Airplane crash analysis using Tableau

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Smart-Bridge

Project-Title: Airplane crash analysis using Tableau

Abstract:

The goal of the project " Airplane crash analysis using Tableau " is to thoroughly examine aviation accidents in order to determine what went wrong and develop better safety protocols. The project makes use of techniques including data cleansing, exploratory data analysis, feature engineering, statistical analysis, and Tableau data visualization to use data from a variety of sources, including Kaggle datasets. The project's thorough crash study and practical suggestions are intended to promote cooperation within the aviation sector and promote ongoing advancements in safety standards. Stakeholders may benefit from a safer and more dependable aviation industry by putting these ideas into practice.

Introduction:

The goal of the project " Airplane crash analysis using Tableau " is to perform a thorough investigation into aviation accidents in order to pinpoint the contributing causes and circumstances. The project's main goal is to increase aviation safety by the analysis of a variety of data, including details on aircraft systems, human factors, operational variables, and outside impacts.

The safety of the general population and the aviation sector as a whole are significantly impacted by plane crashes. To prevent similar incidents in the future and enhance safety protocols, it is essential to understand the underlying reasons of these mishaps. By performing a thorough crash review, we hope to offer insightful conclusions and practical advice that will lessen the chance of mishaps, save lives, and boost public confidence in aviation.

The initiative makes use of datasets acquired from sources like Kaggle to guarantee access to a variety of pertinent information. We will find important patterns, connections, and aspects related to airplane crashes using thorough data cleansing, exploratory data analysis, feature engineering, statistical analysis, and data visualization using tools like Tableau.

The project's findings will be applied to the creation of suggestions for improving safety procedures within the aviation sector. These suggestions might cover topics like pilot training programs, maintenance guidelines, operational policies, and operational standards. Airlines, aviation authorities, and industry organizations may cooperate to build a safer and more dependable aviation environment by putting these recommendations into practice.

The " Airplane crash analysis using Tableau " project's overall goal is to support ongoing efforts to increase aviation security and avoid crash-related injuries and fatalities. We want to make a positive difference in the lives of passengers, the standing of airlines, and the general safety standards within the aviation industry by conducting a complete investigation and offering actionable insights.

Project flow:

Problem definition:

The problem at hand is the requirement for a thorough investigation into air crash incidents in order to pinpoint their causes and enhance aviation industry safety precautions. By gathering and analyzing data from numerous sources, including pertinent datasets available on Kaggle, the goal is to perform a thorough analysis of the variables causing airplane accidents. Understanding the fundamental causes of aircraft crashes is the main challenge since these reasons might include intricate interactions between numerous components, including aircraft systems, operator characteristics, ambient factors, and outside events. We hope to find insights and patterns that can provide useful information for averting future mishaps by thoroughly analyzing the acquired data. The project seeks to significantly influence both the social and commercial facets of aviation by addressing this issue and offering insights and solutions. It might prevent fatalities, lessen injuries, and boost public trust in flying. From a financial standpoint, the project can save money for airlines by reducing mishaps and related legal penalties, as well as by enhancing their standing and customer confidence. Overall, the project's success will result in a more dependable and safe aviation sector.

Business problem:

The need to increase aviation safety by figuring out why plane disasters happen is the business issue for our research, " Airplane crash analysis using Tableau." The goal is to use data from many sources, including Kaggle datasets, to do a thorough investigation of aircraft crashes. The research aims to offer suggestions for improving safety measures and preventing further accidents by identifying the elements that lead to these mishaps. The results and suggestions from this research could have an impact on a number of business-related issues, including operating guidelines, maintenance processes, training programs, and regulatory rules. Airlines can reduce risks, prevent accidents, and safeguard their reputation by putting the suggested procedures into practice. Additionally, enhanced safety procedures can boost client happiness and trust, drawing in more travelers and favorably affecting an airline's bottom line. Our project's overall goal is to improve aviation safety by investigating plane catastrophes, offering insightful analysis, and suggesting ways to avoid future incidents that are akin to them.

