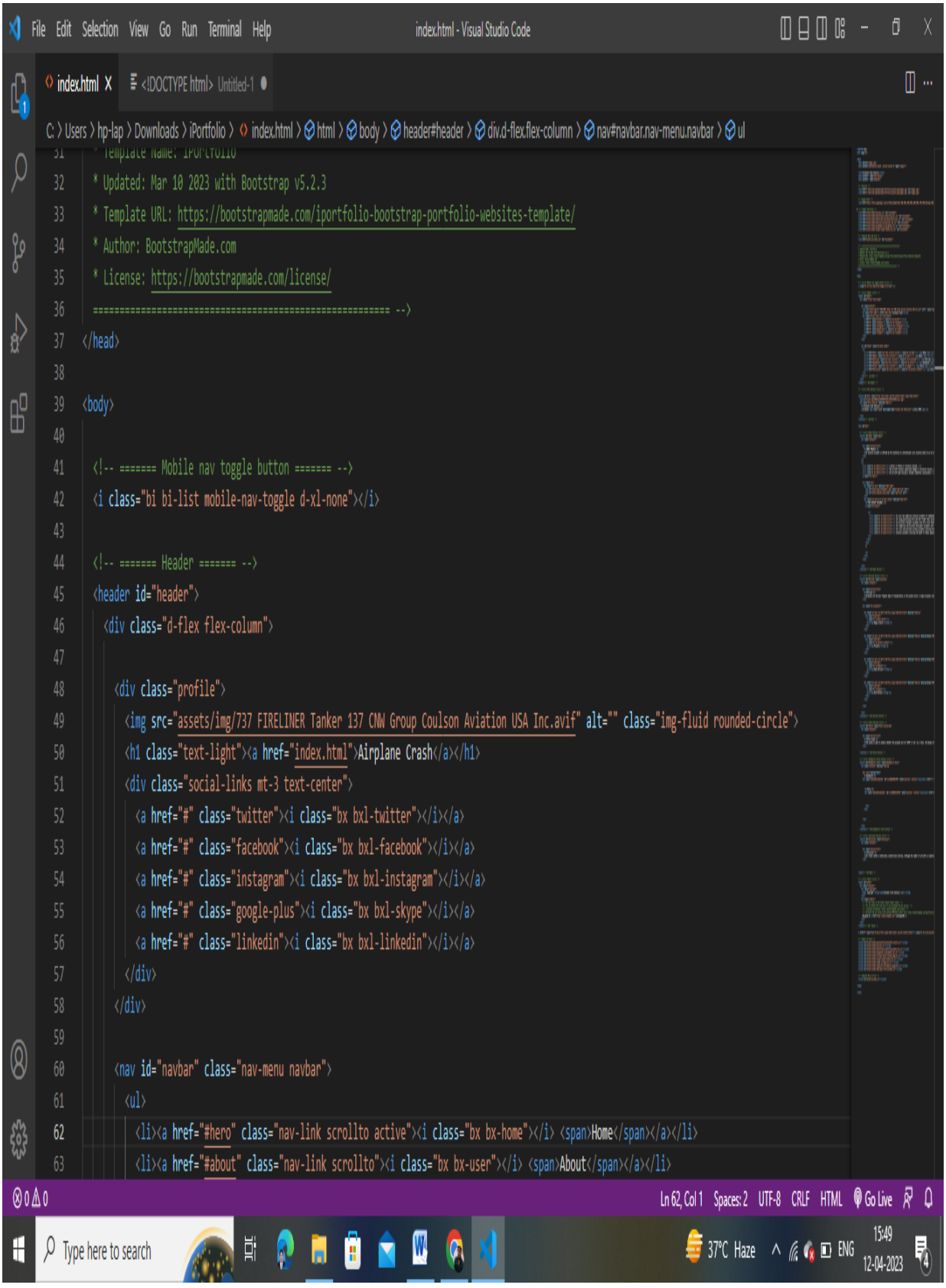
Aviation accident analysis is an important part of aviation safety research. We used long-term sequence aviation accident statistics to **analyze the characteristics of historical aviation accidents and predict the future direction of aviation accidents**.

The system is able to predict whether the airplane will be "SAFE" or not. As a resut, the delays of every airplane can also be predicted. The period after which an airplane has to go under the maintanance stage can also be included with the system. Hence, the system will be the one stop destination to check the flight delays, airplanr crashes and the period after which the flight should undergo the maintenance phase.

