

THE TRAGEDY OF FLIGHT: A COMPREHENSIVE CRASH ANALYSIS

BACHELOR OF SCIENCE IN MATHEMATICS

Submitted by

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1. INTRODUCTION

1.1 Overview

An airplane crash analysis is a detailed investigation into the causes of an aviation accident. The goal of an airplane crash analysis is to identify any factors that contributed to the accident, with the ultimate goal of improving safety and preventing future accidents.

The process of conducting an airplane crash analysis typically involves the collection and analysis of a wide range of data, including information about the aircraft and its systems, the operators, and any other relevant factors. This data is typically collected from Kaggle.

Once the data has been collected, it is analysed through tableau, to identify any potential causes of the accident. The results of an airplane crash analysis are typically published in a report, which may include recommendations for improving safety and preventing similar accidents in the future.

These recommendations may be implemented by the relevant authorities or industry organizations.

1.2 Purpose:-

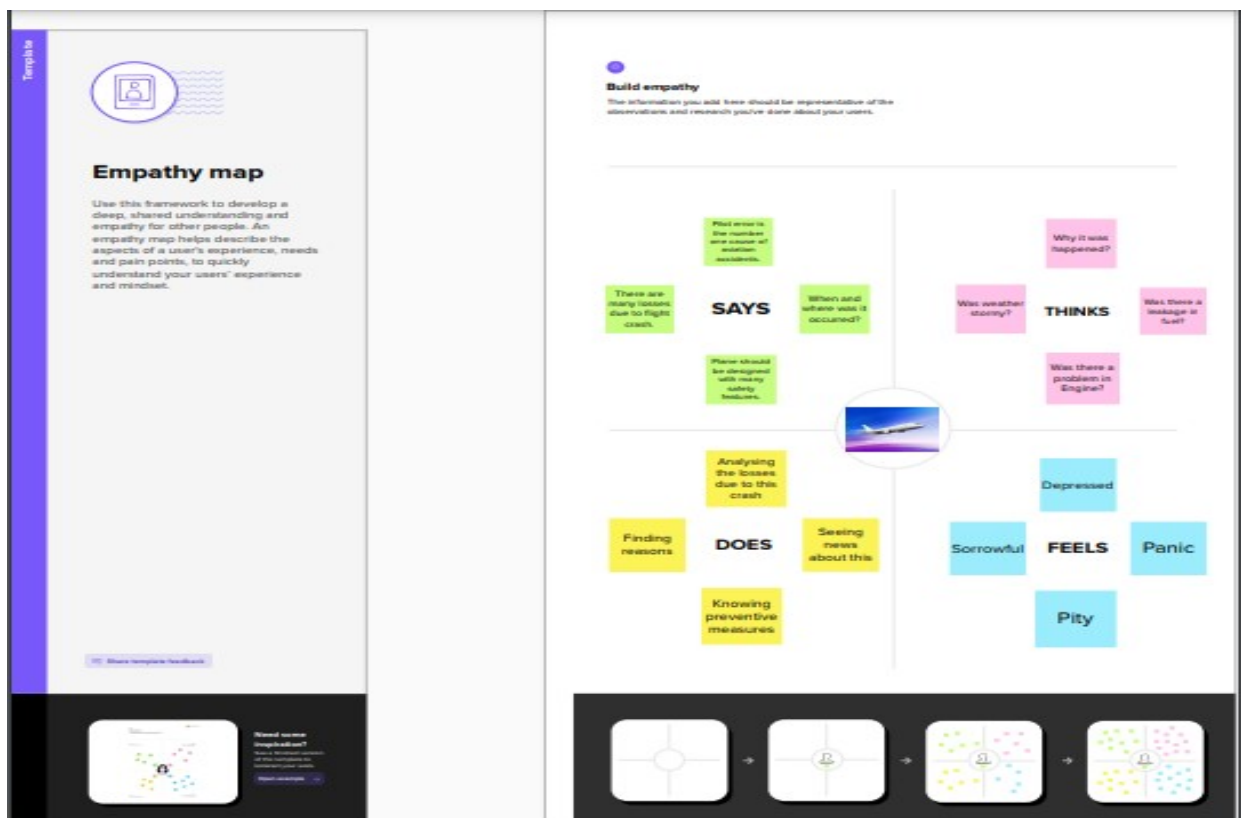
Incident analysis is a process for **identifying what happened during an outage**: discovering things like who and what parts of the system were involved, and how the problem was handled.

Aviation accident analysis is performed to determine the cause of errors once an accident has happened.

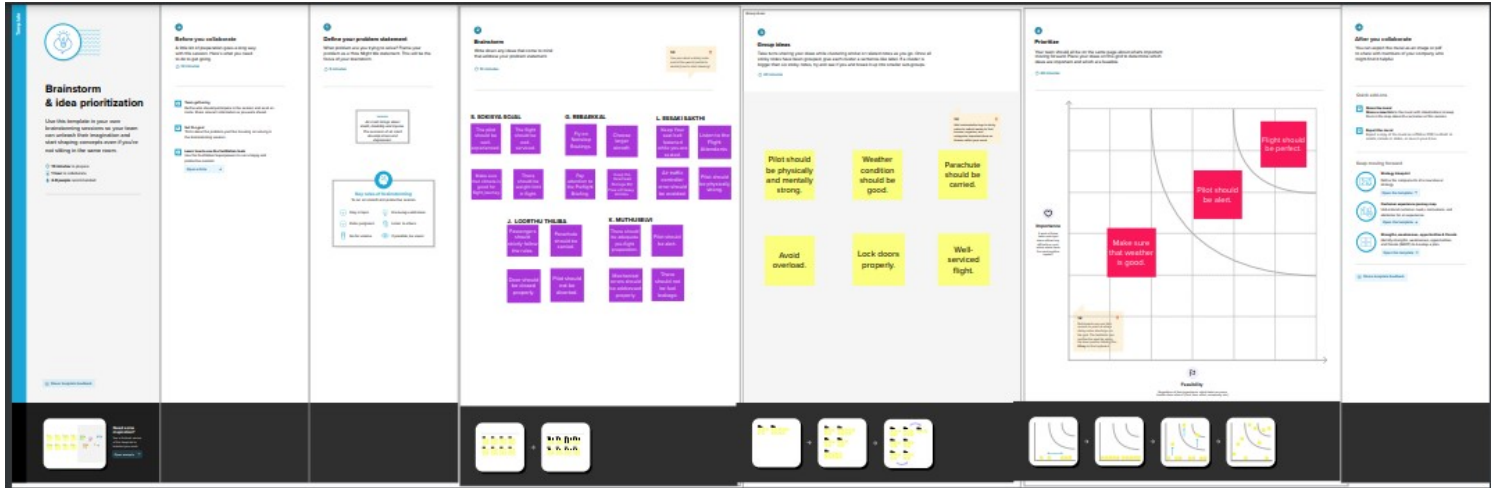
In the modern aviation industry, it is also used to analyze a database of past accidents in order to prevent an accident from happening.

