

TEAM MEMBERS:

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TRAGEDY OF FLIGHT: A COMPREHENSIVE CRASH ANALYSIS

1. INTRODUCTION:

1.1 OVERVIEW

The second most cause of weather related aviation accidents is due to fog. Flying in fog is quite challenging even for most experienced pilots. In this analysis the aviation accidents caused due to fog is analyzed and visualized. The major challenges faced by the pilots are the reduction of visibility. The pilots rely only on the controller and navigation system for landing and takeoff. Fog reduces the visibility of the runway lighting which makes landing and takeoff difficult. The analysis mainly focuses on providing the information about major causes of accidents and thereby generating preventive measures for avoiding such accidents future.

1.2 PURPOSE

The purpose is to identify the potential causes of the accident due to fog and to find feasible insights.

Potential causes:

- ✓ *Fog reduces the visibility of the pilot. It is difficult to land or take off an aircraft in poor visibility.*
- ✓ *Fog can cause difficulty in accessing the aircrafts position on the airfield.*
- ✓ *Fog remains notoriously challenging to predict.*
- ✓ *Flight routes are planned in advance; unpredicted weather changes can cause havoc.*
- ✓ *Pilots misjudge weather and not paying attention to the seriousness of the weather.*

- ✓ *Operator and controller not providing proper information while landing and takeoff in fog.*
- ✓ *An island of Newfoundland, Canada is the foggiest place in the world and faced large number of crashes.*
- ✓ *Instrumental error can increase potential risk of accidents.*

Feasible Insights:

- ✓ *Instrument Landing System (ILS) provide accurate azimuth and precession in fog and use localizer while landing.*
- ✓ *CAT IIIC, an advance technique allows us to land in thick fog.*
- ✓ *Pilots must train for Low Visibility Landing Procedure (LVP) and have to undergo longer taxiing time while landing.*
- ✓ *Pilots can use the facility of Auto land facility at a height of 200 feet, if installed.*
- ✓ *Installation of Guide Path Antenna, Infrared lighting arrangement in runway.*
- ✓ *Use of Runway Visual Range (RVR) technique to measure the visibility of pilot.*
- ✓ *Greater distance between planes in the airport should be maintained.*

PROBLEM DEFINITION AND DESIGN THINKING:

2.1 Empathy Map:

The information which is included in the empathy map is:

Hear:

- ✓ Risk increases in winter months (December to March).
- ✓ World's Foggiest airport is Arcata-Eureka airport in California.
- ✓ Flying in Fog deadly hazardous.
- ✓ Many flights delay and cancellation.
- ✓ Each year 440 people killed due to weather problem.

Think and feel:

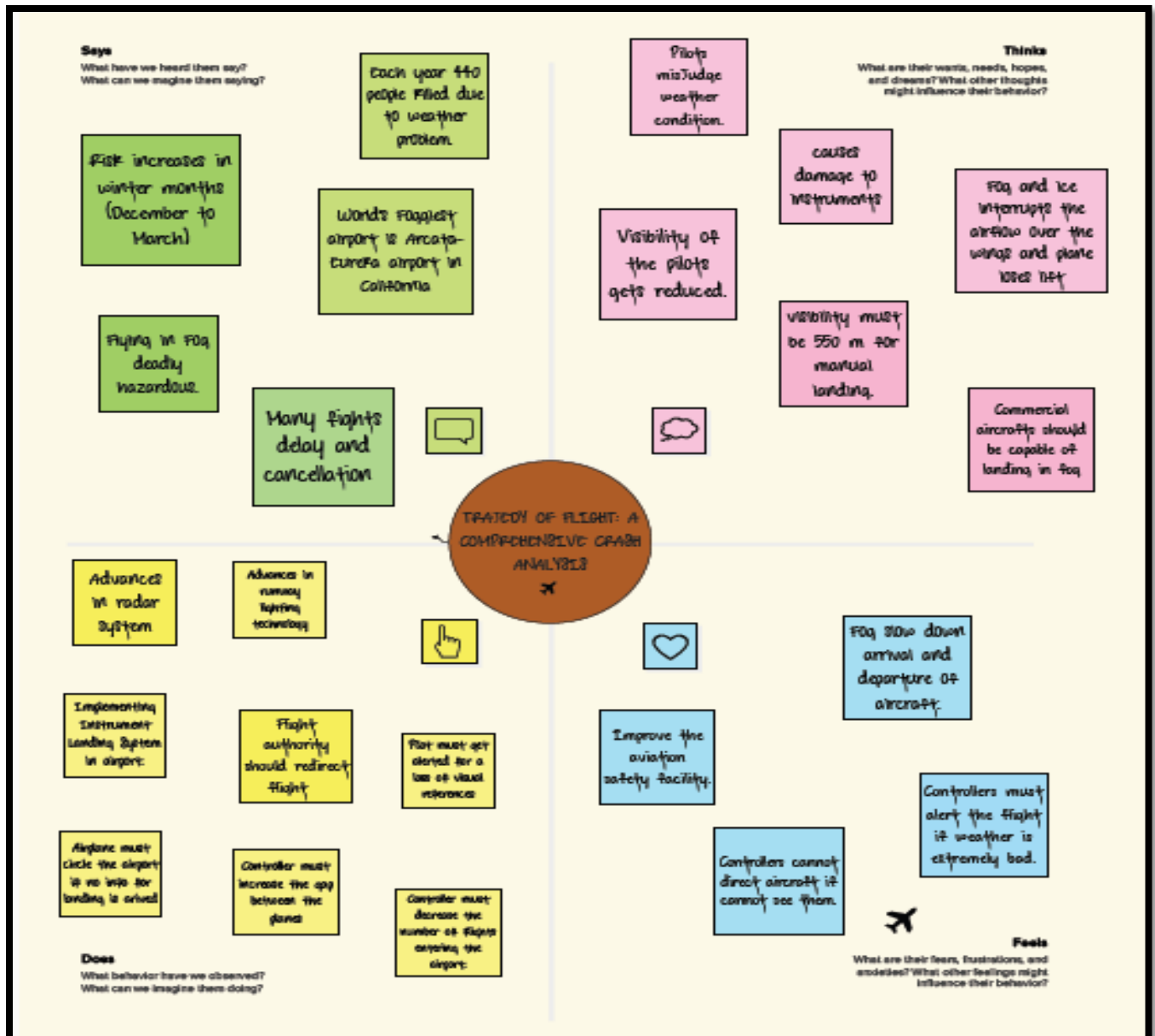
- ✓ Pilots misjudge weather condition.
- ✓ Visibility of the pilots gets reduced.
- ✓ Fog and ice interrupts the airflow over the wings and plane loses lift.
- ✓ Visibility must be 550 m for manual landing.
- ✓ Commercial aircrafts should be capable of landing in fog.
- ✓ Causes damage to instruments.

See:

- ✓ Advances in radar system.
- ✓ Advances in runway lighting technology.
- ✓ Implementing Instrument Landing System in airport.
- ✓ Flight authority should redirect flight.
- ✓ Pilot must get alerted for a loss of visual references.
- ✓ Airplane must circle the airport if no info for landing is arrived.
- ✓ Controller must increase the gap between the planes.
- ✓ Controller must decrease the number of flights entering the airport.

Say and Do:

- ✓ Fog slow down arrival and departure of aircraft.
- ✓ Controllers cannot direct aircraft if cannot see them.
- ✓ Controllers must alert the flight if weather is extremely bad.
- ✓ Improve the aviation safety facility.