# 8. APPENDIX

## SOURCE CODE

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* Updated: Mar 10 2023 with Bootstrap v5.2.3
* Template URL: https://bootstrapmade.com/iportfolio-bootstrap-portfolio-websites-template/
* Author: BootstrapMade.com
* License: https://bootstrapmade.com/license/
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<a href="#" class="instagram"></a>
<a href="#" class="google-plus"></a>
<a href="#" class="linkedin"></a>

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<ul>
<li><a href="#hero" class="nav-link scrollto active"> Home</a></li>
<li><a href="#about" class="nav-link scrollto"> About</a></li>
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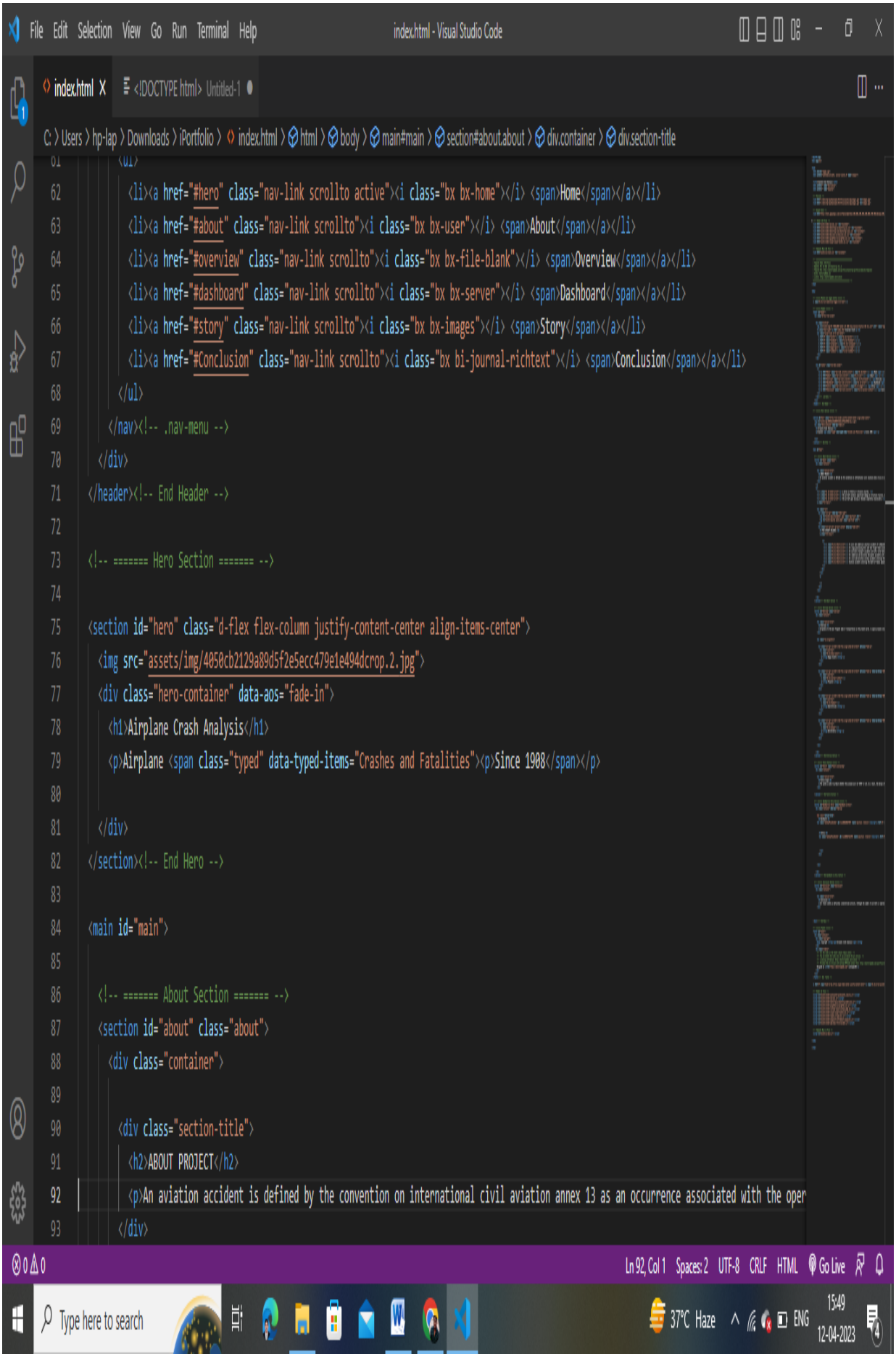
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<li><a href="#hero" class="nav-link scrollto active"> Home</a></li>
<li><a href="#about" class="nav-link scrollto"> About</a></li>
<li><a href="#overview" class="nav-link scrollto"> Overview</a></li>
<li><a href="#dashboard" class="nav-link scrollto"> Dashboard</a></li>
<li><a href="#story" class="nav-link scrollto"> Story</a></li>
<li><a href="#Conclusion" class="nav-link scrollto"> Conclusion</a></li>
</ul>
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</header><!-- End Header -->
<!-- ======= Hero Section ======= -->
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<img src="assets/img/4050cb2129a89d5f2e5ecc479e1e494dcrop.2.jpg">