2. PROBLEM DEFINITION & DESIGN THINKING

2.1 Empathy Map

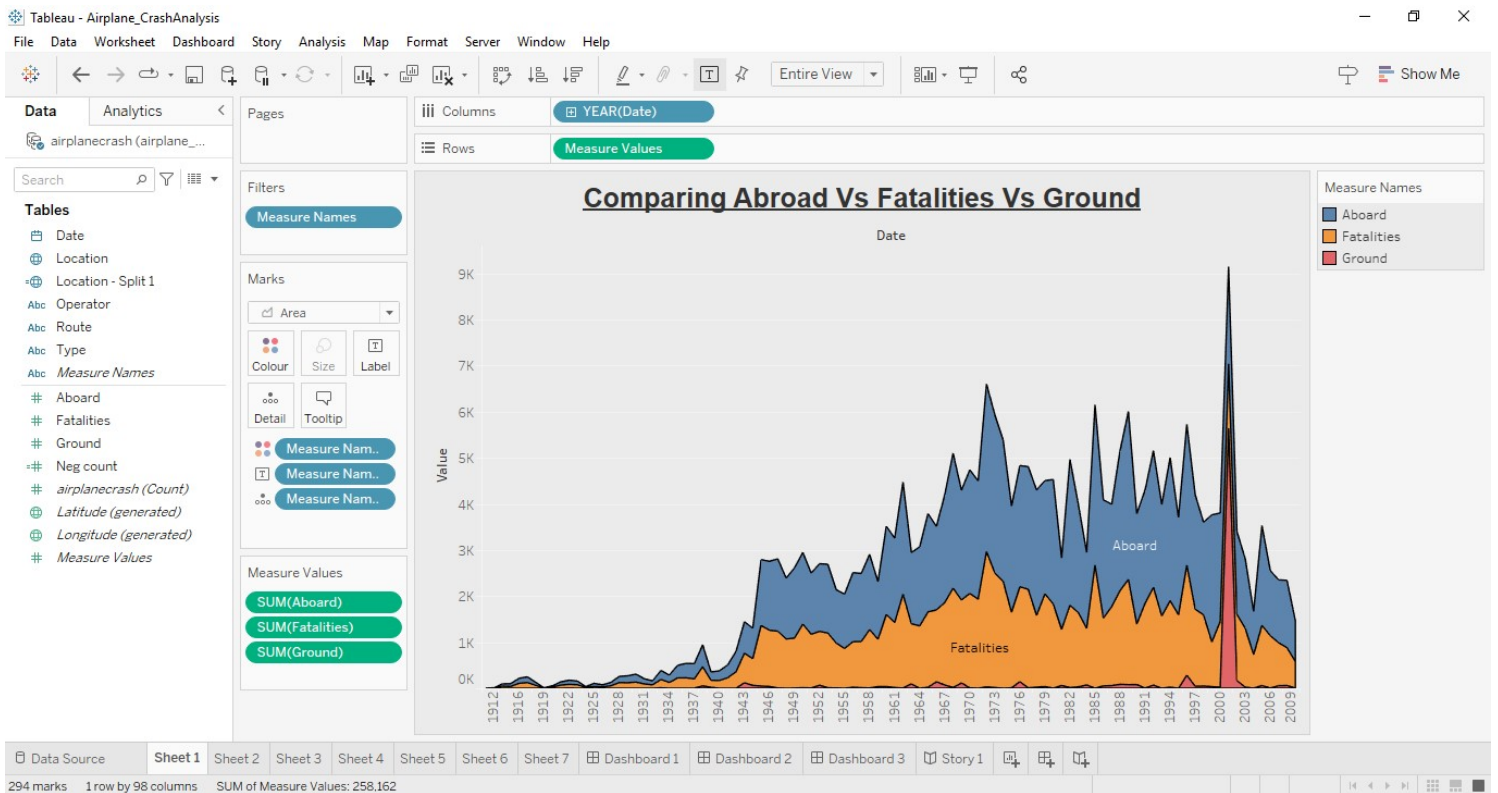


2.2 Ideation & Brainstorming Map:-

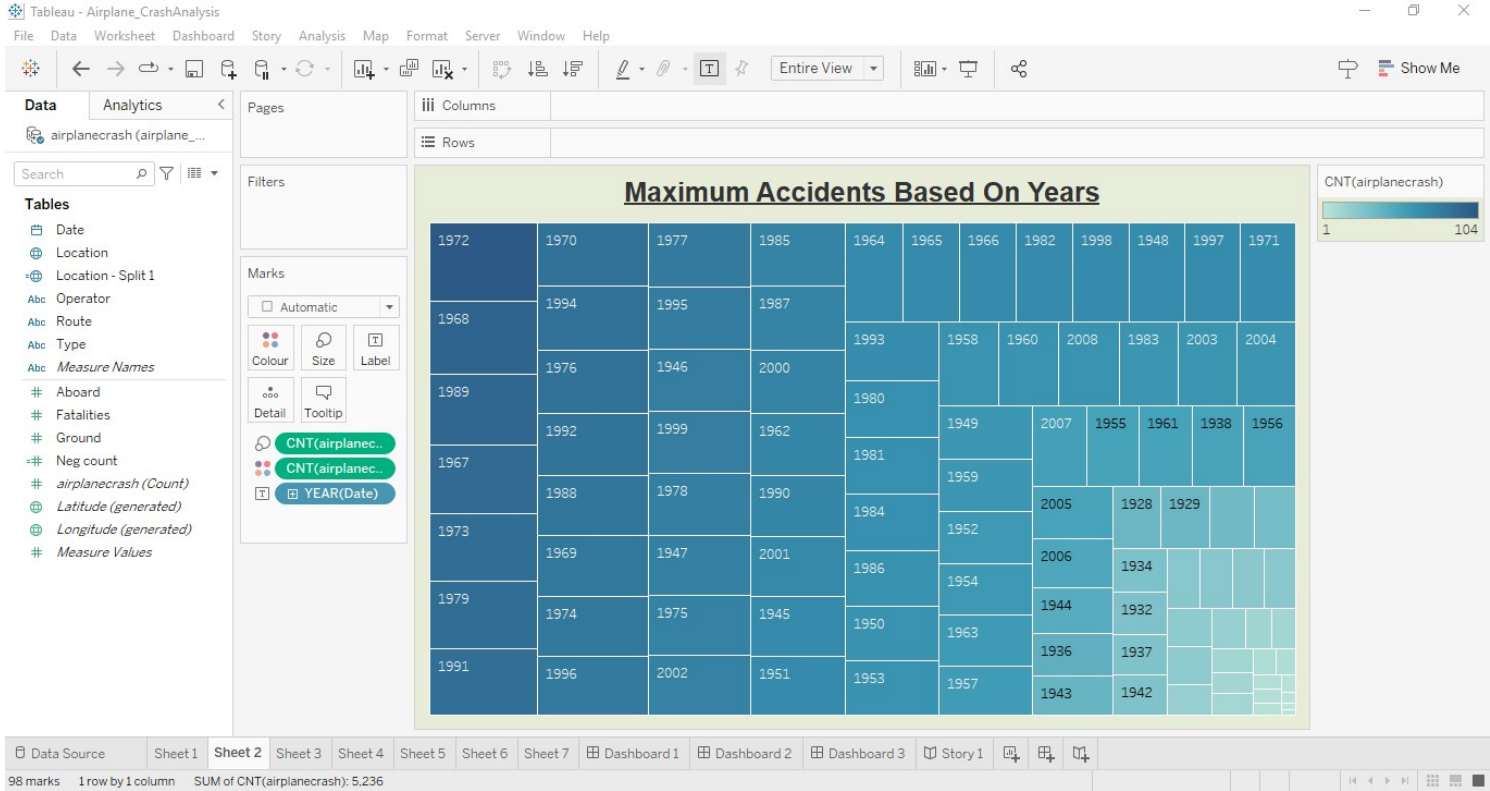


3. RESULT

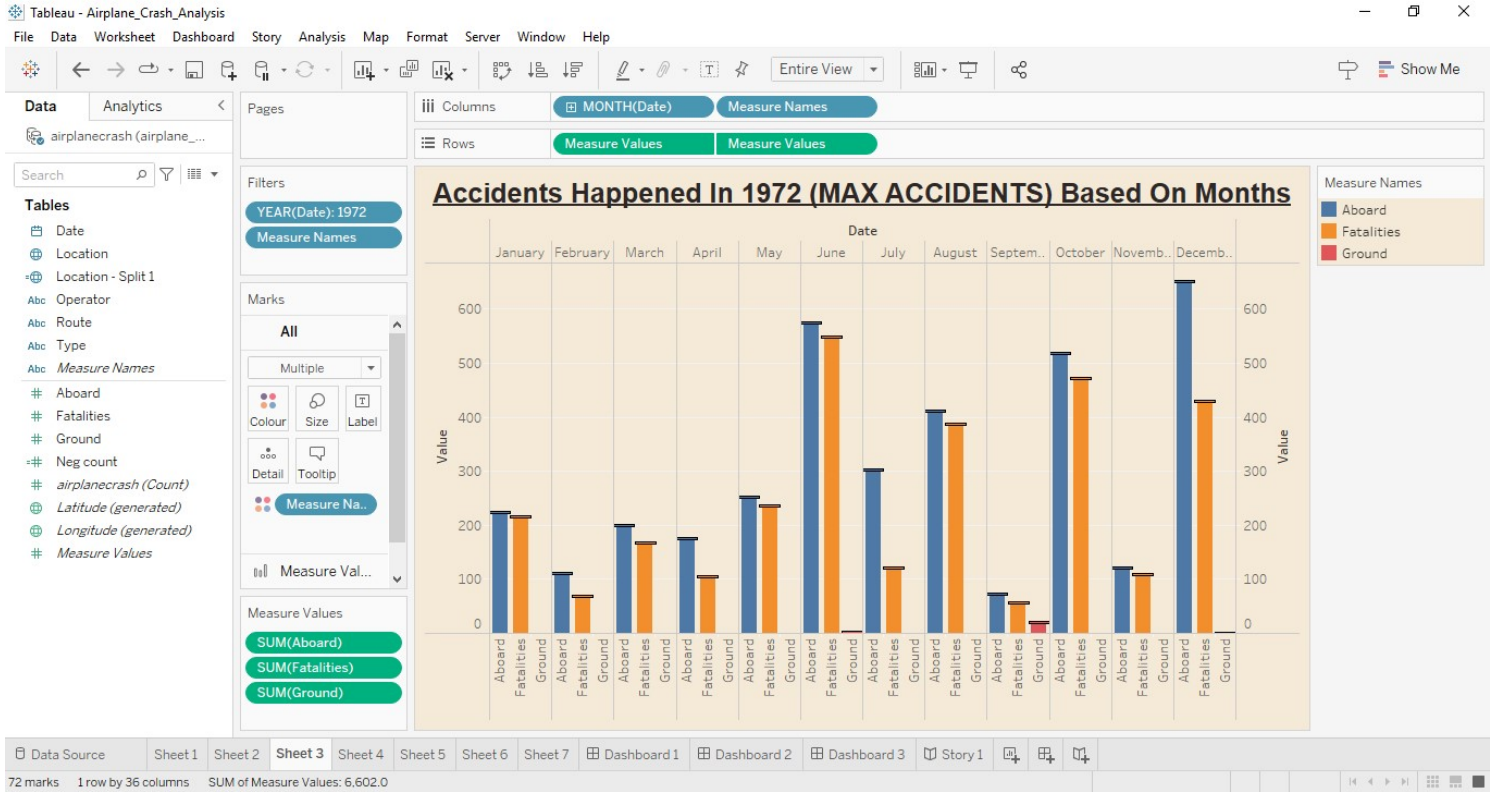
The below sheet represents that in 2001, the number of abroad people, fatalities and people grounded are high when compared to other years.