2.2 Ideation and Brainstorming map screenshot:

1

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

🕒 5 minutes

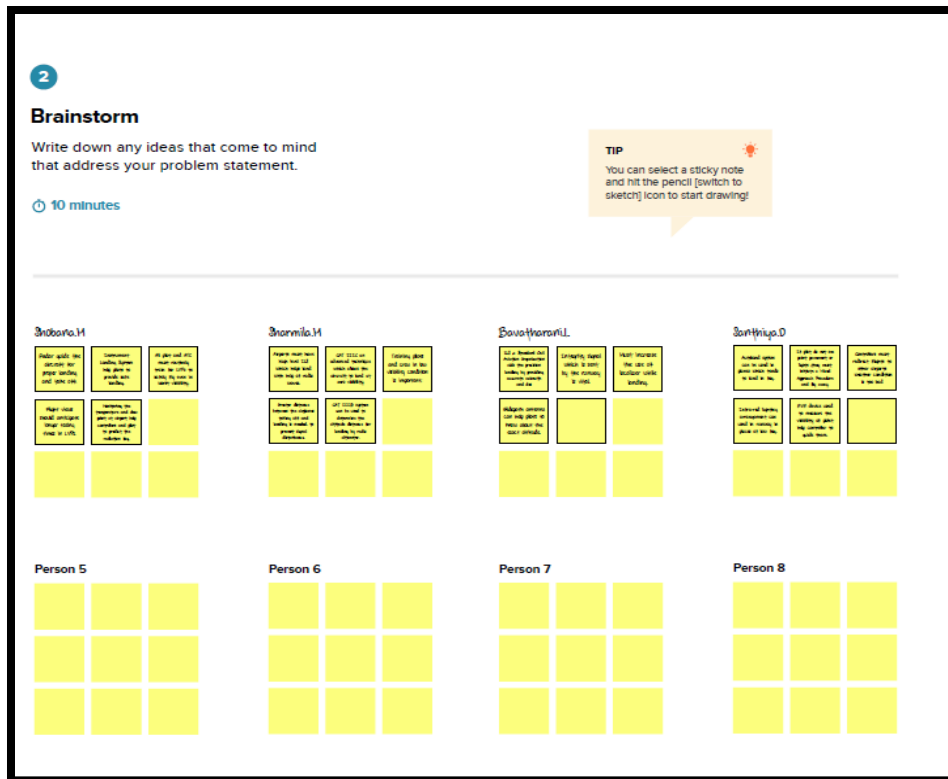
PROBLEM
How might we prevent the
aviation crash which is caused
due to fog?



Key rules of brainstorming

To run a smooth and productive session

- 🗣️ Stay in topic.
- 💡 Encourage wild ideas.
- ⏸️ Defer judgment.
- 👂 Listen to others.
- 🗣️ Go for volume.
- 👁️ If possible, be visual.



The information which is included in the above screenshot is given below:

SHOBANA M

- ✓ Radar guides the aircraft for proper landing and takeoff.
- ✓ Instrument Landing System helps pilots to provide safe landing.
- ✓ All pilot and ATC must routinely train for LVPs to safely fly even in worst visibility.
- ✓ Flight views should anticipate longer taxing times in LVPs.
- ✓ Monitoring the temperature and dew point at airport help controllers and pilot to predict the radiation fog.

SHARMILA M

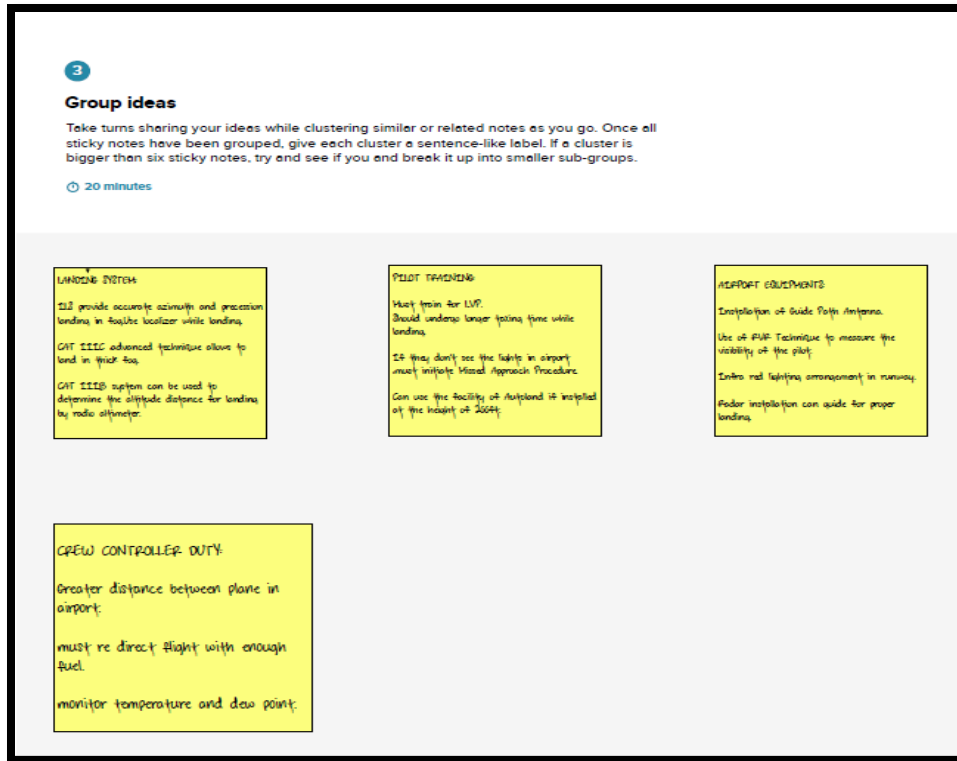
- ✓ *Airports must have high level ILS which helps land with help of radio waves.*
- ✓ *CAT IIIC an advanced technique which allows the aircraft to land at zero visibility.*
- ✓ *Training pilots and crew in low visibility condition is important.*
- ✓ *Greater distance between the airplanes taking off and landing is needed to prevent signal disturbance.*
- ✓ *CAT IIIB system can be used to determine the altitude distance for landing by radio altimeter.*

BAVATHARANI L

- ✓ *ILS, a Standard Civil Aviation Organization aids the precision landing by providing accurate azimuth.*
- ✓ *Integrity signal which is sent by the runway is vital.*
- ✓ *Must increase the use of localizer while landing.*
- ✓ *Glide path antenna can help pilots to know about the exact altitude.*

SANTHIYA D

- ✓ *Auto land option can be used in planes which tends to land in fog.*
- ✓ *If pilot do not see paint pavement or lights ,they must initiate a Mixed Approach Procedure and fly away.*
- ✓ *Controllers must redirect flights to other airports weather condition is too bad*
- ✓ *Infra-red lighting arrangement can used in runway in places of low fog.*
- ✓ *RVR device used to measure the visibility of pilot help controller to guide them.*



The information which is included in the above screenshot is:

LANDING SYSTEM:

- ✓ *ILS provides accurate azimuth and precision landing in fog. Use localizer while landing.*
- ✓ *CAT IIIC, advanced technique allows to land in thick fog.*
- ✓ *CAT IIIB system can be used to determine the altitude distance for landing by radio altimeter.*

PILOT TRAINING:

- ✓ *Must train for LVP.*
- ✓ *Should undergo longer taxiing time while landing.*
- ✓ *If they don't see the lights in airport, must initiate Missed Approach Procedure.*
- ✓ *Can use the facility of Auto land if installed at the height of 200ft.*

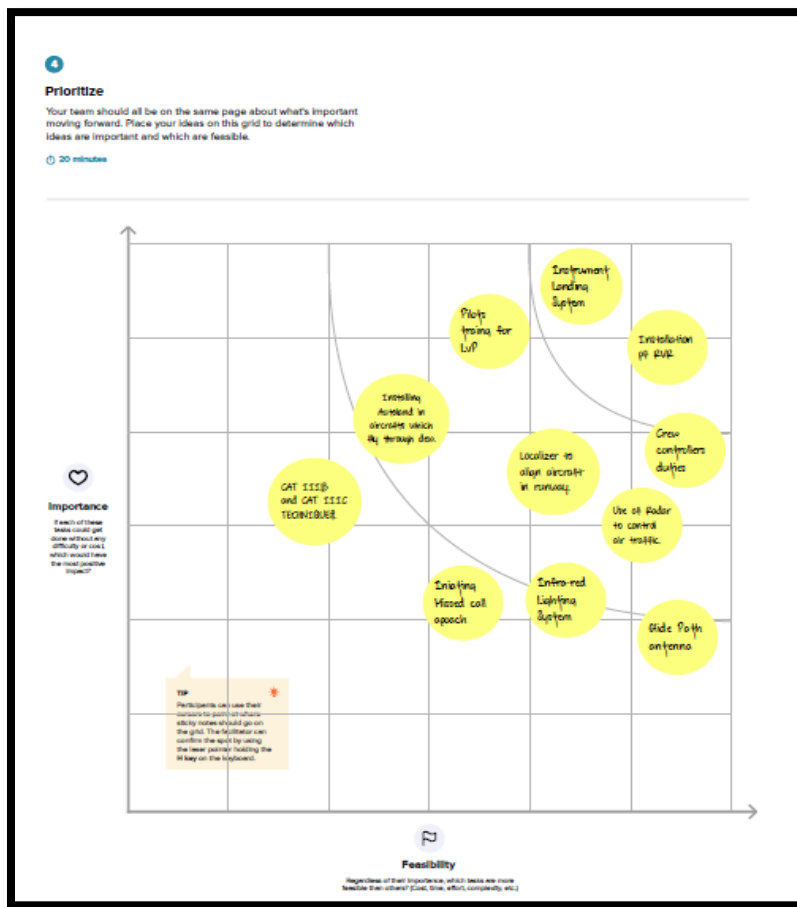
AIRPORT EQUIPMENTS:

- ✓ *Installation of Guide Path Antenna.*
- ✓ *Use of RVR Technique to measure the visibility of the pilot.*

- ✓ *Infra red lighting arrangement in runway.*
- ✓ *Radar installation can guide for proper landing.*

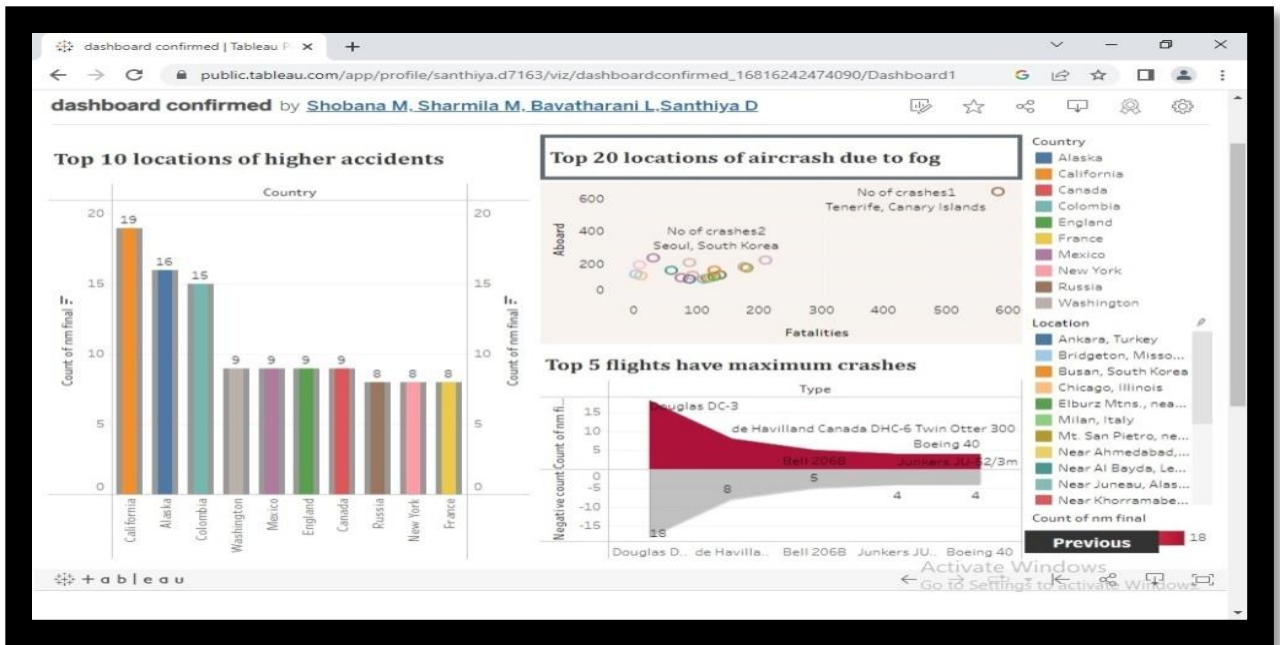
CREW CONTROLLER DUTY:

- ✓ *Greater distance between planes in airport.*
- ✓ *Must re direct flight with enough fuel.*
- ✓ *Monitor temperature and dew point.*

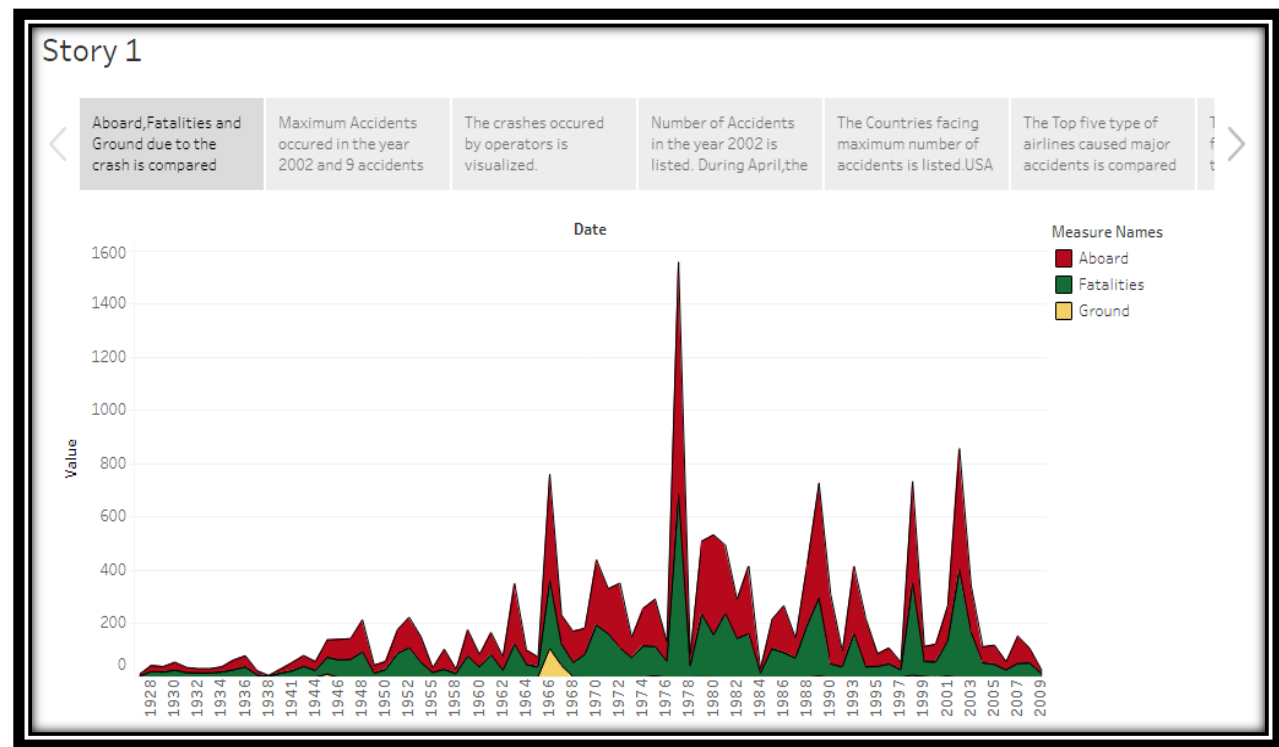


RESULT:

Dashboard: 1

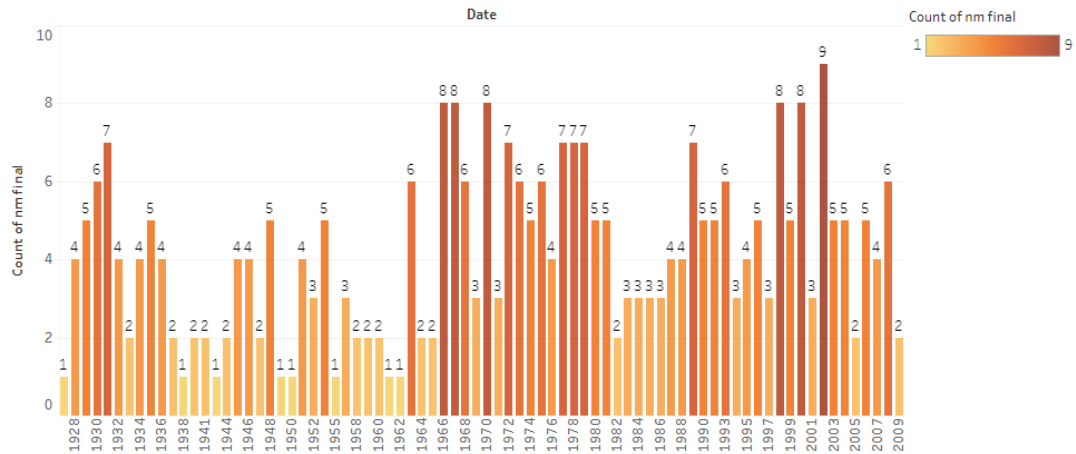


Story:



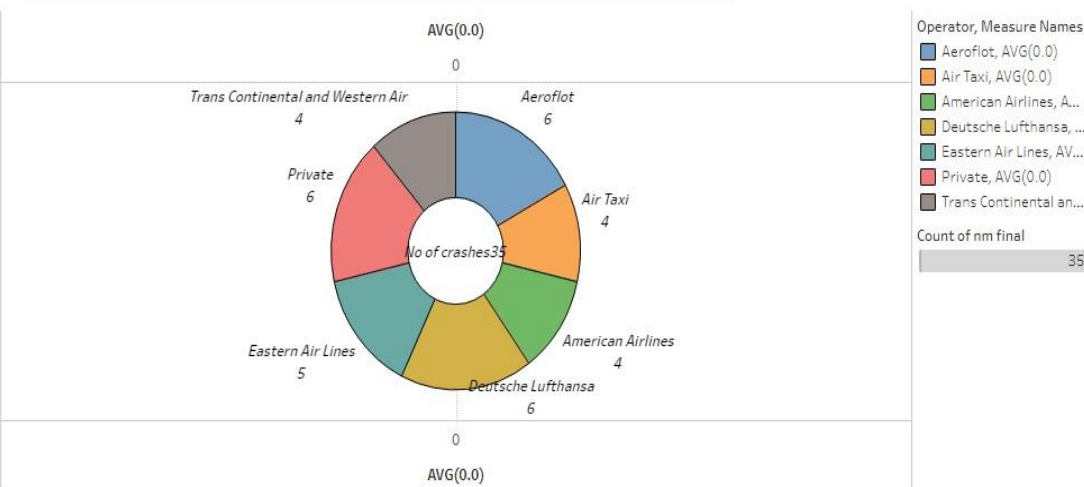
Story 1

<	Aboard,Fatalities and Ground due to the crash is compared	Maximum Accidents occurred in the year 2002 and 9 accidents	The crashes occurred by operators is visualized.	Number of Accidents in the year 2002 is listed. During April,the	The Countries facing maximum number of accidents is listed.USA	The Top five type of airlines caused major accidents is compared	>
---	---	---	--	--	--	--	---

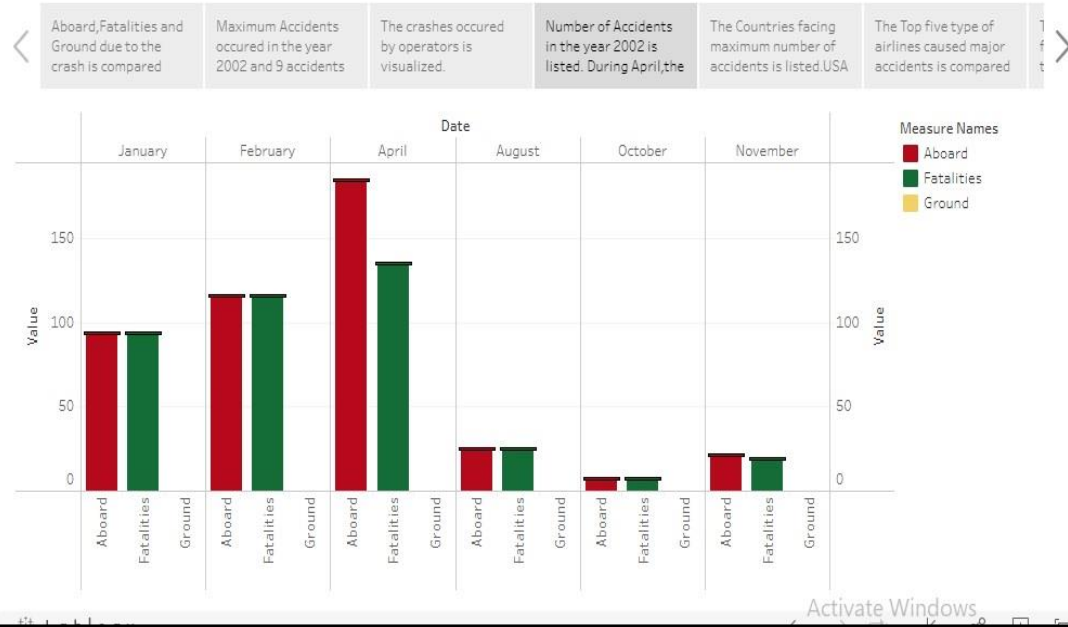


Story 1

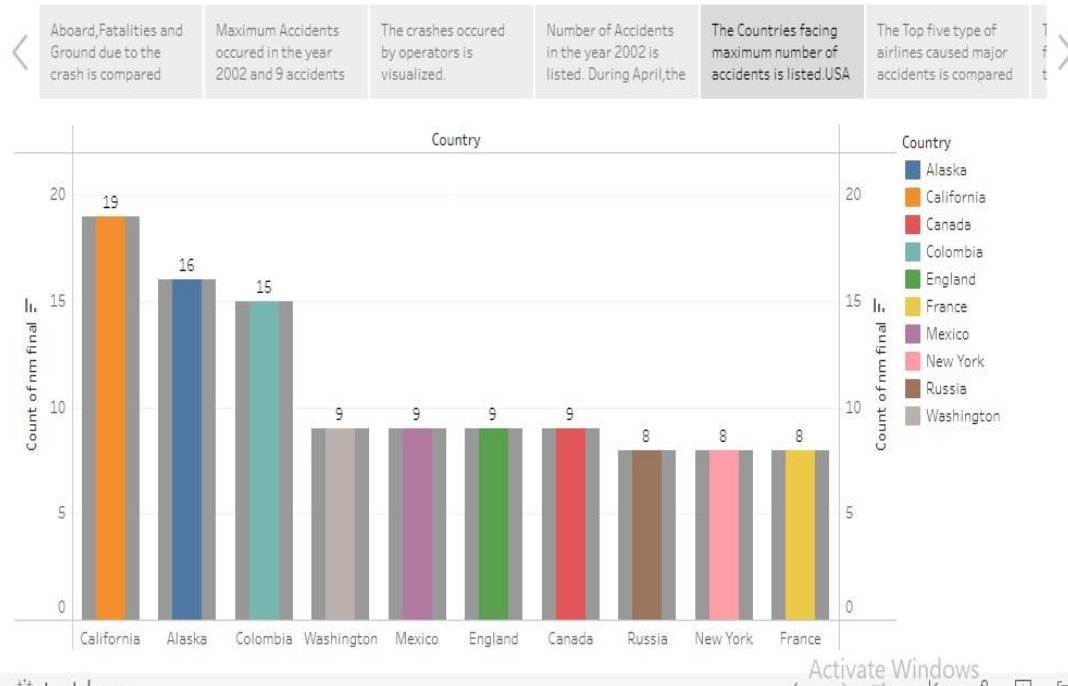
<	Aboard,Fatalities and Ground due to the crash is compared	Maximum Accidents occurred in the year 2002 and 9 accidents	The crashes occurred by operators is visualized.	Number of Accidents in the year 2002 is listed. During April,the	The Countries facing maximum number of accidents is listed.USA	The Top five type of airlines caused major accidents is compared	>
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Story 1