<h1>Airplane Crash Analysis</h1>
Airplane Since 1908

</section><!-- End Hero -->
<main id="main">
<!-- ======= About Section ======= -->
<section id="about" class="about">

<h2>ABOUT PROJECT</h2>
An aviation accident is defined by the convention on international civil aviation annex 13 as an occurrence associated with the oper

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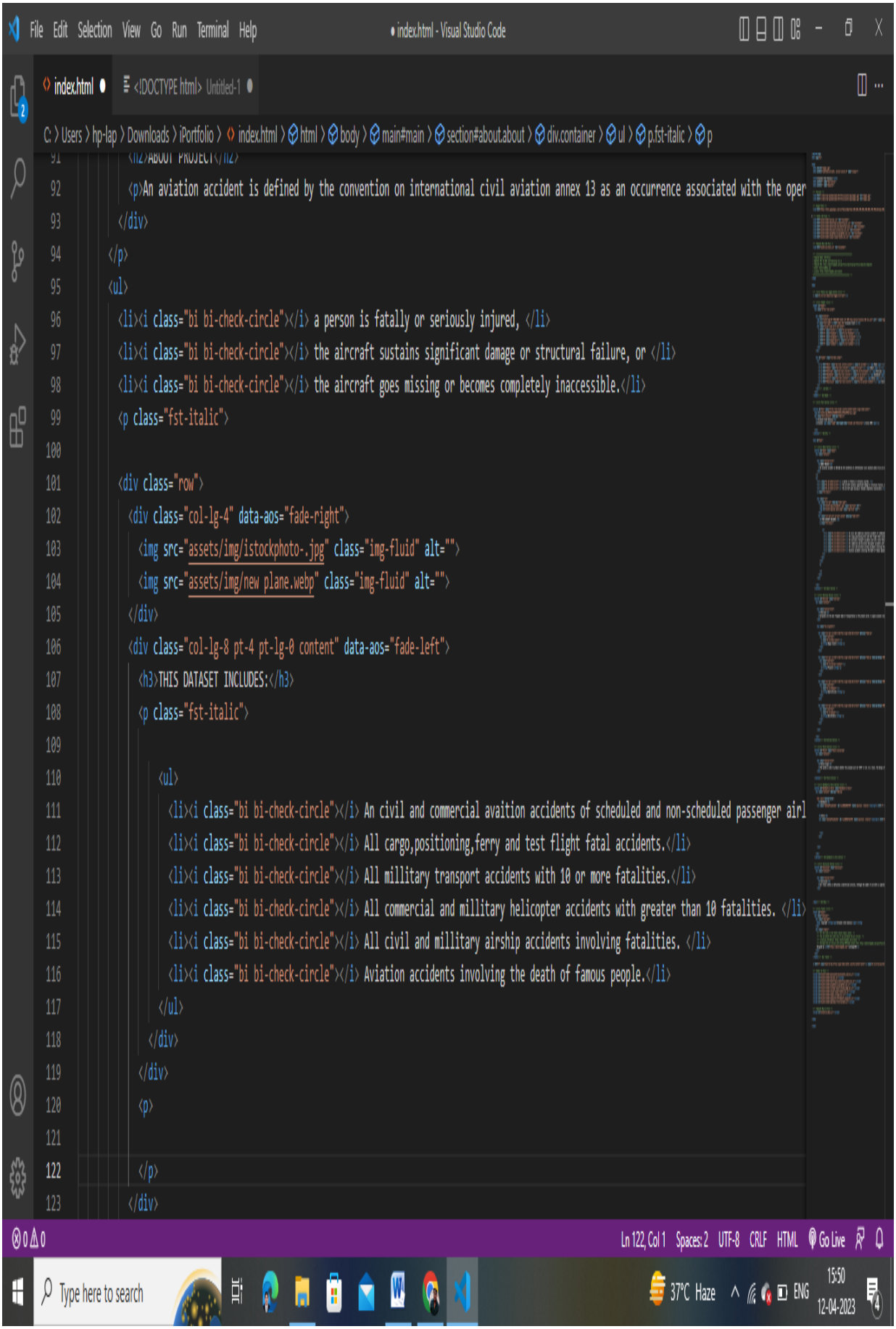
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<h2>ABOUT PROJECT</h2>
An aviation accident is defined by the convention on international civil aviation annex 13 as an occurrence associated with the oper