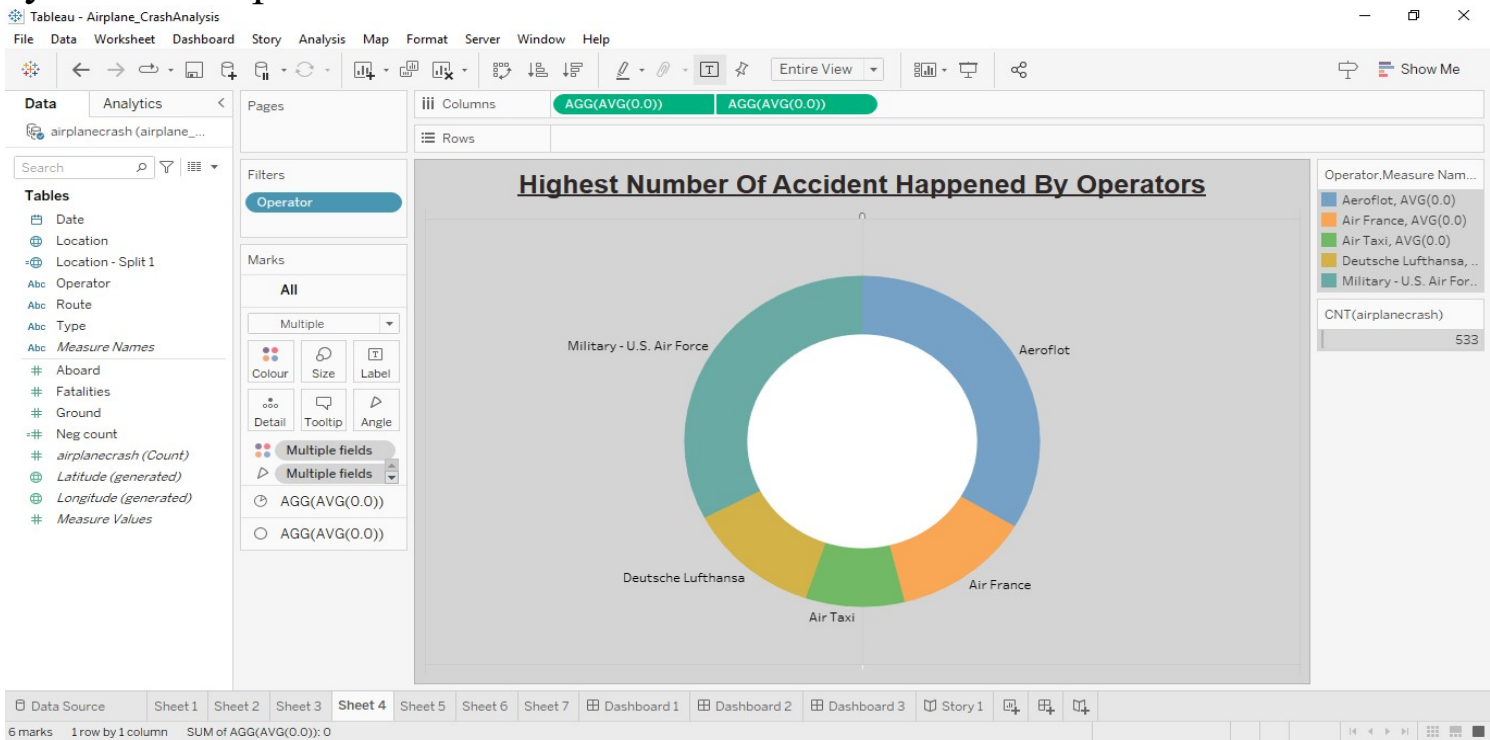
The below sheet represents that in the year of 1972, maximum number of accidents happened.



The below sheet represents that in 1972, the number of abroad people is high in December, the number of Fatalities is high in June and the number of people grounded is high in September.



The below sheet represents that the highest number of accidents happened by Aeroflot operator.



The below sheet represents that among the top 10 locations which had more accidents, Brazil is the number one.

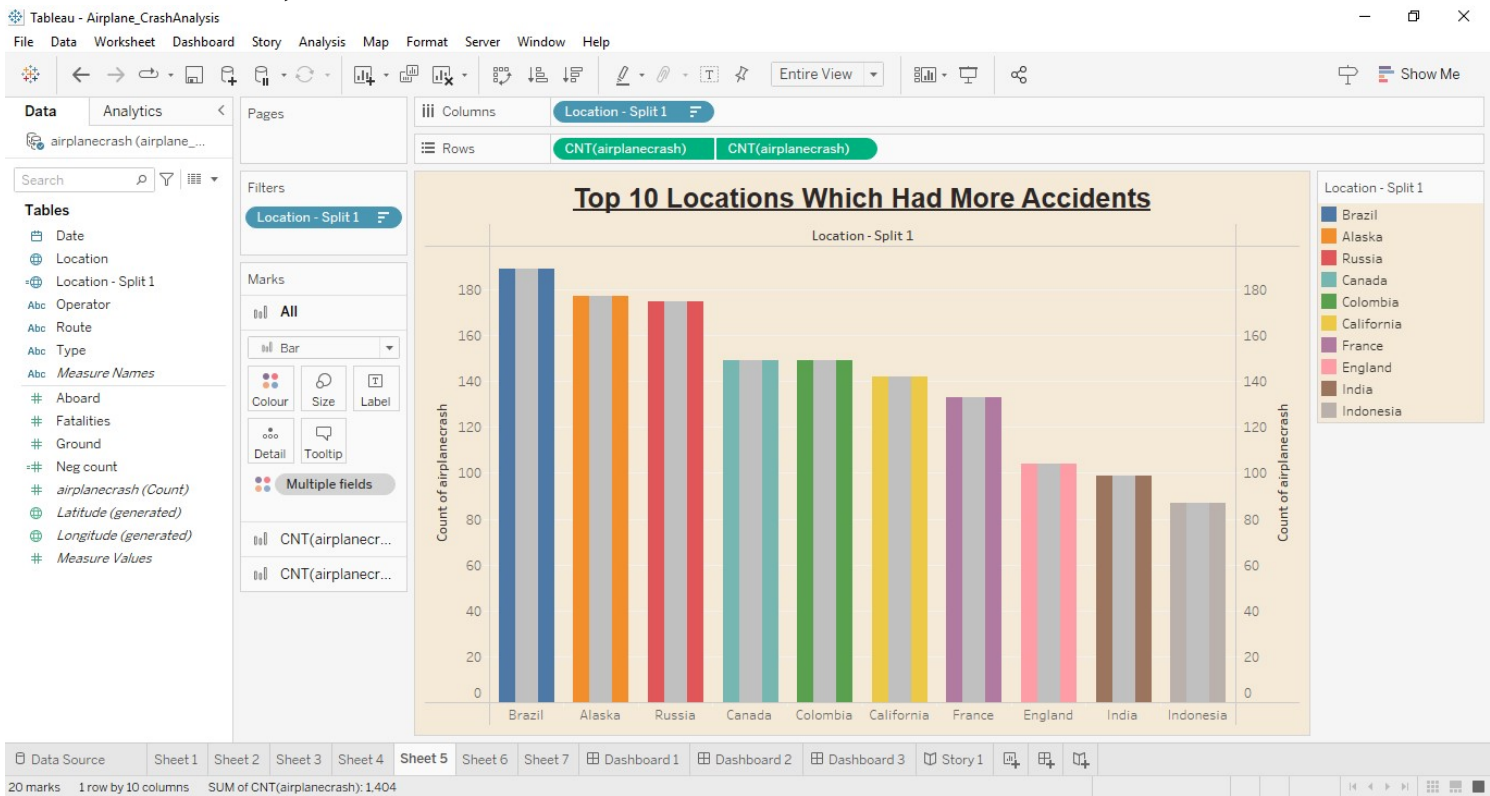


Tableau - Airplane_CrashAnalysis

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

airplanecrash (airplane_...

Search

Tables

- Date
- Location
- Location - Split 1
- Operator
- Route
- Type
- Measure Names
- Aboard
- Fatalities
- Ground
- Neg count
- airplanecrash (Count)
- Latitude (generated)
- Longitude (generated)
- Measure Values

Filters

Type

Marks

All

Area

Colour Size Label

Detail Tooltip

Multiple fields

Multiple fields

CNT(airplanecr...

AGG(Neg count)

Columns

Type

Rows

CNT(airplanecrash)

AGG(Neg count)

Top 3 Flights Which Have Max Accident History

Count of airplanecrash

Type

Douglas DC-4

Douglas C-47

Douglas C-47A

de Havilland Canada DHC-6 Twin Otter 300

Douglas DC-3

40

61

74

81

332

Douglas DC-4

Douglas C-47

Douglas C-47A

de Havilland Canada DHC-6 Twin Otter 300

Douglas DC-3

Type

- Douglas DC-4
- Douglas C-47
- Douglas C-47A
- de Havilland Canada...
- Douglas DC-3

Data Source Sheet 1 Sheet 2 Sheet 3 Sheet 4 Sheet 5 Sheet 6 Sheet 7 Dashboard 1 Dashboard 2 Dashboard 3 Story 1

10 marks 2 rows by 5 columns SUM of CNT(airplanecrash): 588

Tableau - Airplane_CrashAnalysis

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

airplanecrash (airplane_...

Search

Tables

- Date
- Location
- Location - Split 1
- Operator
- Route
- Type
- Measure Names
- Aboard
- Fatalities
- Ground
- Neg count
- airplane crash (Count)
- Latitude (generated)
- Longitude (generated)
- Measure Values

Marks

Automatic

Colour Size Label

Detail Tooltip

CNT(airplane...) Location - Spli... CNT(airplane...) Location - Spli...