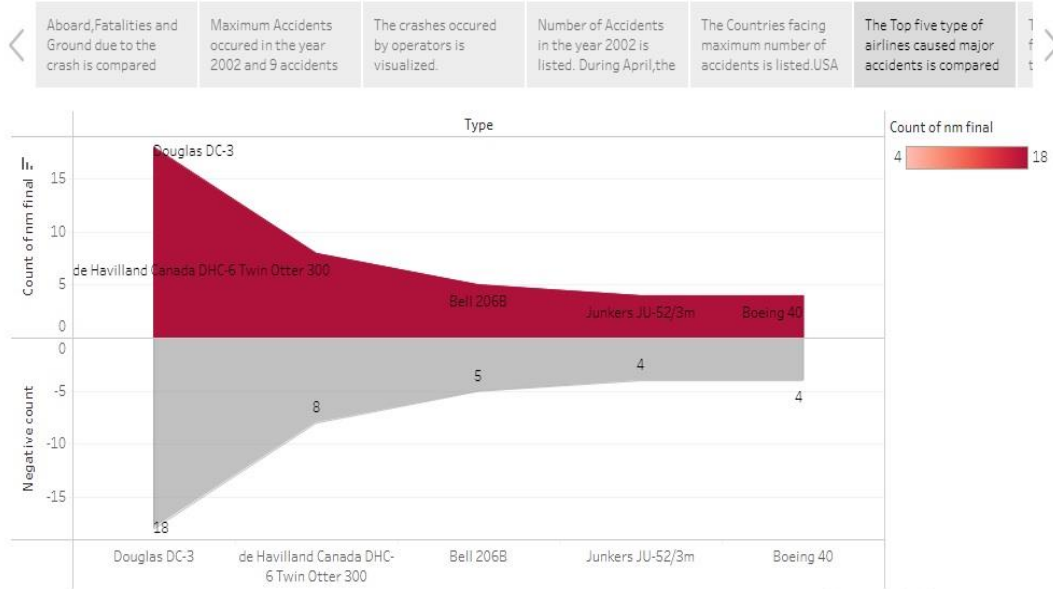
Story 1



Story confirmed by [Shobana M. Sharmila M. Bavatharani L. Santhiya D](#)



Story 1



+ a b l e a u

Activate Windows
Go to Settings to activate Windows.

Story 1

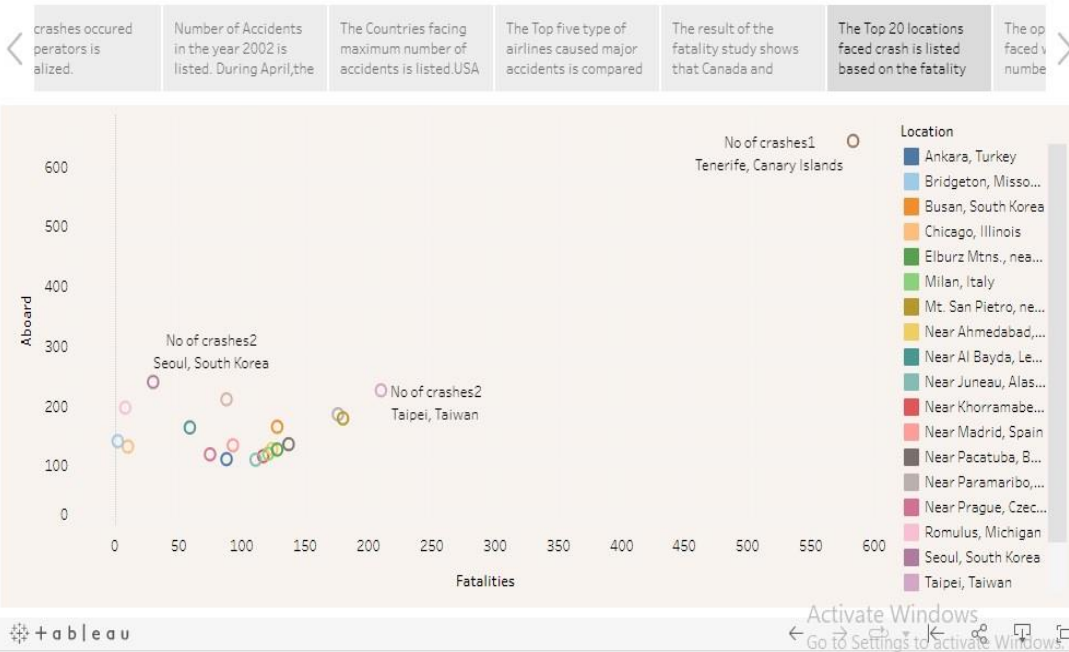


© 2023 Mapbox © OpenStreetMap

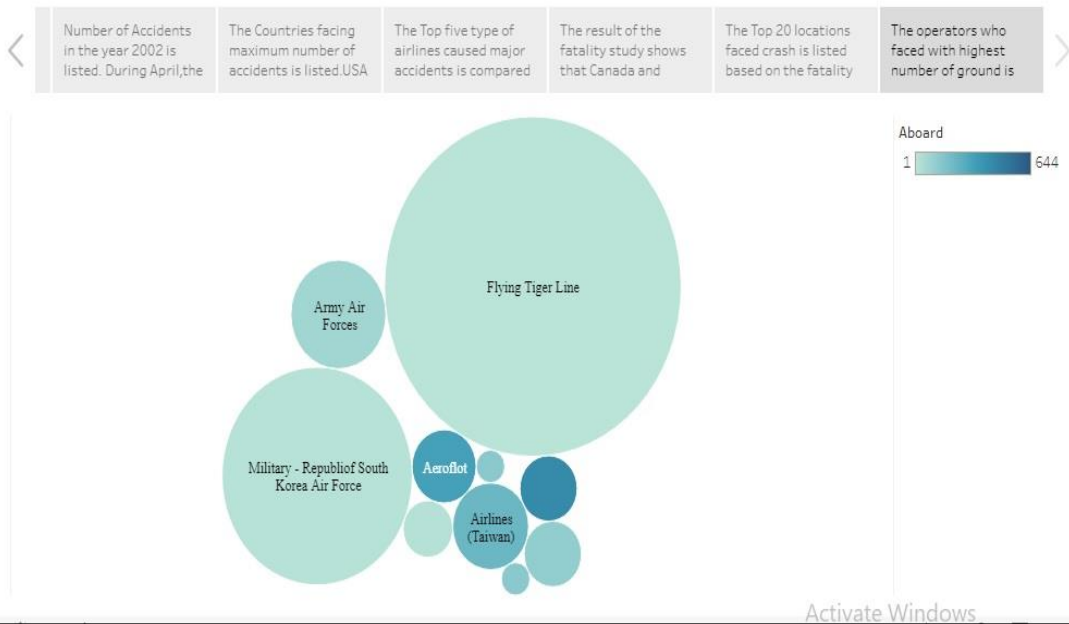
+ a b l e a u

Activate Windows
Go to Settings to activate Windows.