Business Requirements:

1) Access to Useful Data: The project needs access to extensive and useful datasets on aviation accidents. Getting access to Kaggle datasets or other trustworthy sources that offer thorough details on the accidents, such as aircraft specifics, operators, and other crucial elements, is one way to do this.
2) Data Preparation: In order to guarantee accuracy, consistency, and quality, the acquired data must be cleaned and prepared. This entails eliminating pointless or redundant entries, dealing with missing values, and standardizing the data format for future analysis.
3) Exploratory Data Analysis (EDA): To obtain understanding of the causes influencing airplane crashes, careful exploratory data analysis is essential. This entails selecting important variables, assessing how they are distributed, and looking for connections or patterns in the data.

4) Feature Engineering: Finding useful insights requires feature engineering, which is the process of extracting pertinent features from the available data. This entails changing existing factors or developing new ones that can reveal important details regarding what causes airplane crashes. Techniques for feature engineering should be used to improve the analysis.
5) Data Visualization: The project calls for the creation of efficient and aesthetically pleasing visualizations that convey the results of the investigation using a technology like Tableau. The visualizations should be interactive and provide the data in a clear manner so that stakeholders may quickly explore and comprehend patterns and trends.
6) Statistical Analysis: In order to pinpoint important causes and connections relating to aviation accidents, statistical analysis techniques must be used. To analyses the data and determine links between variables, you could use statistical techniques like regression analysis or hypothesis testing.
7) Report Generation: It is crucial to summaries the conclusions and recommendations in a thorough report. The report should give a thorough review of the study done, the crash causes that were found, and practical suggestions for enhancing safety measures. The report should have a clear format, be simple to interpret, and be backed up with pertinent statistical analysis.
8) Collaboration and Communication: Throughout the project, excellent communication with team members is essential. To guarantee efficient project execution, this entails holding regular meetings, exchanging status reports, talking about insights, and coordinating efforts.
9) Ethical Considerations: When handling sensitive material pertaining to airplane crashes, it is imperative to ensure compliance with ethical standards and data protection laws. It is crucial to maintain the data's integrity and confidentiality.
10) Timeliness: The project must be finished on schedule, taking into account any restrictions or deadlines established by stakeholders. To guarantee the delivery of findings and reports on time, effective time management and adherence to project milestones are crucial.\

Literature Survey:

The goal of the literature review done for this project was to examine a variety of sources, such as academic publications, business reports, and web articles, to learn more about the investigation of airplane crashes and to spot any particular difficulties or chances for crash prevention. The survey covered a wide range of publications in the areas of risk management, accident investigation, and aviation safety.

The Journal of Air Transportation, Aviation Psychology and Applied Human Factors, and Accident Analysis & Prevention were only a few of the scholarly journals that were examined. These publications provide a variety of study on many areas of aviation accidents, such as their origins, aggravating circumstances, and mitigation strategies. Studies have shown how crucially important human factors—such as pilot mistakes, crew communication issues, and decision-making processes—are in accidents. The importance of aircraft design, maintenance procedures, and safety laws in reducing crash chances was also emphasized by studies.

We also looked at industry papers and publications from institutions including the National Transportation Safety Board (NTSB), Federal Aviation Administration (FAA), and

International Civil Aviation Organization (ICAO). These reports provided in-depth analyses of significant aviation accidents, highlighting major findings and making suggestions for safety enhancements. They provided insightful information on data collection methods, crash investigation methodology, and the value of industry stakeholder cooperation in enhancing aviation safety.

Additionally, online news and article sources were incorporated into the literature review to reflect current events and discussions pertaining to aviation accidents. These resources provide case studies from actual situations, professional advice, and discussions of cutting-edge techniques and technologies for preventing accidents. The report highlighted the ongoing developments in accident analysis's use of data analytics, machine learning, and predictive modelling, emphasizing their ability to spot precursors and reduce risks.

In summary, the literature review integrated knowledge from scholarly publications, business reports, and web articles to present a comprehensive grasp of airplane crash study. The survey revealed the complex nature of crash analysis, emphasized major difficulties, and indicated possible openings for accident avoidance. This thorough understanding will guide the analysis carried out for this project and aid in the creation of strong suggestions for enhancing aircraft safety.