Pages

Columns Longitude (generated)

Rows Latitude (generated)

Filters

Accidents Based On Regions

CNT(airplanecrash)

1 189

© 2023 Mapbox © OpenStreetMap

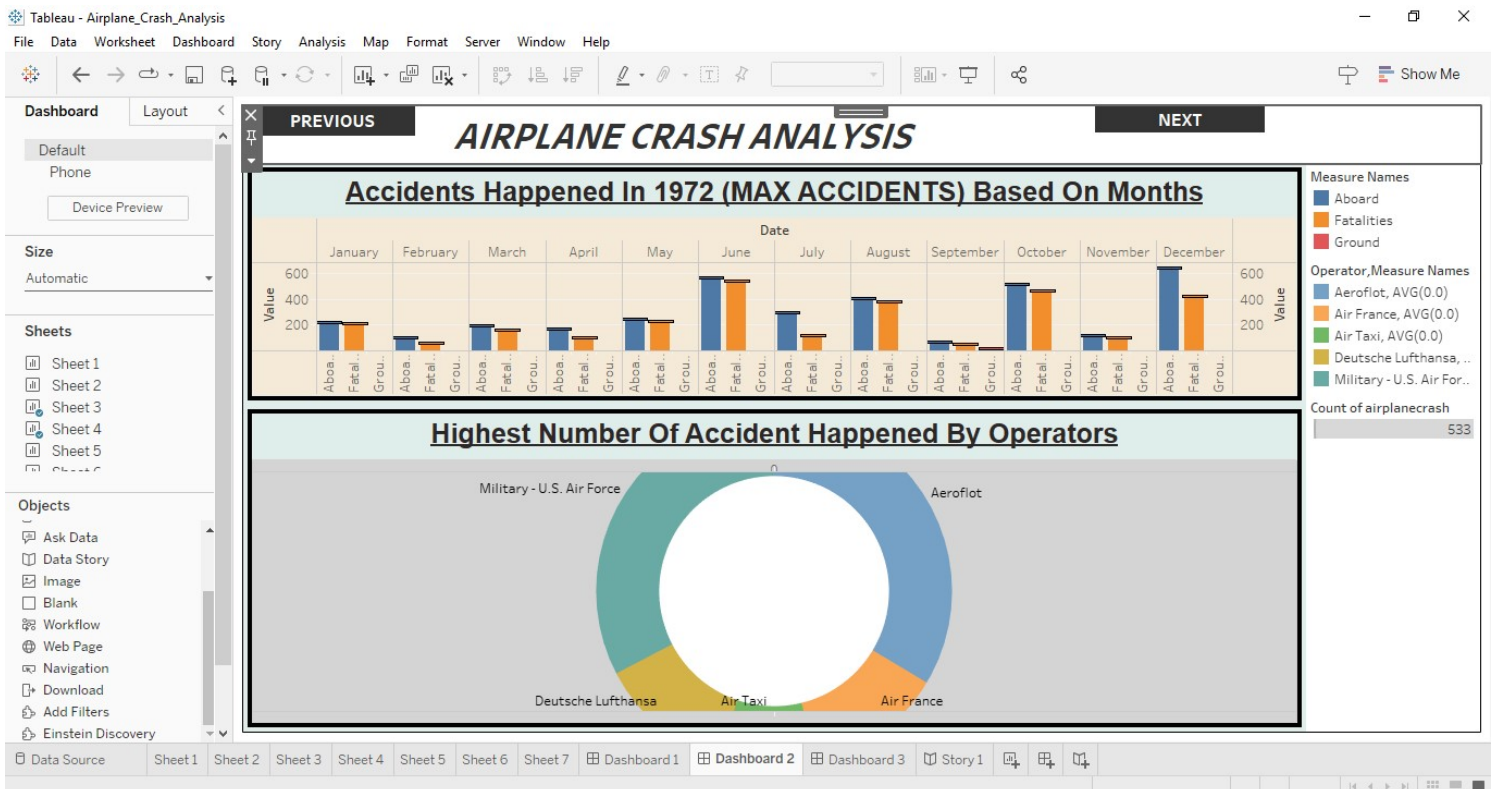
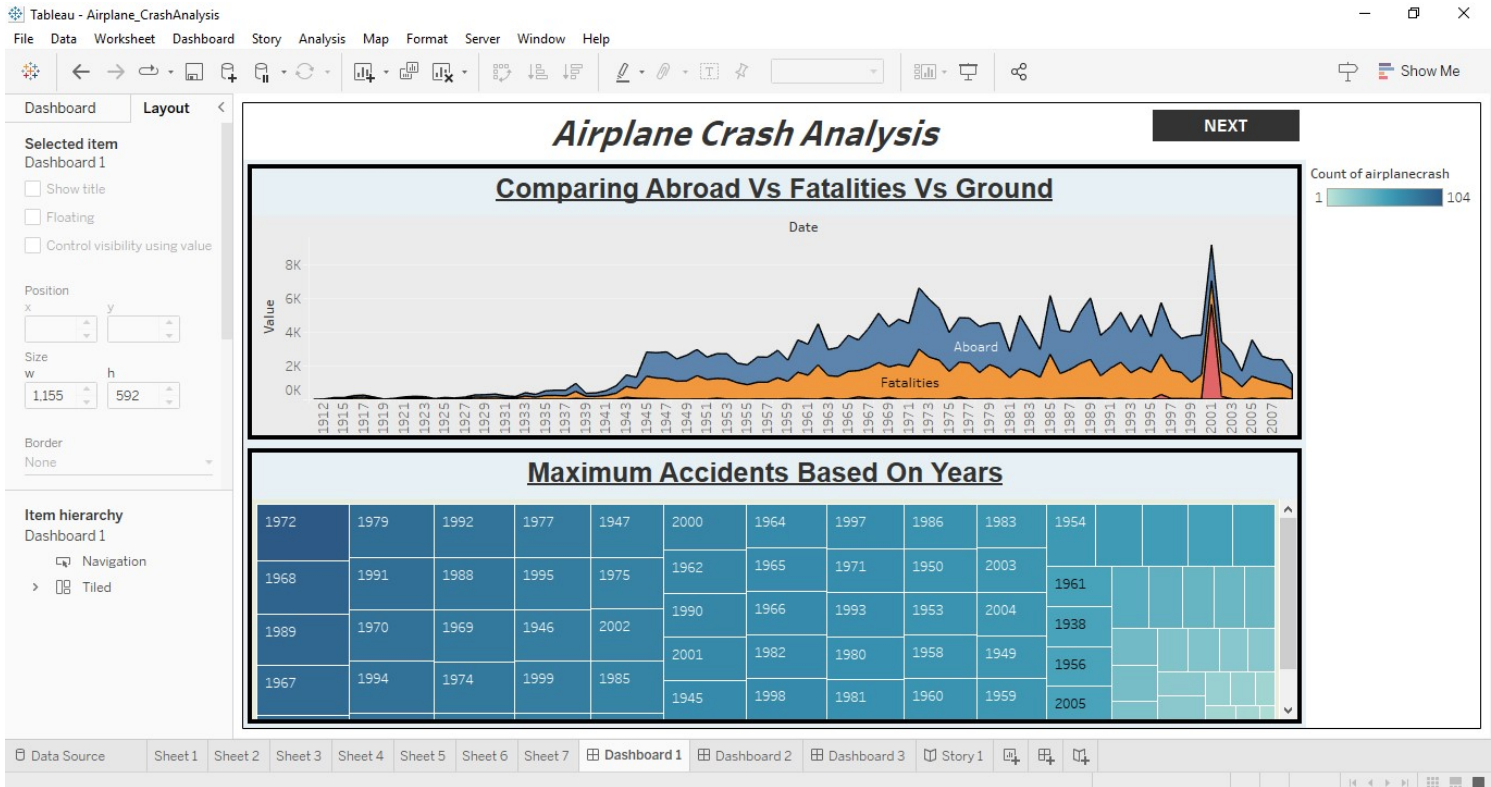
290 unknown

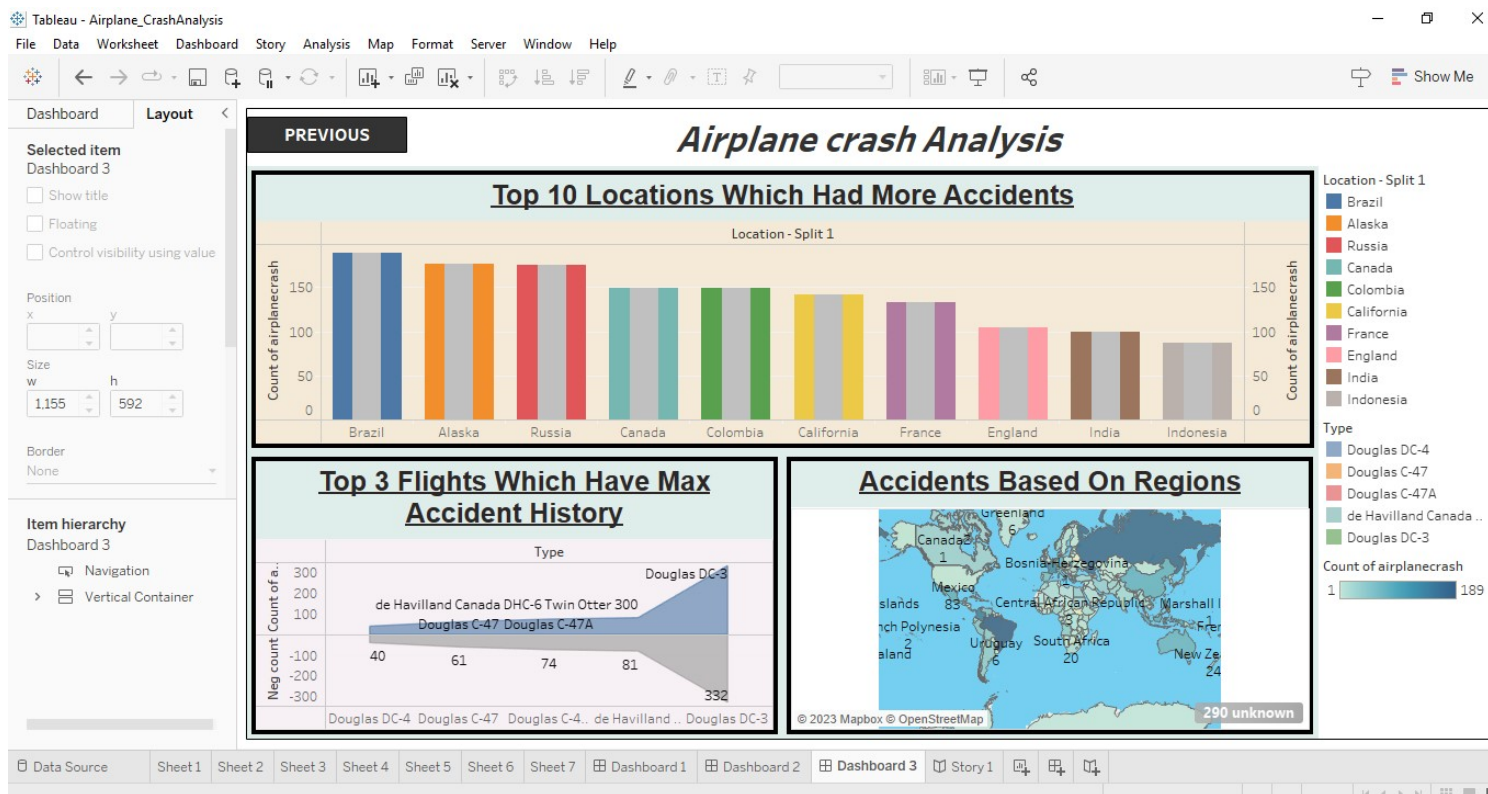
Data Source Sheet 1 Sheet 2 Sheet 3 Sheet 4 Sheet 5 Sheet 6 Sheet 7 Dashboard 1 Dashboard 2 Dashboard 3 Story 1