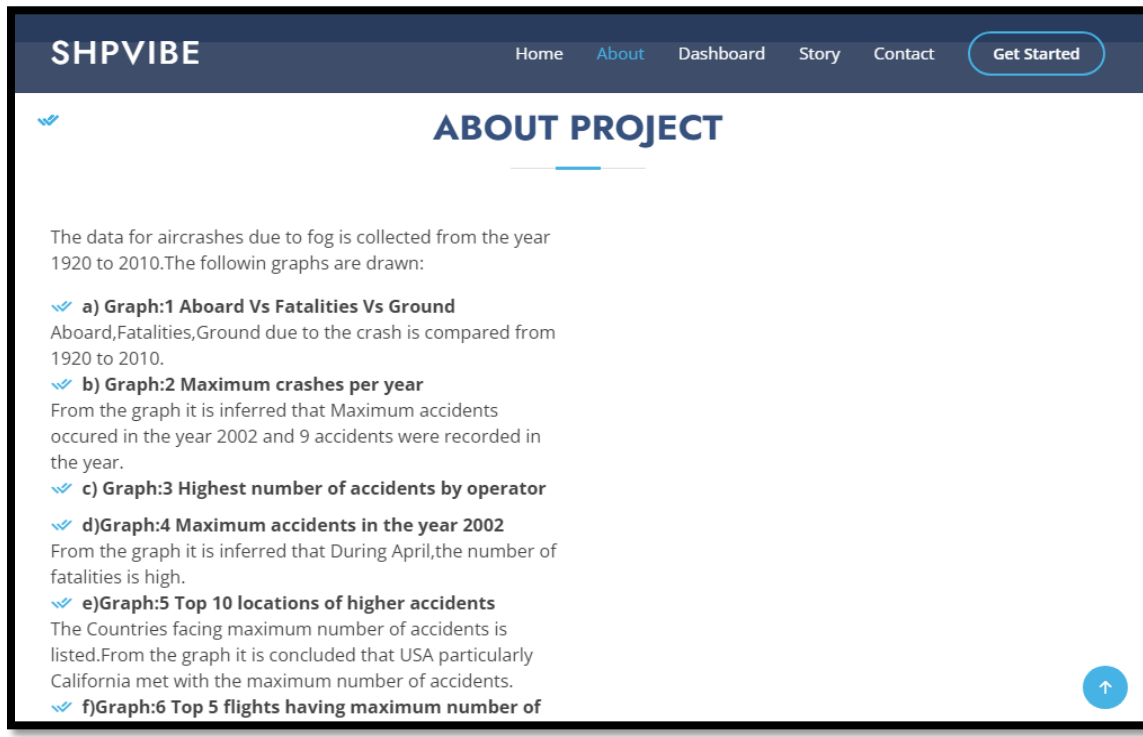
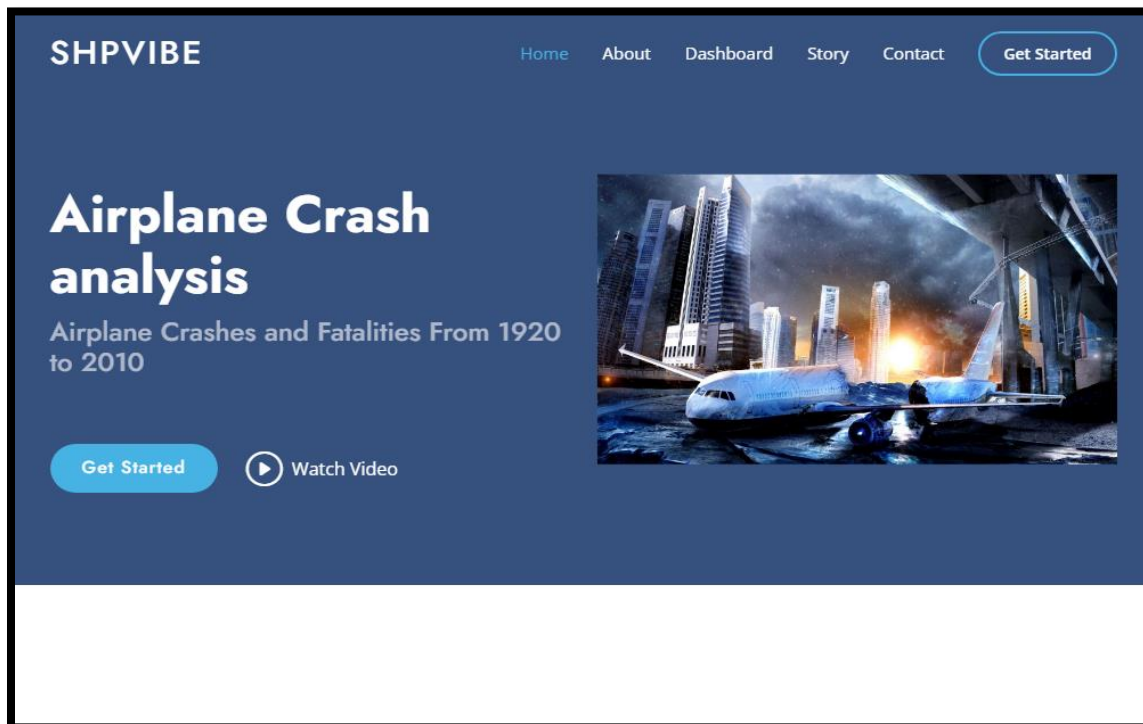
Story 1

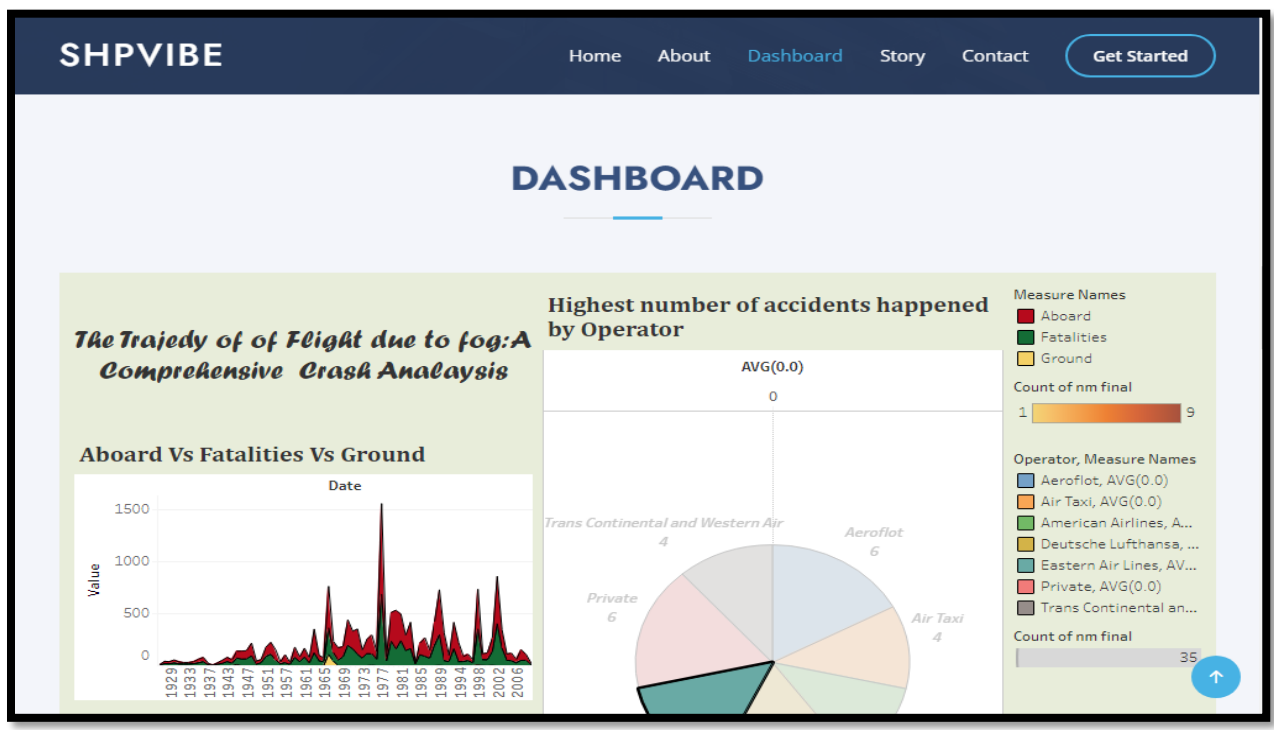
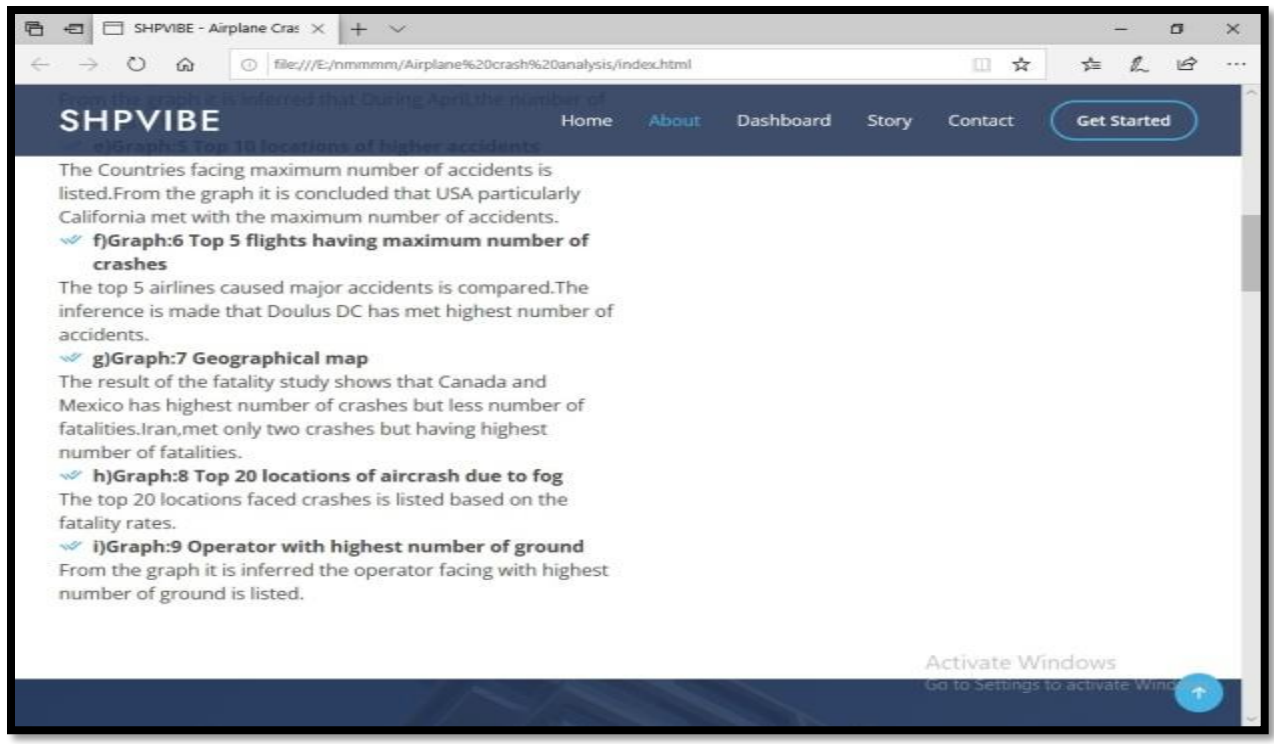