<ul>
<li> a person is fatally or seriously injured, </li>
<li> the aircraft sustains significant damage or structural failure, or </li>
<li> the aircraft goes missing or becomes completely inaccessible.</li>

<img src="assets/img/istockphoto-.jpg" class="img-fluid" alt="">
<img src="assets/img/new plane.webp" class="img-fluid" alt="">

<h3>THIS DATASET INCLUDES:</h3>

<ul>
<li> An civil and commercial avaition accidents of scheduled and non-scheduled passenger airl
<li> All cargo,positioning,ferry and test flight fatal accidents.</li>
<li> All millitary transport accidents with 10 or more fatalities.</li>
<li> All commercial and millitary helicopter accidents with greater than 10 fatalities. </li>
<li> All civil and millitary airship accidents involving fatalities. </li>
<li> Aviation accidents involving the death of famous people.</li>
</ul>

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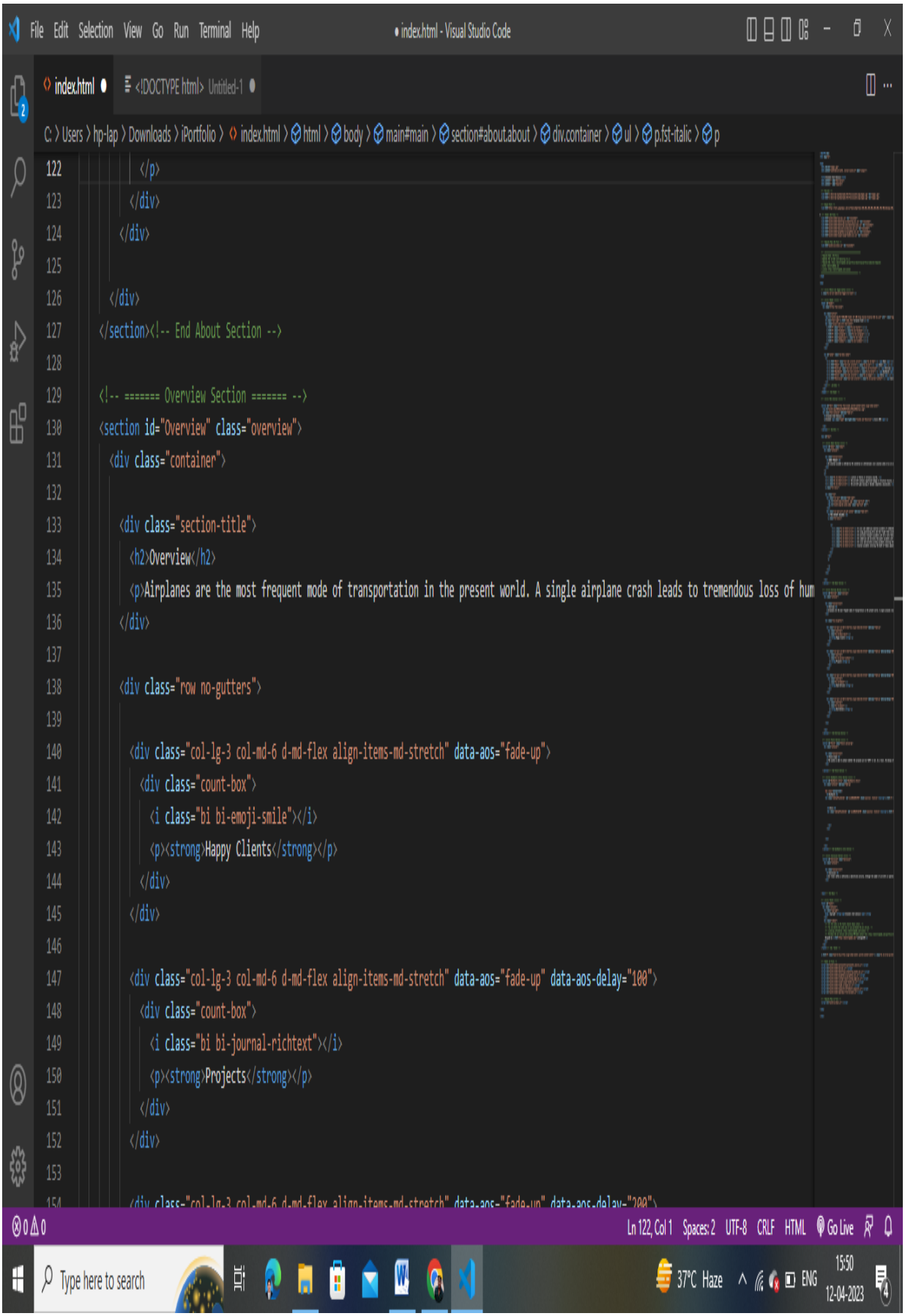
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122 
123 
124 
125
126 
127 </section><!-- End About Section -->
128
129 <!-- ======= Overview Section ======= -->
130 <section id="Overview" class="overview">
131 
132
133 
134 <h2>Overview</h2>
135 Airplanes are the most frequent mode of transportation in the present world. A single airplane crash leads to tremendous loss of hum
136 
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143 Happy Clients
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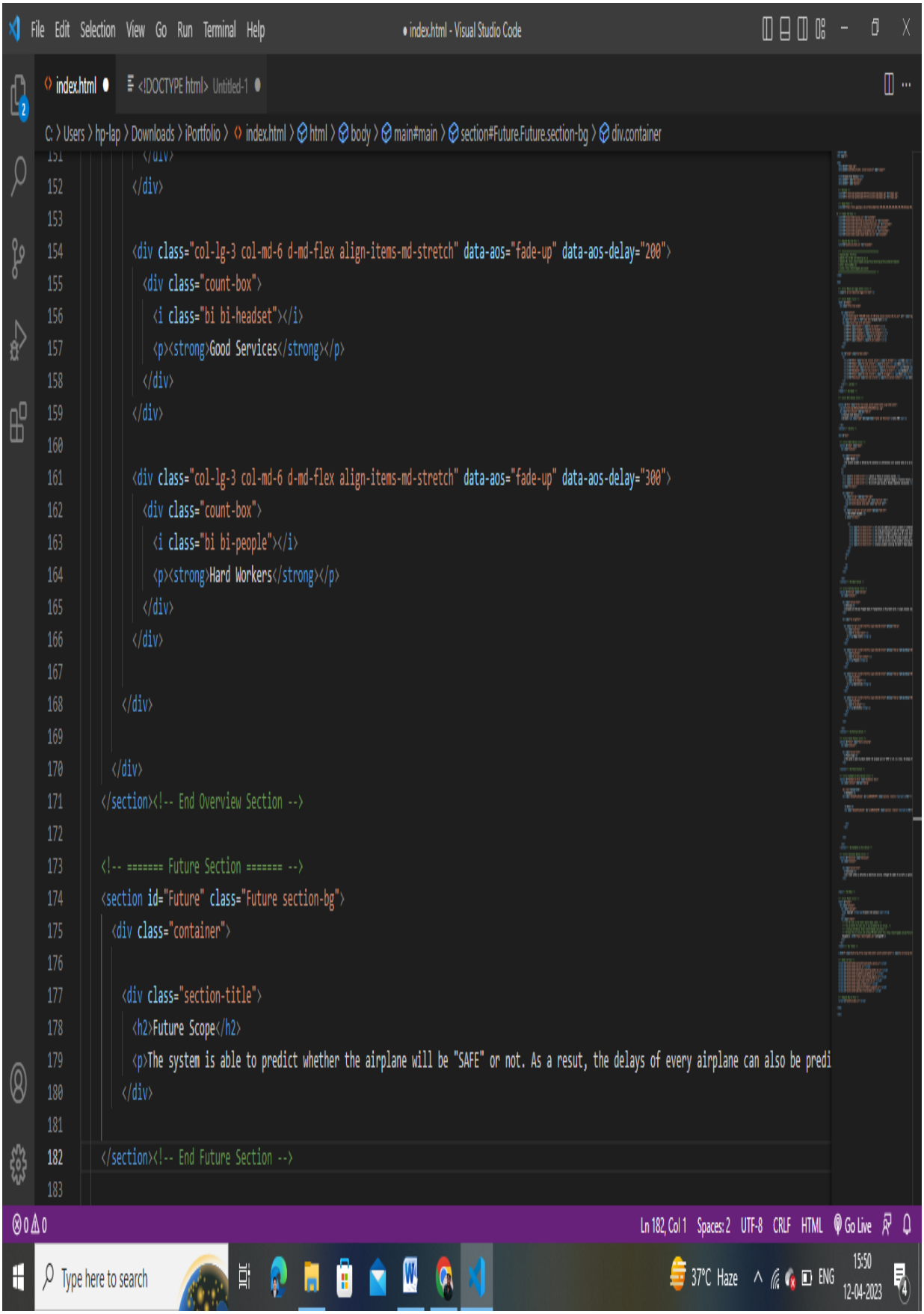
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Good Services