204 marks 1 row by 1 column SUM of CNT(airplane crash): 5,236

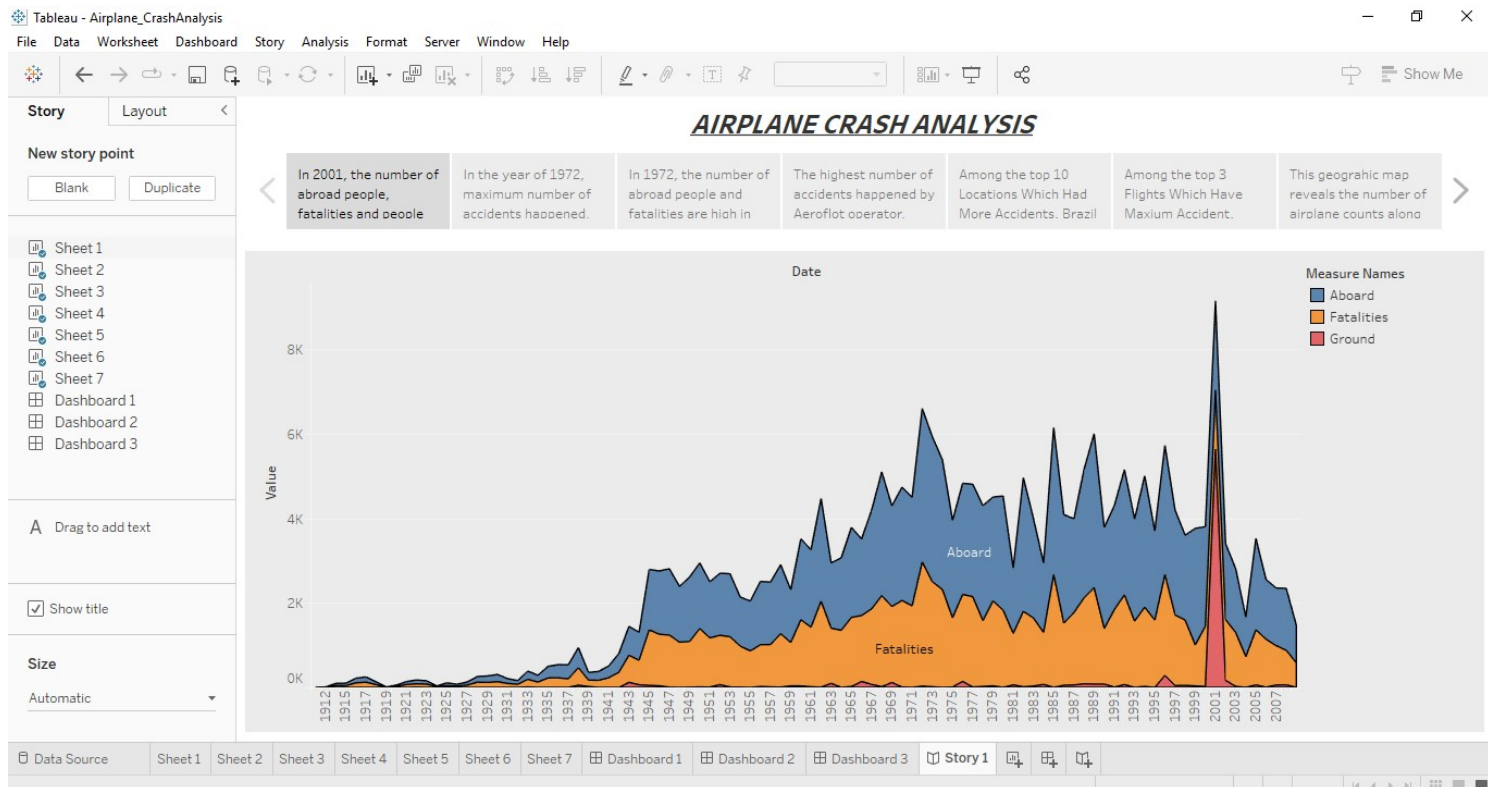
Region	Crash Count
Greenland	6
Sweden	11
Russia	175
Canada	2
United States	1
United Kingdom	1
China	80
South Korea	17
Philippines	98
Papua New Guinea	20
Australia	78
New Zealand	24
French Polynesia	2
Fiji	4
South Africa	20
Mozambique	5
Central African Republic	3
Morocco	24
United Arab Emirates	8
Sri Lanka	13
Kazakhstan	3
Ukraine	1
Bosnia and Herzegovina	1
British Virgin Islands	1
Ecuador	34
Brazil	189
Argentina	44

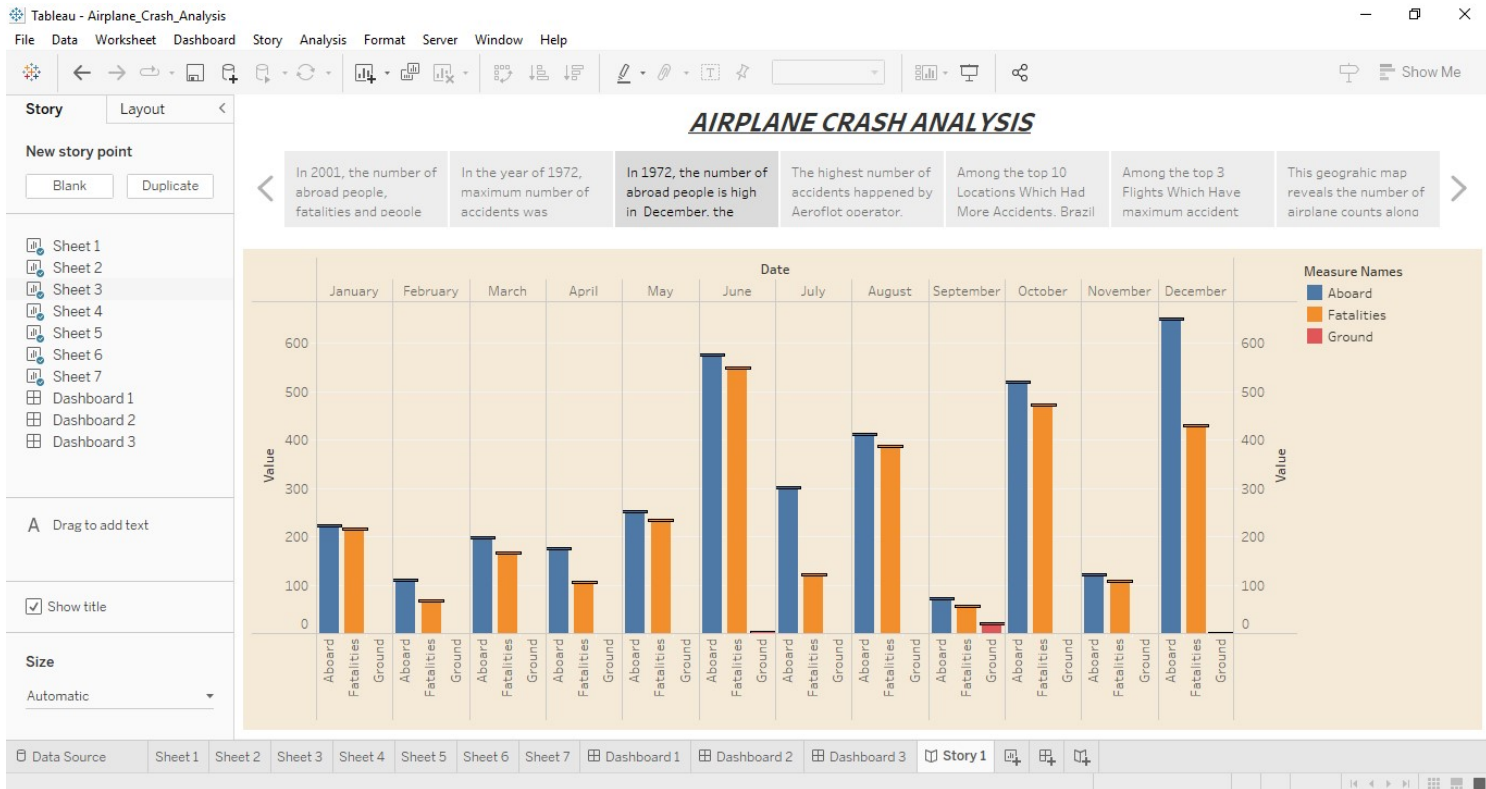
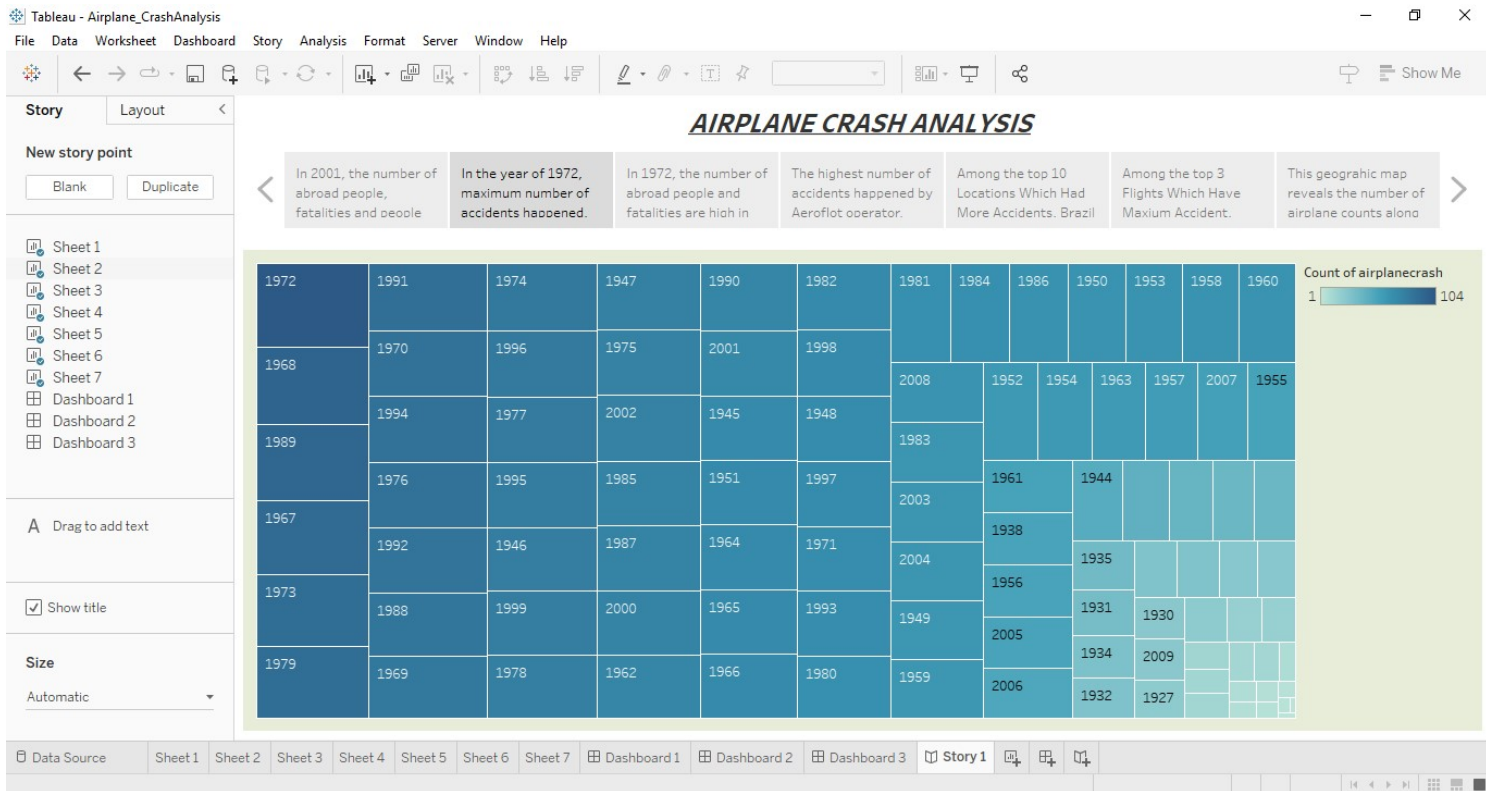
DASHBOARD