Story 1



Web Application:





SHPVIBE

Home

About

Dashboard

Story

Contact

Get Started

CONTACT

Location:

xxxxxx Street, xxx, xx 53xxx2

Email:

info@example.com

Call:

+1 5xxx 5xxx8 5xs

Downtown Confer...
View larger map

1 Memorial & Museum

CHINATOWN

Downtown Conference Center

Your Name

Your Email

Subject

Message

SHPVIBE

Home

About

Dashboard

Story

Contact

Get Started

Join Our Newsletter

Subscribe

Useful Links

> Home

> About

> Charts

> Dashboard

> Story

Our Social Networks

in

f

@

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Designed by SHPV

ADVANTAGES AND DISADVANTAGES:

Advantages:

- ✓ *Maximum accidents can be prevented by using the insights.*
- ✓ *Runway lighting will be improved as Infra Red (IR) lighting in places of mild fog.*
- ✓ *Pilots are allowed to train for Low Visibility Landing Procedure (LVP) routinely and also trained to fly in worst visibility.*
- ✓ *Weather will be checked before landing and takeoff to ensure safety.*
- ✓ *CAT IIIC, CAT IIIB will be installed in the aircrafts which are allowed to land in areas of thick fog such as California.*
- ✓ *Air traffic controllers will re-direct the flight if the climatic condition is poor.*

Disadvantages:

- ✓ *CAT IIIC is a very expensive compared to other prevention measures.*
- ✓ *Instrumental Landing System (ILS) involves the entire re arrangement of the aircraft landing system.*
- ✓ *These measures could not avoid the delay of the flight due to fog.*
- ✓ *Weather is unpredictable. Sudden changes in weather must be informed to the operators at the earliest.*

APPLICATIONS:

The analysis and visualization graphs can be used for understanding the potential threats and feasible insights to avoid such accidents. CAT IIIC, CAT IIIB can be implemented in places of higher accidents and thick fog. The analysis can help in improving the structure and runway path in foggy areas. The analysis is useful in areas of visibility. The analysis is also very in improving the safety and the preventive measures of flight, crew members and passengers.

CONCLUSION:

One of the important causes of aviation accidents is analyzed and visualized. The safety measures provided are useful in preventing further accidents. The flights and the climate must be monitored vigorously in thick fog areas.

FUTURE SCOPE:

Data are extracted from the year 1920 to 2010 for this analysis. If the project is given for further development; the data for the year 2011 to 2023 will be included. More visualization graphs will be drawn for further investigations. The reason for the crash will be included as a column for a detailed classification of crashes. Based on the observations insights for every separate region can be provided in future.

APPENDIX:

SOURCE CODE:

```
<!DOCTYPE html>
```

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

```
<head>
```

```
<meta charset="utf-8">
```

```
<meta content="width=device-width, initial-scale=1.0" name="viewport">
```

```
<title>SHPVIBE - Airplane Crash</title>
```

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

```
<meta content="" name="keywords">
```

```
<!-- Favicons -->
```

```
<link href="assets/img/favicon.png" rel="icon">
```

```
<link href="assets/img/apple-touch-icon.png" rel="apple-touch-icon">
```

```
<!-- Google Fonts -->
```

```
<link  
href="https://fonts.googleapis.com/css?family=Open+Sans:300,300i,400,400i,600,600i,700,700i|Jost:300,300i,400,400i,500,500i,600,600i,700,700i|Poppins:300,300i,400,400i,500,500i,600,600i,700,700i" rel="stylesheet">
```

```
<!-- Vendor CSS Files -->
```

```
<link href="assets/vendor/aos/aos.css" rel="stylesheet">
```

```
<link href="assets/vendor/bootstrap/css/bootstrap.min.css" rel="stylesheet">
```

```
<link href="assets/vendor/bootstrap-icons/bootstrap-icons.css" rel="stylesheet">
```

```
<link href="assets/vendor/boxicons/css/boxicons.min.css" rel="stylesheet">
```

```
<link href="assets/vendor/glightbox/css/glightbox.min.css" rel="stylesheet">
```

```
<link href="assets/vendor/remixicon/remixicon.css" rel="stylesheet">
```

```
<link href="assets/vendor/swiper/swiper-bundle.min.css" rel="stylesheet">
```

```
<!-- Template Main CSS File -->
```

```
<link href="assets/css/style.css" rel="stylesheet">
```

```
<!-- =====
```

* Template Name: Arsha - v4.9.1

* Template URL: <https://bootstrapmade.com/arsha-free-bootstrap-html-template-corporate/>

* Author: BootstrapMade.com

* License: <https://bootstrapmade.com/license/>

===== -->

</head>

<body>

<!-- ===== Header ===== -->

<header id="header" class="fixed-top ">

<div class="container d-flex align-items-center">

<h1 class="logo me-auto">SHPVIBE</h1>

<!-- Uncomment below if you prefer to use an image logo -->

<!-- -->

<nav id="navbar" class="navbar">

Home

About

Dashboard

Story

Contact

Get Started

<i class="bi bi-list mobile-nav-toggle"></i>

</nav><!-- .navbar -->

</div>

</header><!-- End Header -->

<!-- ===== Hero Section ===== -->

<section id="hero" class="d-flex align-items-center">

<div class="container">

<div class="row">

<div class="col-lg-6 d-flex flex-column justify-content-center pt-4 pt-lg-0 order-2 order-lg-1" data-aos="fade-up" data-aos-delay="200">

<h1>Airplane Crash analysis</h1>

<h2>Airplane Crashes and Fatalities From 1920 to 2010</h2>

<div class="d-flex justify-content-center justify-content-lg-start">

Get Started

```
        <a href="https://www.youtube.com/@thesmartbridge/videos" class="lightbox btn-
watch-video"><i class="bi bi-play-circle"></i><span>Watch Video</span></a>
```

```
    </div>
```

```
</div>
```

```
<div class="col-lg-6 order-1 order-lg-2 hero-img" data-aos="zoom-in" data-aos-
delay="200">
```

```
    
```

```
</div>
```

```
</div>
```

```
</div>
```

```
</section><!-- End Hero -->
```

```
<main id="main">
```

```
    <!-- ===== About Us Section ===== -->
```

```
<section id="about" class="about">
```

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

```
        <div class="section-title">
```

```
            <h2>About Project</h2>
```

```
        </div>
```

```
<div class="row content">
```

```
    <div class="col-lg-6">
```

```
        <p>
```

The data for aircrashes due to fog is collected from the year 1920 to 2010. The following graphs are drawn:

a) Graph:1 Aboard Vs Fatalities Vs Ground

Aboard, Fatalities, Ground due to the crash is compared from 1920 to 2010.

b) Graph:2 Maximum crashes per year

From the graph it is inferred that Maximum accidents occurred in the year 2002 and 9 accidents were recorded in the year.

c) Graph:3 Highest number of accidents by operator

d) Graph:4 Maximum accidents in the year 2002

From the graph it is inferred that During April, the number of fatalities is high.

e) Graph:5 Top 10 locations of higher accidents

The Countries facing maximum number of accidents is listed. From the graph it is concluded that USA particularly California met with the maximum number of accidents.

f) Graph:6 Top 5 flights having maximum number of crashes

The top 5 airlines caused major accidents is compared. The inference is made that Douglas DC has met highest number of accidents.