Social impact:

Our effort, " Airplane crash analysis using Tableau" has a huge social influence. The project attempts to improve aviation safety by performing in-depth analyses of aircraft crashes and determining their causes. Public safety as well as the lives of passengers and crew members are directly impacted by this. Understanding the causes of accidents allows us to create solutions and put them into action to stop them from happening again, minimizing the number of fatalities and injuries.

The project's conclusions and suggestions may also increase people's trust in flying. Passengers are more inclined to trust and select air travel when they believe that safety is prioritized and that proactive steps are in place to prevent mishaps. The entire development and sustainability of the aviation sector may benefit as a result.

Business Impact:

From a commercial standpoint, our proposal has enormous effects on the aviation sector. By putting the suggestions resulting from our crash investigation into practice, airlines and aviation authorities can enhance their safety procedures and procedures. This entails upgrading pilot and crew member training programs, enhancing maintenance processes, and improving operational regulations.

The project may also promote cooperation and information exchange within the aviation sector. We may promote a team effort to raise safety standards throughout the sector by publicizing the results and suggestions through industry conferences, reports, and publications. All parties engaged gain from this collaboration's promotion of a culture of ongoing learning, innovation, and best practices.

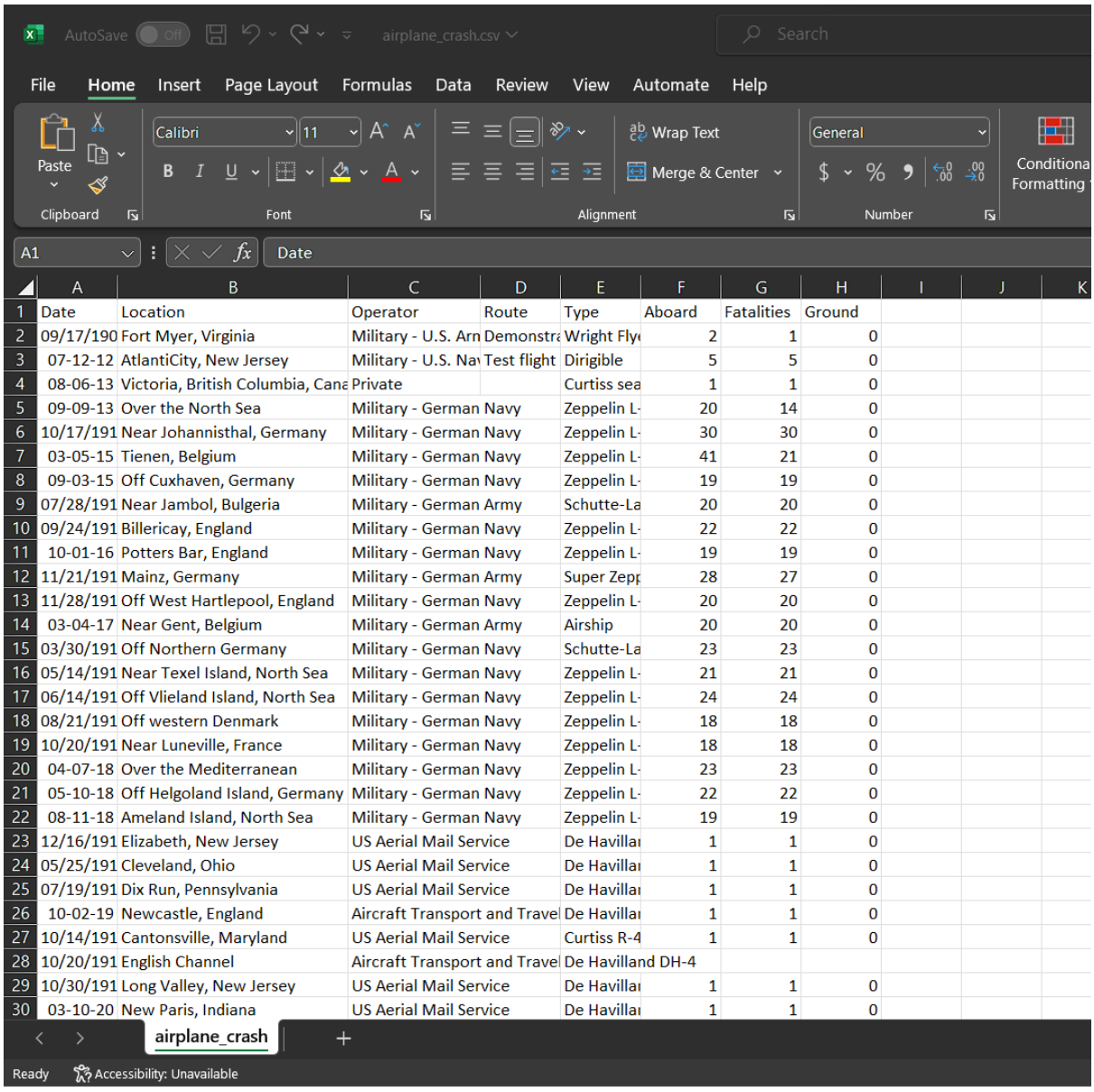
Overall, improving aviation safety, saving lives, lowering injuries, and fostering public trust are the project's main social and commercial impacts. We contribute to a safer and more