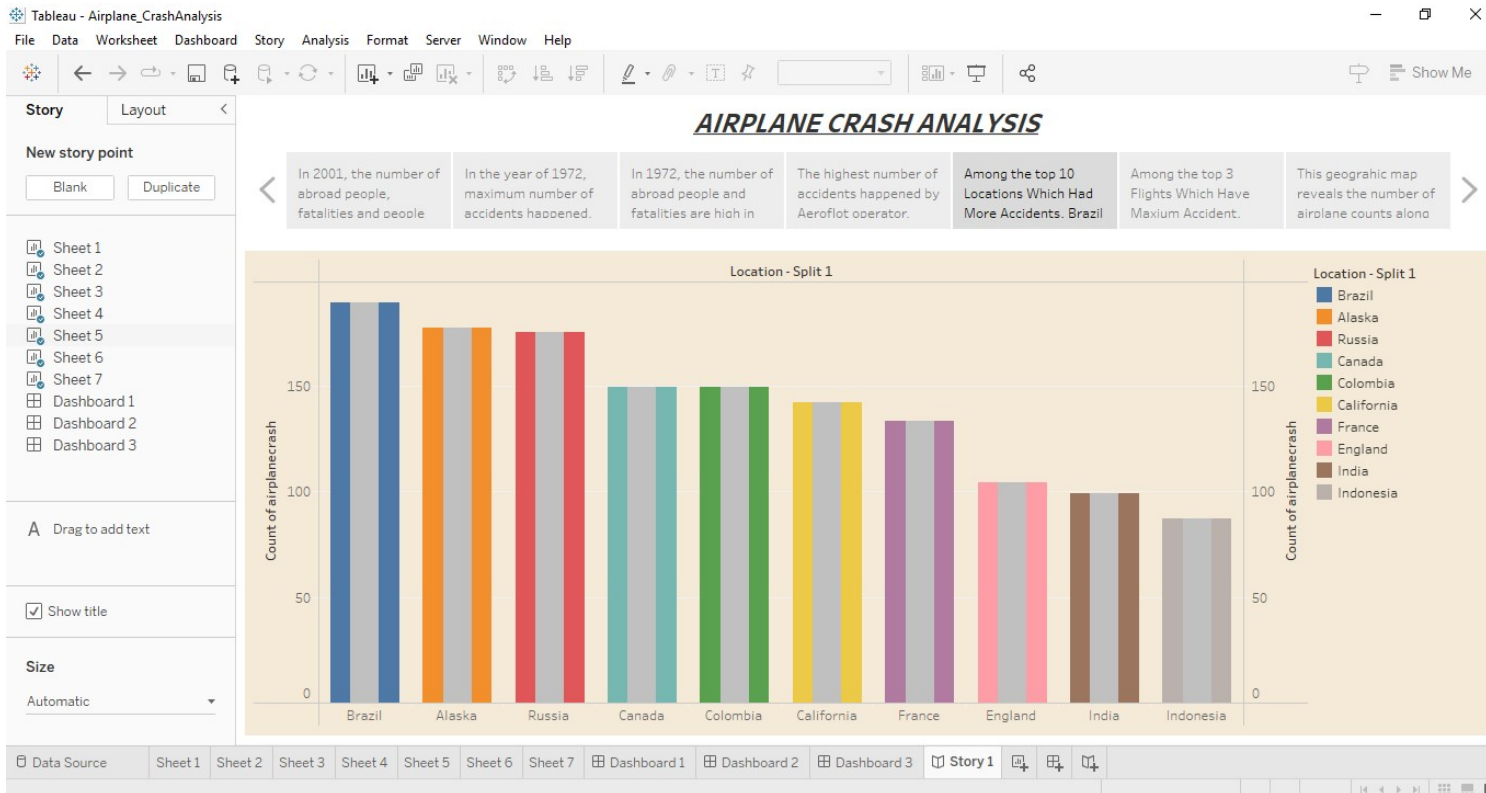
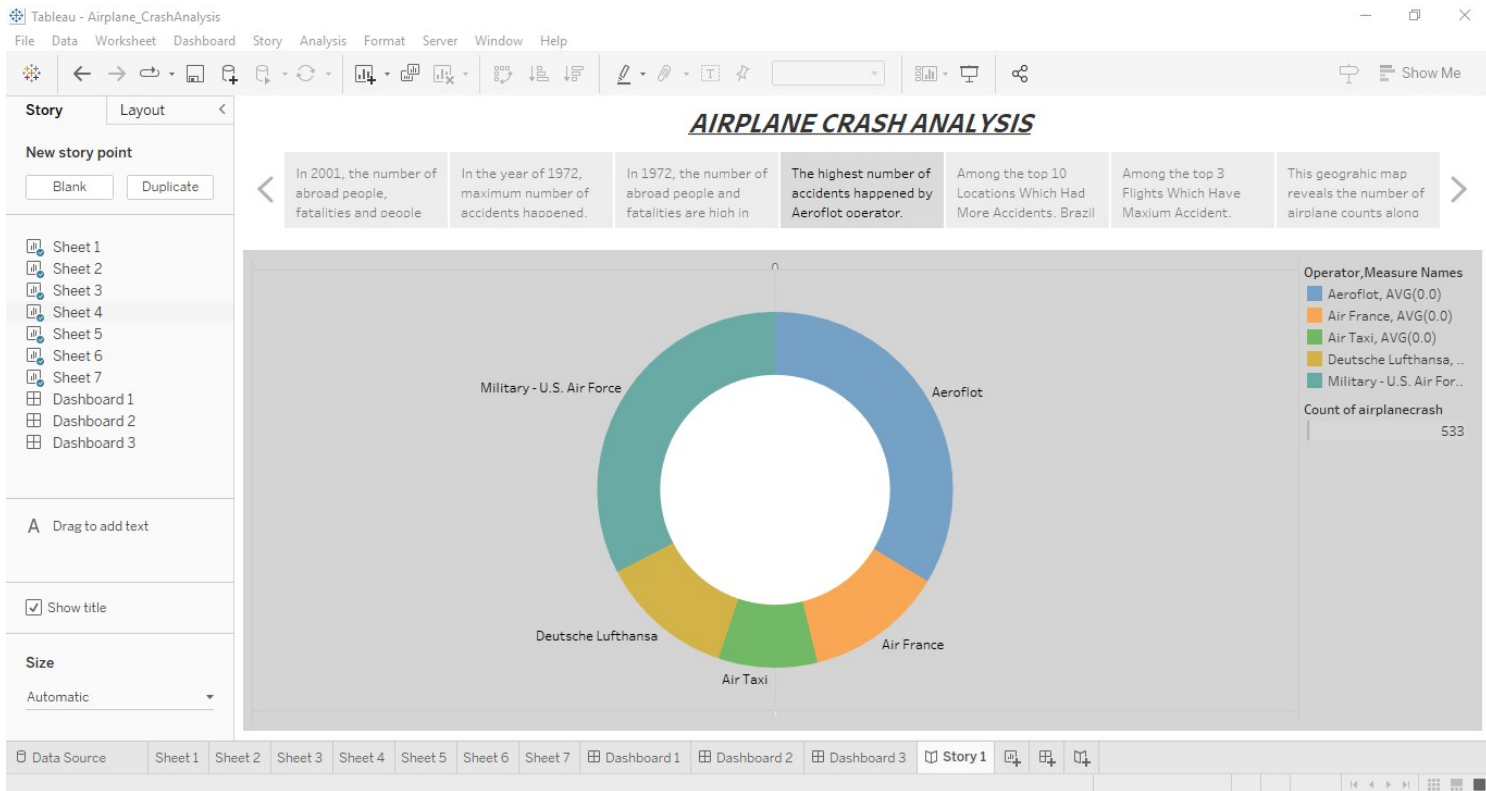