Hard Workers

</section><!-- End Overview Section -->
<!-- ======= Future Section ======= -->
<section id="Future" class="Future section-bg">

<h2>Future Scope</h2>
The system is able to predict whether the airplane will be "SAFE" or not. As a resut, the delays of every airplane can also be predi

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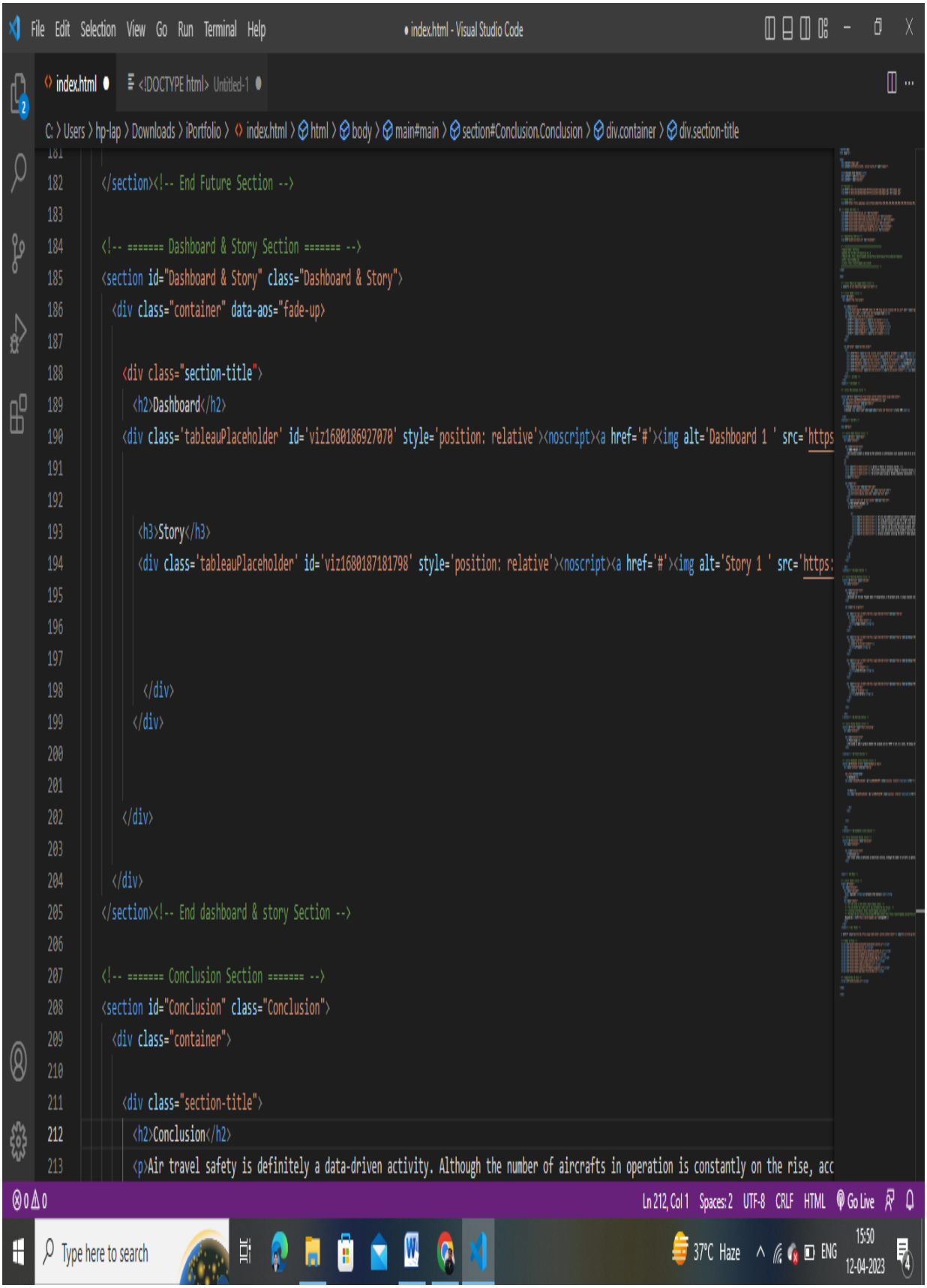
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</section><!-- End Future Section -->
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<h3>Story</h3>
<noscript><a href='#'><img alt='Story 1 ' src='https:

</section><!-- End dashboard & story Section -->
<!-- ======= Conclusion Section ======= -->
<section id="Conclusion" class="Conclusion">

<h2>Conclusion</h2>
<p>Air travel safety is definitely a data-driven activity. Although the number of aircrafts in operation is constantly on the rise, acc
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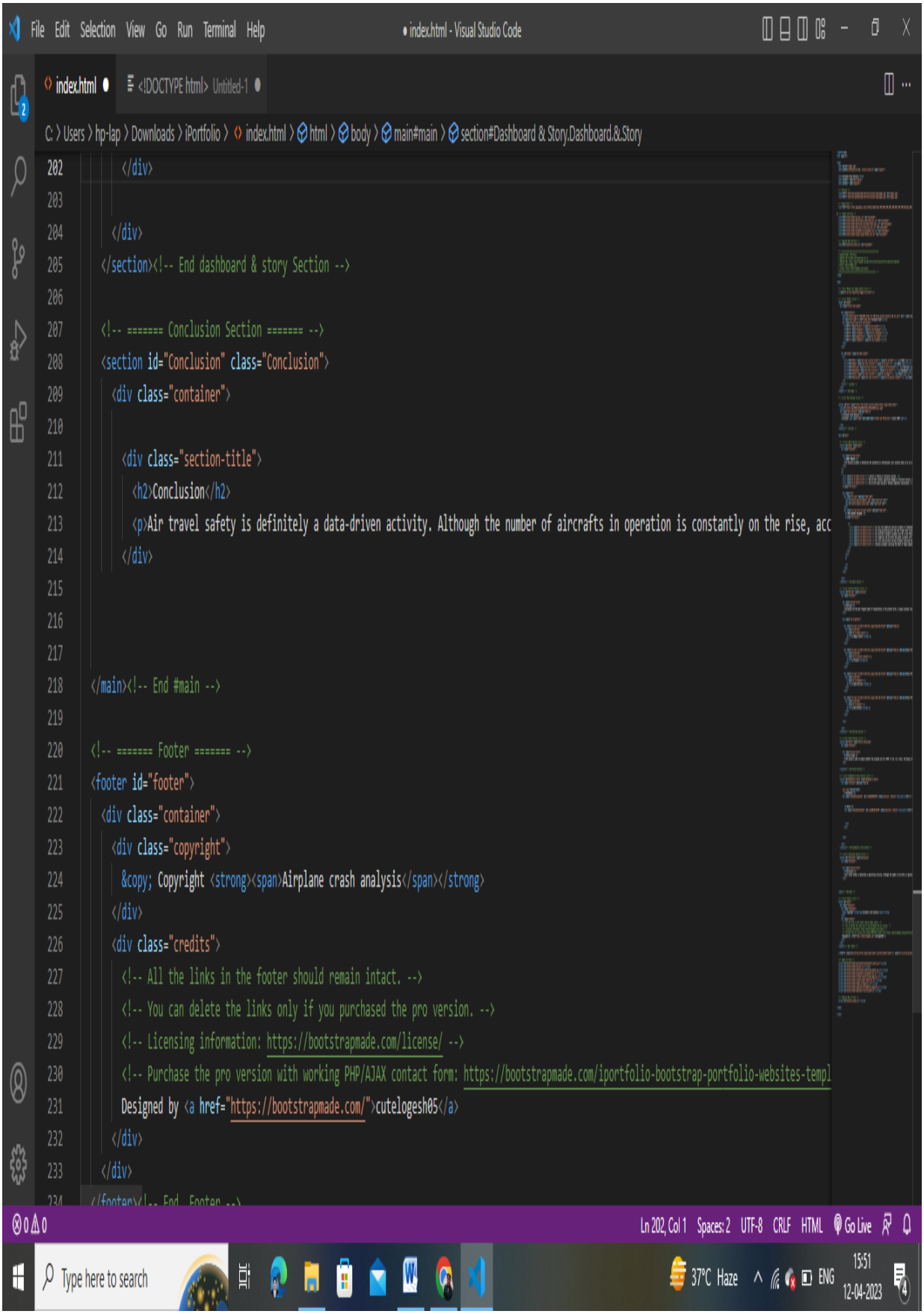
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</section><!-- End dashboard & story Section -->
<!-- ======= Conclusion Section ======= -->
<section id="Conclusion" class="Conclusion">