dependable aviation industry that benefits both customers and companies working in the industry by preventing accidents and enhancing safety procedures.

Data Collection & Extraction from Database:

Dataset link:

https://www.kaggle.com/datasets/saurograndi/airplane-crashes-since-1908



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A1 Date

	A	B	C	D	E	F	G	H	I	J	K
1	Date	Location	Operator	Route	Type	Aboard	Fatalities	Ground			
2	09/17/190	Fort Myer, Virginia	Military - U.S. Arn	Demonstra	Wright Fly	2	1	0			
3	07-12-12	AtlantiCity, New Jersey	Military - U.S. Na	Test flight	Dirigible	5	5	0			
4	08-06-13	Victoria, British Columbia, Cana	Private		Curtiss sea	1	1	0			
5	09-09-13	Over the North Sea	Military - German Navy		Zeppelin L-	20	14	0			
6	10/17/191	Near Johannisthal, Germany	Military - German Navy		Zeppelin L-	30	30	0			
7	03-05-15	Tienen, Belgium	Military - German Navy		Zeppelin L-	41	21	0			
8	09-03-15	Off Cuxhaven, Germany	Military - German Navy		Zeppelin L-	19	19	0			
9	07/28/191	Near Jambol, Bulgeria	Military - German Army		Schutte-La	20	20	0			
10	09/24/191	Billericay, England	Military - German Navy		Zeppelin L-	22	22	0			
11	10-01-16	Potters Bar, England	Military - German Navy		Zeppelin L-	19	19	0			
12	11/21/191	Mainz, Germany	Military - German Army		Super Zepp	28	27	0			
13	11/28/191	Off West Hartlepool, England	Military - German Navy		Zeppelin L-	20	20	0			
14	03-04-17	Near Gent, Belgium	Military - German Army		Airship	20	20	0			
15	03/30/191	Off Northern Germany	Military - German Navy		Schutte-La	23	23	0			
16	05/14/191	Near Texel Island, North Sea	Military - German Navy		Zeppelin L-	21	21	0			
17	06/14/191	Off Vlieland Island, North Sea	Military - German Navy		Zeppelin L-	24	24	0			
18	08/21/191	Off western Denmark	Military - German Navy		Zeppelin L-	18	18	0			
19	10/20/191	Near Luneville, France	Military - German Navy		Zeppelin L-	18	18	0			
20	04-07-18	Over the Mediterranean	Military - German Navy		Zeppelin L-	23	23	0			
21	05-10-18	Off Helgoland Island, Germany	Military - German Navy		Zeppelin L-	22	22	0			
22	08-11-18	Ameland Island, North Sea	Military - German Navy		Zeppelin L-	19	19	0			
23	12/16/191	Elizabeth, New Jersey	US Aerial Mail Service		De Havillar	1	1	0			
24	05/25/191	Cleveland, Ohio	US Aerial Mail Service		De Havillar	1	1	0			
25	07/19/191	Dix Run, Pennsylvania	US Aerial Mail Service		De Havillar	1	1	0			
26	10-02-19	Newcastle, England	Aircraft Transport and Travel		De Havillar	1	1	0			
27	10/14/191	Cantonsville, Maryland	US Aerial Mail Service		Curtiss R-4	1	1	0			
28	10/20/191	English Channel	Aircraft Transport and Travel		De Havilland DH-4						
29	10/30/191	Long Valley, New Jersey	US Aerial Mail Service		De Havillar	1	1	0			
30	03-10-20	New Paris, Indiana	US Aerial Mail Service		De Havillar	1	1	0			