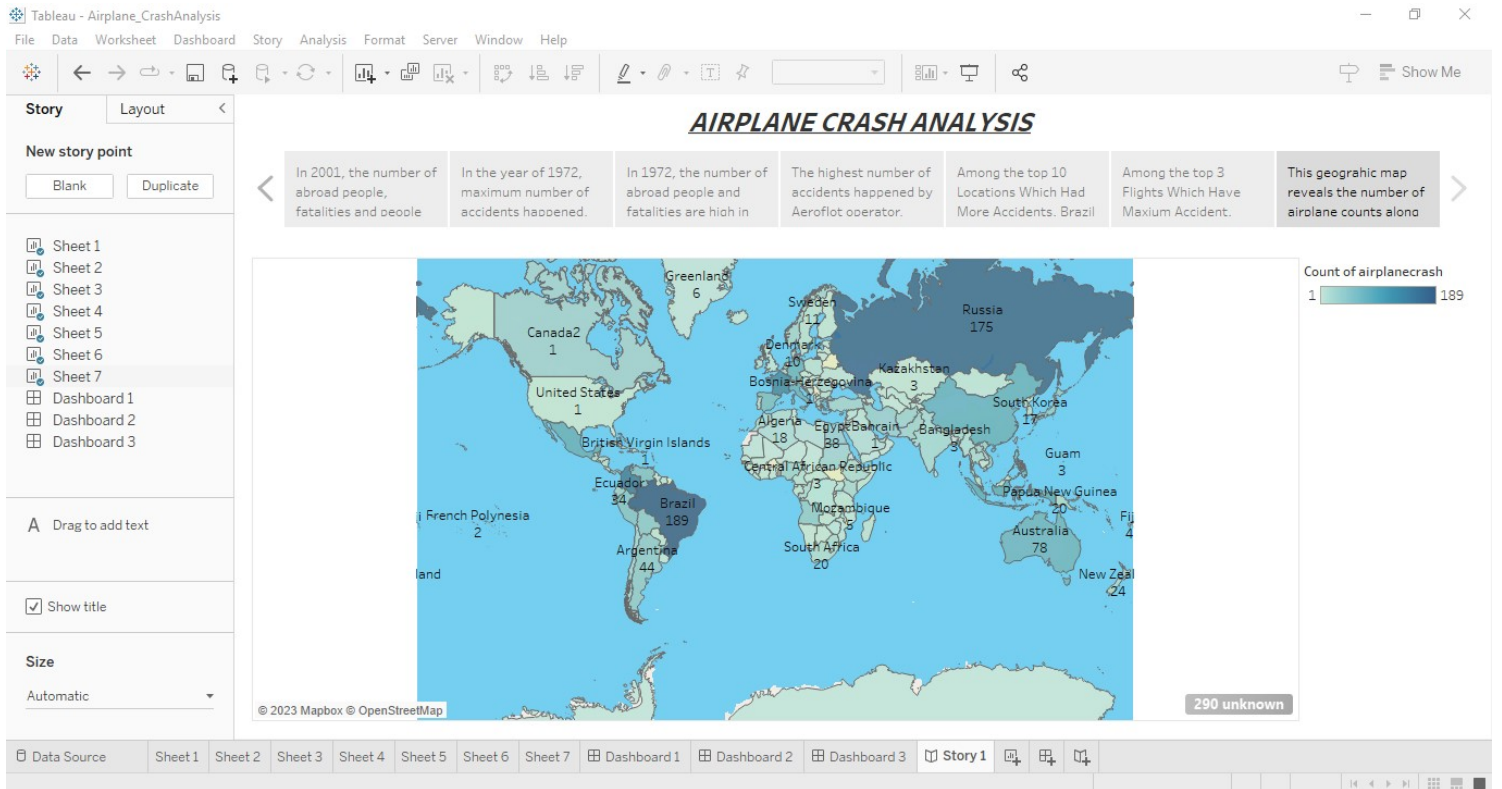
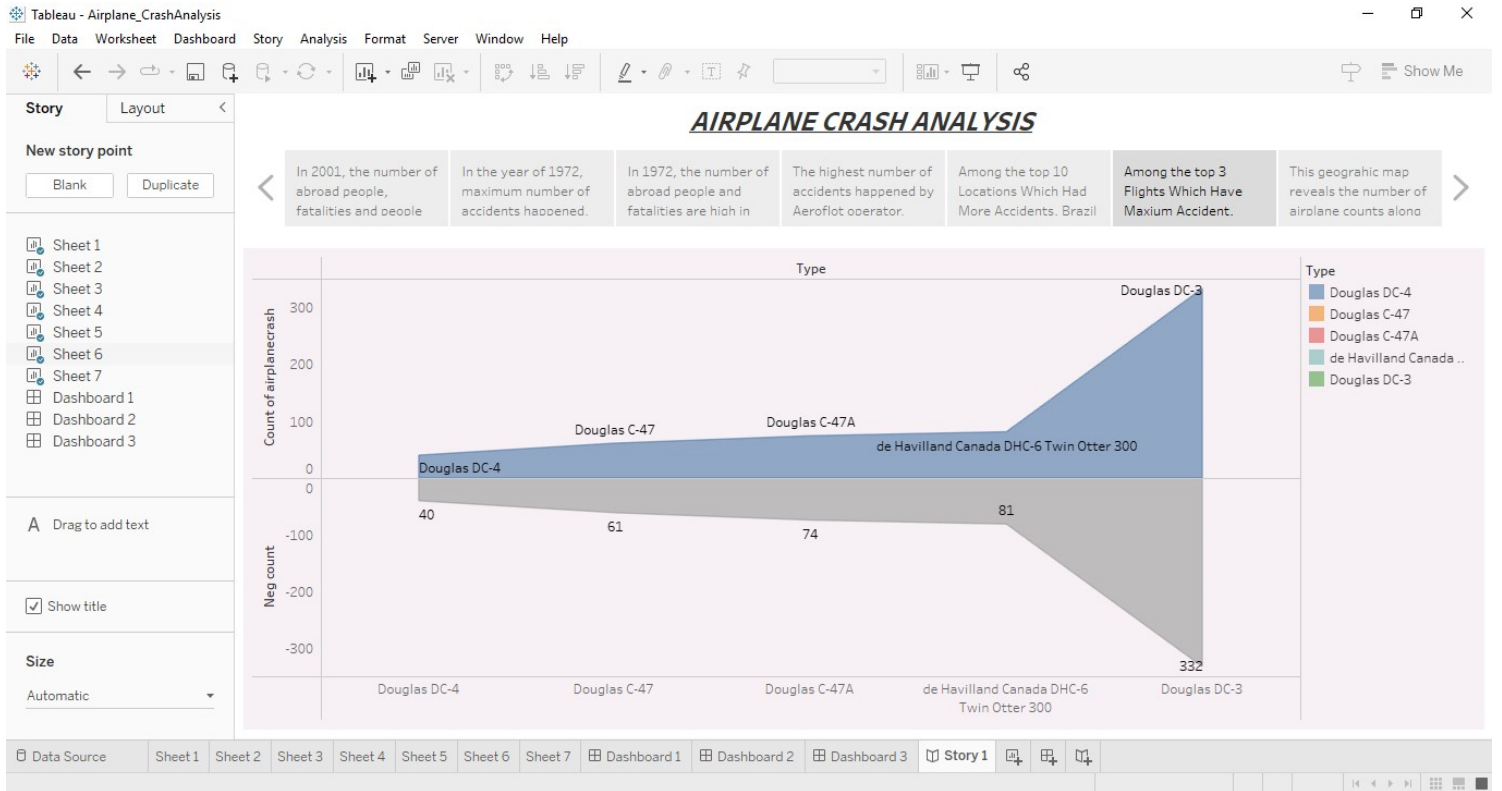


STORY









4. ADVANTAGES & DISADVANTAGES

Advantage:-

- It's the fastest way to travel long distances.
- It's the most efficient way to travel long distances.
- Planes can carry a lot of weight.
- You can fly everywhere.
- It's safe.

Disadvantage:-

- It can be expensive depending on the route and season.
- You might have to fly early or late.
- You might have to fly in a middle seat.
- Security measures can be inconvenient and time-consuming.
- It can be uncomfortable for long journeys.

6. APPLICATIONS

There are many solutions in this project. Some of them are,

- Pilot should be alert.
- Proper fuel maintenance.
- Proper landing.
- Don't bring any hazardous material.
- Keep your seat belt fastened while you are seated.

It can be applied to pilot, manufacturers, airplane infrastructure, passengers, air traffic controller etc.

6. CONCLUSION

Problem definition and design thinking is made through the Empathy map and Ideation & Brainstorming map. Data is analysed through data visualization by Tableau desktop. 7 visualizations, dashboard, and story are made in Tableau desktop.

This dashboard and story is published to tableau public.

And also, website about airplane crash analysis is created through PyCharm app. This website contains About the project, dashboard and story.