<h2>Conclusion</h2>
<p>Air travel safety is definitely a data-driven activity. Although the number of aircrafts in operation is constantly on the rise, acc

</main><!-- End #main -->
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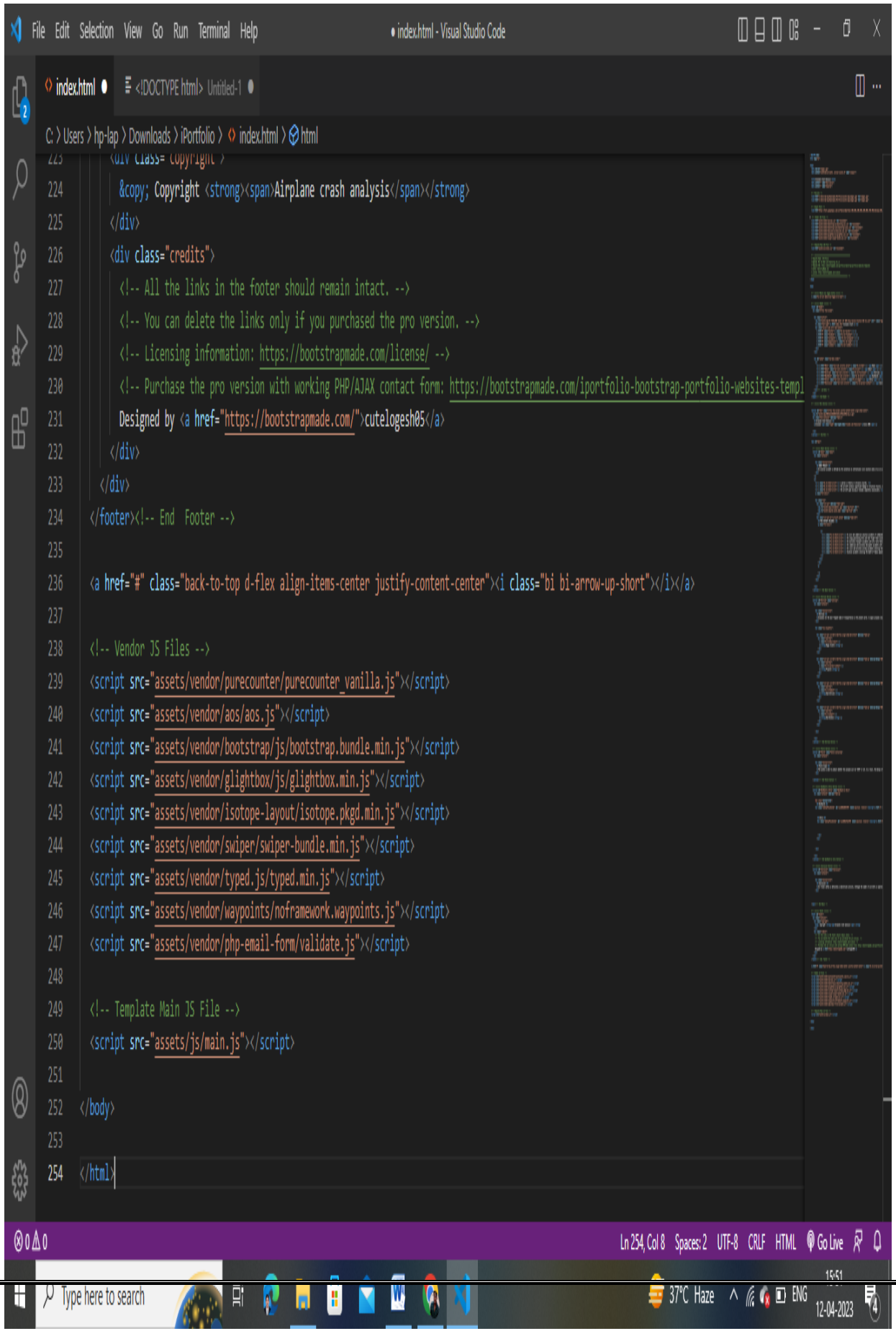
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Designed by <a href="https://bootstrapmade.com/">cutelogesh05</a>

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