*<i class="ri-check-double-line"></i> g)Graph:7 Geographical map *

<i class="ri-check-double-line"></i> The result of the fatality study shows that Canada and Mexico has highest number of crashes but less number of fatalities.Iran,met only two crashes but having highest number of fatalities.

*<i class="ri-check-double-line"></i> h)Graph:8 Top 20 locations of aircrash due to fog *

<i class="ri-check-double-line"></i> The top 20 locations faced crashes is listed based on the fatality rates.

*<i class="ri-check-double-line"></i> i)Graph:9 Operator with highest number of ground *

<i class="ri-check-double-line"></i> From the graph it is inferred the operator facing with highest number of ground is listed.

**

</div>

</div>

</section><!-- End About Us Section -->

<!-- ===== Cta Section ===== -->

<section id="cta" class="cta">

<div class="container" data-aos="zoom-in">

<div class="row">

<div class="col-lg-9 text-center text-lg-start">

<h3>Call To Action</h3>

</div>

<div class="col-lg-3 cta-btn-container text-center">

Call To Action

</div>

</div>

</div>

</section><!-- End Cta Section -->

<!-- ===== Team Section ===== -->

<section id="team" class="team section-bg">

<div class="container" data-aos="fade-up">

<div class="section-title">

<h2>Dashboard</h2>

</div>

<div class='tableauPlaceholder' id='viz1681624311651' style='position: relative'><noscript></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='dashboardconfirmed_16816242474090/Dashboard1' /><param name='tabs' value='no' /><param name='toolbar' value='yes' /><param name='static_image' value='https://public.tableau.com/static/images/da/dashboardconfirmed_16816242474090/Dashboard1/1.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('viz1681624311651');      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='1327px';}      var
scriptElement = document.createElement('script');      scriptElement.src =
'https://public.tableau.com/javascripts/api/viz_v1.js';
vizElement.parentNode.insertBefore(scriptElement, vizElement);      </script>

```

```

</div>

```

```

</section><!-- End Team Section -->

```

```

<!-- ===== Pricing Section ===== -->

```

```

<section id="pricing" class="pricing">

```

```

  <div class="container" data-aos="fade-up">

```

```

    <div class="section-title">

```

```

      <h2>Story</h2>

```

```

      <div class='tableauPlaceholder' id='viz1681623914465' style='position:
relative'><noscript><a href='#'><img alt='Story 1 '
src='https://public.tableau.com/static/images/St/Storyconfirmed
&Story1&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='Storyconfirmed&Story1' /><param name='tabs' value='no'
/><param name='toolbar' value='yes' /><param name='static_image'
value='https://public.tableau.com/static/images/St/Storyconfirm
ed&Story1&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('viz1681623914465');            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>

</section><!-- End Pricing Section -->

```

```

<!-- ===== Contact Section ===== -->

```

```

<section id="contact" class="contact">

```

```

    <div class="container" data-aos="fade-up">

```

```

        <div class="section-title">

```

```

            <h2>Contact</h2>

```

```

        </div>

```

```

    <div class="row">

```

```

        <div class="col-lg-5 d-flex align-items-stretch">

```

```

            <div class="info">

```

```

                <div class="address">

```

```

                    <i class="bi bi-geo-alt"></i>

```

<h4>Location:</h4>

<p>xxxxxx Street, xxx, xx 53xxx2</p>

</div>

<div class="email">

<i class="bi bi-envelope"></i>

<h4>Email:</h4>

<p>info@example.com</p>

</div>

<div class="phone">

<i class="bi bi-phone"></i>

<h4>Call:</h4>

<p>+1 5xxx 5xxx8 5xs</p>

</div>

<iframe

src="https://www.google.com/maps/embed?pb=!1m14!1m8!1m3!1d12097.433213460943!2d-74.0062269!3d40.7101282!3m2!1i1024!2i768!4f13.1!3m3!1m2!1s0x0%3A0xb89d1fe6bc499443!2sDowntown+Conference+Center!5e0!3m2!1smk!2sbg!4v1539943755621" frameborder="0" style="border:0; width: 100%; height: 290px;" allowfullscreen></iframe>

</div>

</div>

<div class="col-lg-7 mt-5 mt-lg-0 d-flex align-items-stretch">


```
<form action="forms/contact.php" method="post" role="form" class="php-email-form">

  <div class="row">

    <div class="form-group col-md-6">

      <label for="name">Your Name</label>

      <input type="text" name="name" class="form-control" id="name" required>

    </div>

    <div class="form-group col-md-6">

      <label for="name">Your Email</label>

      <input type="email" class="form-control" name="email" id="email" required>

    </div>

  </div>

  <div class="form-group">

    <label for="name">Subject</label>

    <input type="text" class="form-control" name="subject" id="subject" required>

  </div>

  <div class="form-group">

    <label for="name">Message</label>

    <textarea class="form-control" name="message" rows="10" required></textarea>

  </div>

  <div class="my-3">

    <div class="loading">Loading</div>

    <div class="error-message"></div>

    <div class="sent-message">Your message has been sent. Thank you!</div>

  </div>
```

```
<div class="text-center"><button type="submit">Send Message</button></div>

</form>

</div>

</div>

</div>

</section><!-- End Contact Section -->

</main><!-- End #main -->

<!-- ===== Footer ===== -->

<footer id="footer">

<div class="footer-newsletter">

<div class="container">

<div class="row justify-content-center">

<div class="col-lg-6">

<h4>Join Our Newsletter</h4>

<form action="" method="post">

<input type="email" name="email"><input type="submit" value="Subscribe">

</form>

</div>
```

</div>

</div>

</div>

<div class="footer-top">

<div class="container">

<div class="row">

<div class="col-lg-3 col-md-6 footer-links">

<h4>Useful Links</h4>

<i class="bx bx-chevron-right"></i> Home

<i class="bx bx-chevron-right"></i> About

<i class="bx bx-chevron-right"></i> Charts

<i class="bx bx-chevron-right"></i> Dashboard

<i class="bx bx-chevron-right"></i> Story

</div>

<div class="col-lg-3 col-md-6 footer-links">

<h4></h4>

</div>

<div class="col-lg-3 col-md-6 footer-links">

<h4></h4>

</div>

<div class="col-lg-3 col-md-6 footer-links">

<h4>Our Social Networks</h4>

<div class="social-links mt-3">

<i class="bx bxl-linkedin"></i>

<i class="bx bxl-twitter"></i>

<i class="bx bxl-facebook"></i>

<i class="bx bxl-instagram"></i>

<i class="bx bxl-skype"></i>

</div>

</div>

</div>

</div>

</div>

<div class="container footer-bottom clearfix">

<div class="copyright">

© Copyright SHPVIBE. All Rights Reserved

</div>

<div class="credits">

<!-- All the links in the footer should remain intact. -->

<!-- You can delete the links only if you purchased the pro version. -->

<!-- Licensing information: <https://bootstrapmade.com/license/> -->

<!-- Purchase the pro version with working PHP/AJAX contact form:
<https://bootstrapmade.com/arsha-free-bootstrap-html-template-corporate/> -->

Designed by SHPVIBE

</div>

</div>

</footer><!-- End Footer -->

<div id="preloader"></div>

<i class="bi bi-arrow-up-short"></i>

<!-- Vendor JS Files -->

<script src="assets/vendor/aos/aos.js"></script>

```
<script src="assets/vendor/bootstrap/js/bootstrap.bundle.min.js"></script>
```

```
<script src="assets/vendor/glightbox/js/glightbox.min.js"></script>
```

```
<script src="assets/vendor/isotope-layout/isotope.pkgd.min.js"></script>
```

```
<script src="assets/vendor/swiper/swiper-bundle.min.js"></script>
```

```
<script src="assets/vendor/waypoints/noframework.waypoints.js"></script>
```

```
<script src="assets/vendor/php-email-form/validate.js"></script>
```

```
<!-- Template Main JS File -->
```

```
<script src="assets/js/main.js"></script>
```

```
</body>
```

```
</html>
```

THANK YOU