7. FUTURE SCOPE

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

8. APPENDIX

A. Source Code:-

```
<!DOCTYPE html>
<html lang="en">

<head>

  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
  <meta name="description" content="">
  <meta name="author" content="TemplateMo">
  <link
href="https://fonts.googleapis.com/css?family=Poppins:100,200,300,400,500,600,700,800,900&displ
ay=swap" rel="stylesheet">
  <link href="assets/images/favicon.jpg" rel="icon">
```

```
<title>Airplane Crash Analysis</title>

<!-- Bootstrap core CSS -->
<link href="assets/vendor/bootstrap/css/bootstrap.min.css" rel="stylesheet">

<!-- Additional CSS Files -->
<link rel="stylesheet" href="assets/css/fontawesome.css">
<link rel="stylesheet" href="assets/css/templatemo-finance-business.css">
<link rel="stylesheet" href="assets/css/owl.css">
<!--

Finance Business TemplateMo

https://templatemo.com/tm-545-finance-business

-->
</head>

<body>

<!-- ***** Preloader Start ***** -->
<div id="preloader">
  <div class="jumper">
    <div></div>
    <div></div>
    <div></div>
  </div>
</div>
<!-- ***** Preloader End ***** -->

<header class="">
  <nav class="navbar navbar-expand-lg">
    <div class="container">
      <a class="navbar-brand" href="index.html"><h2>AIRPLANE CRASH ANALYSIS</h2></a>
      <button class="navbar-toggler" type="button" data-toggle="collapse" data-
target="#navbarResponsive" aria-controls="navbarResponsive" aria-expanded="false" aria-
label="Toggle navigation">
        <span class="navbar-toggler-icon"></span>
      </button>
      <div class="collapse navbar-collapse" id="navbarResponsive">
        <ul class="navbar-nav ml-auto">
          <li class="nav-item">
            <a class="nav-link" href="#top">HOME
              <span class="sr-only">(current)</span>
            </a>
          </li>
          <li class="nav-item">
            <a class="nav-link" href="#about">ABOUT</a>
          </li>
          <li class="nav-item">
            <a class="nav-link" href="#dashboard">DASHBOARD</a>
          </li>
          <li class="nav-item">
            <a class="nav-link" href="#story">STORY</a>
          </li>
        </ul>
      </div>
    </div>
  </nav>
</header>
```

```

        </li>

    </ul>
</div>
</div>
</nav>
</header>

<!-- Page Content -->
<!-- Banner Starts Here -->
<div class="main-banner header-text" id="top">
    <div class="Modern-Slider">
        <!-- Item -->
        <div class="item item-1">
            <div class="img-fill">
                <div class="text-content">

                    <center> <h4>AIRPLANE CRASHES AND FATALITIES SINCE 1908</h4>
                    <p>
                        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.
                    </p>
                    <a href="#about" class="filled-button">Get Started</a>
                    <a href="https://www.youtube.com/@thesmartbridge/videos" class="filled-
button">Watch Video</a>
                    </center>
                </div>
            </div>
        </div>
        <!-- // Item -->
        <!-- Item -->
        <div class="item item-2">
            <div class="img-fill">
                <div class="text-content">
                    <center><h4>DASHBOARD</h4>
                    <p>A dashboard is a collection of several views, letting you compare a
                    variety of data simultaneously. For example, if you have a set of views that you review every
                    day, you can create a dashboard that displays all the views at once, rather than navigate to
                    separate worksheets.</p>
                    <a href="#dashboard" class="filled-button">Dashbard</a></center>
                </div>
            </div>
        </div>
        <!-- // Item -->
        <!-- Item -->
        <div class="item item-3">
            <div class="img-fill">
                <div class="text-content">
                    <center><h4>STORY</h4>
                    <p>In Tableau, a story is a sequence of visualizations that work together to
                    convey information. You can create stories to tell a data narrative, provide context,
                    demonstrate how decisions relate to outcomes, or to simply make a compelling case.</p>
                    <a href="#story" class="filled-button">Story</a></center>
                </div>
            </div>
        </div>
    </div>

```

```
</div>
<!-- // Item -->
</div>
</div>
<!-- Banner Ends Here -->
```

```
<section id="about" class="about">
  <div class="container" data-aos="fade-up">

    <div class="section-title">
      <section id="about" class="about">
    <div class="container" data-aos="fade-up">
```

```

    <div class="section-title"><br><br>
      <br><br><center><h2>About Project</h2></center><br>
    </div>
    <div style="display: flex; justify-content: center; align-items: center;">
      
    </div>
  </div>
```

```
  <div class="row content">
    <div class="col-lg-6">
      <br><br><p>
```

An aviation accident is defined by the Convention on International Civil Aviation Annex 13 as an occurrence associated with the operation of an aircraft, which takes place from the time any person boards the aircraft with the intention of flight until all such persons have disembarked, and in which

-
 a person is fatally or seriously injured,
- the aircraft sustains significant damage or structural failure,
- the aircraft goes missing or becomes completely inaccessible.

```

  </p>
</div>
<div class="col-lg-6 pt-4 pt-lg-0"><br><br>
  <p>
```

This dataset includes:

 All civil and commercial aviation accidents of scheduled and non-scheduled passenger airliners worldwide, which resulted in a fatality (including all U.S. Part 121 and Part 135 fatal accidents)

All cargo, positioning, ferry and test flight fatal accidents.

All military transport accidents with 10 or more fatalities.

All commercial and military helicopter accidents with greater than 10 fatalities.

All civil and military airship accidents involving fatalities.

Aviation accidents involving the death of famous people.

</p>

```

  </div>
</div>
```

```
</div>
```



```

</section>
  <div class="services" id="dashboard">
    <div class="container">
      <div class="row">
        <div class="col-md-12">
          <div class="section-heading">
            <br><br><br><br> <h2>DASHBOARD</h2>

            <div class='tableauPlaceholder' id='viz1681055522310' style='position:
relative'><noscript><a href='#'><img alt='
Airplane Crash Analysis '
src='https://public.tableau.com/static/images/Ai/Airplane_CrashAnalysis
Dashboard1/1_rss.png' style='border: none' /></a></noscript><object class='tableauViz'
style='display:none;'><param name='host_url' value='https%3A%2F%2Fpublic.tableau.com%2F' />
<param name='embed_code_version' value='3' /> <param name='site_root' value='' /><param
name='name' value='Airplane_CrashAnalysisDashboard1' /><param name='tabs' value='no'
/><param name='toolbar' value='yes' /><param name='static_image'
value='https://public.tableau.com/static/images/Ai/Airplane_CrashAnalys
isDashboard1/1.png' /> <param name='animate_transition' value='yes' /><param
name='display_static_image' value='yes' /><param name='display_spinner' value='yes' /><param
name='display_overlay' value='yes' /><param name='display_count' value='yes' /><param
name='language' value='en-US' /></object></div> <script type='text/javascript'>
var divElement = document.getElementById('viz1681055522310'); var vizElement
= divElement.getElementsByTagName('object')[0]; if ( divElement.offsetWidth
> 800 ) {
vizElement.style.width='100%';vizElement.style.height=(divElement.offsetWidth*0.75)+'px';} else
if ( divElement.offsetWidth > 500 ) {
vizElement.style.width='100%';vizElement.style.height=(divElement.offsetWidth*0.75)+'px';} else
{ vizElement.style.width='100%';vizElement.style.height='827px';} var
scriptElement = document.createElement('script'); scriptElement.src =
'https://public.tableau.com/javascripts/api/viz_v1.js';
vizElement.parentNode.insertBefore(scriptElement, vizElement); </script>
      </div>
    </div>>
  </div>
</div>
<section id="story" class="pricing">
<div class="container" data-aos="fade-up">

  <div class="section-title">
    <br><br><br><br><center><h2><b>STORY<b></b></h2></center>
  </div>

  <div class='tableauPlaceholder' id='viz1681618693648' style='position:
relative'><noscript><a href='#'><img alt='AIRPLANE CRASH ANALYSIS '
src='https://public.tableau.com/static/images/Ai/Airplane_Crash_Analysi
sStory1/1_rss.png' style='border: none' /></a></noscript><object class='tableauViz'
style='display:none;'><param name='host_url' value='https%3A%2F%2Fpublic.tableau.com%2F' />
<param name='embed_code_version' value='3' /> <param name='site_root' value='' /><param
name='name' value='Airplane_Crash_AnalysisStory1' /><param name='tabs' value='no' /><param
name='toolbar' value='yes' /><param name='static_image'
value='https://public.tableau.com/static/images/Ai/Airplane_Crash_Analy
sisStory1/1.png' /> <param name='animate_transition' value='yes' /><param
name='display_static_image' value='yes' /><param name='display_spinner' value='yes' /><param
name='display_overlay' value='yes' /><param name='display_count' value='yes' /><param
name='language' value='en-US' /></object></div> <script type='text/javascript'>
var divElement = document.getElementById('viz1681618693648'); var vizElement
= divElement.getElementsByTagName('object')[0];

```

```
vizElement.style.width='100%';vizElement.style.height=(divElement.offsetWidth*0.75)+'px';
var scriptElement = document.createElement('script');                                scriptElement.src =
'https://public.tableau.com/javascripts/api/viz_v1.js';
vizElement.parentNode.insertBefore(scriptElement, vizElement);                    </script>

<!-- Bootstrap core JavaScript -->
<script src="assets/vendor/jquery/jquery.min.js"></script>
<script src="assets/vendor/bootstrap/js/bootstrap.bundle.min.js"></script>

<!-- Additional Scripts -->
<script src="assets/js/custom.js"></script>
<script src="assets/js/owl.js"></script>
<script src="assets/js/slick.js"></script>
<script src="assets/js/accordions.js"></script>

<script language = "text/Javascript">
    cleared[0] = cleared[1] = cleared[2] = 0; //set a cleared flag for each field
    function clearField(t){                      //declaring the array outside of the
    if(! cleared[t.id]){                          // function makes it static and global
        cleared[t.id] = 1;  // you could use true and false, but that's more typing
        t.value='';         // with more chance of typos
        t.style.color='#fff';
    }
    }
</script>

</body>
</html>
```