airplane_crash

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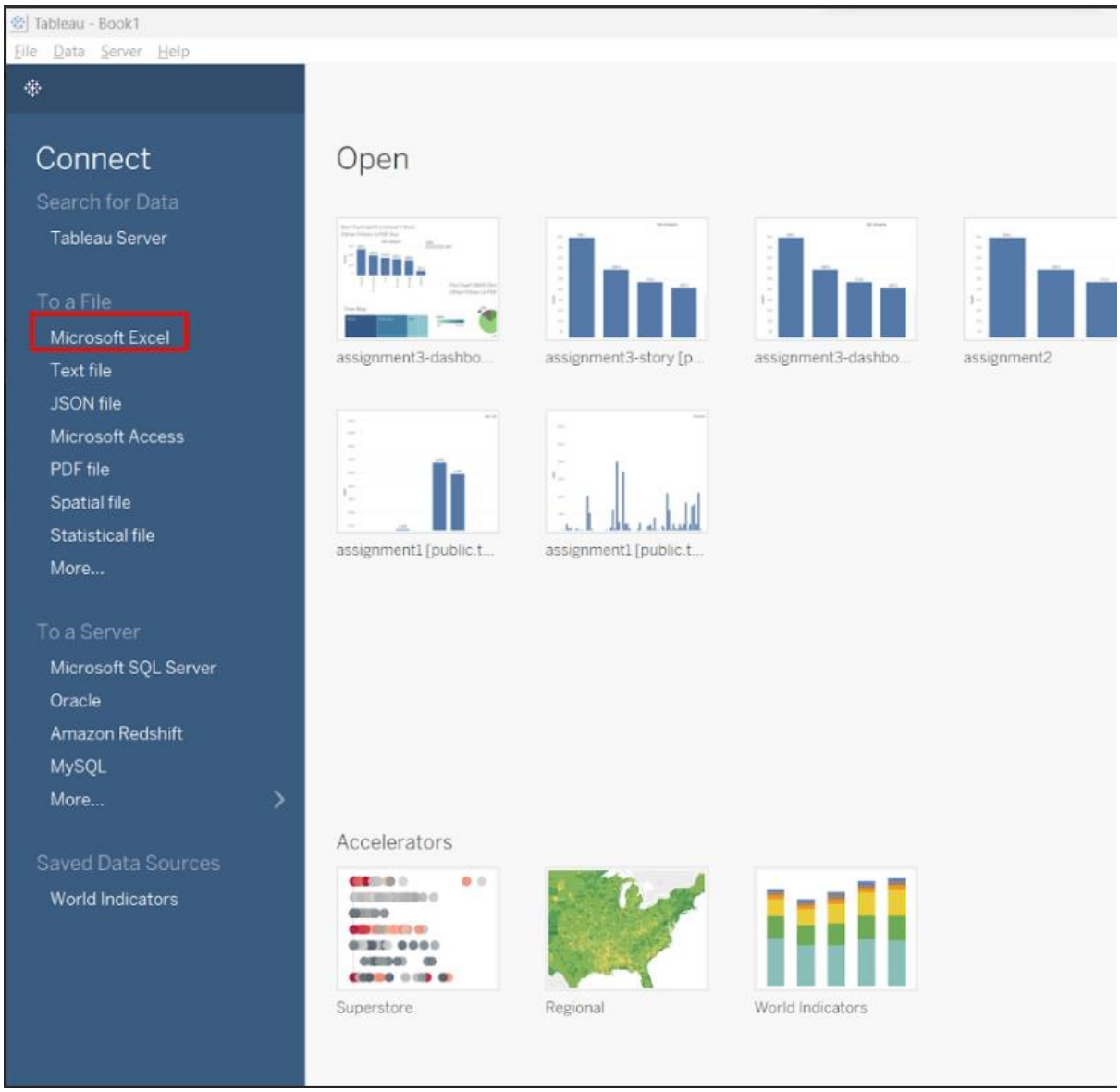

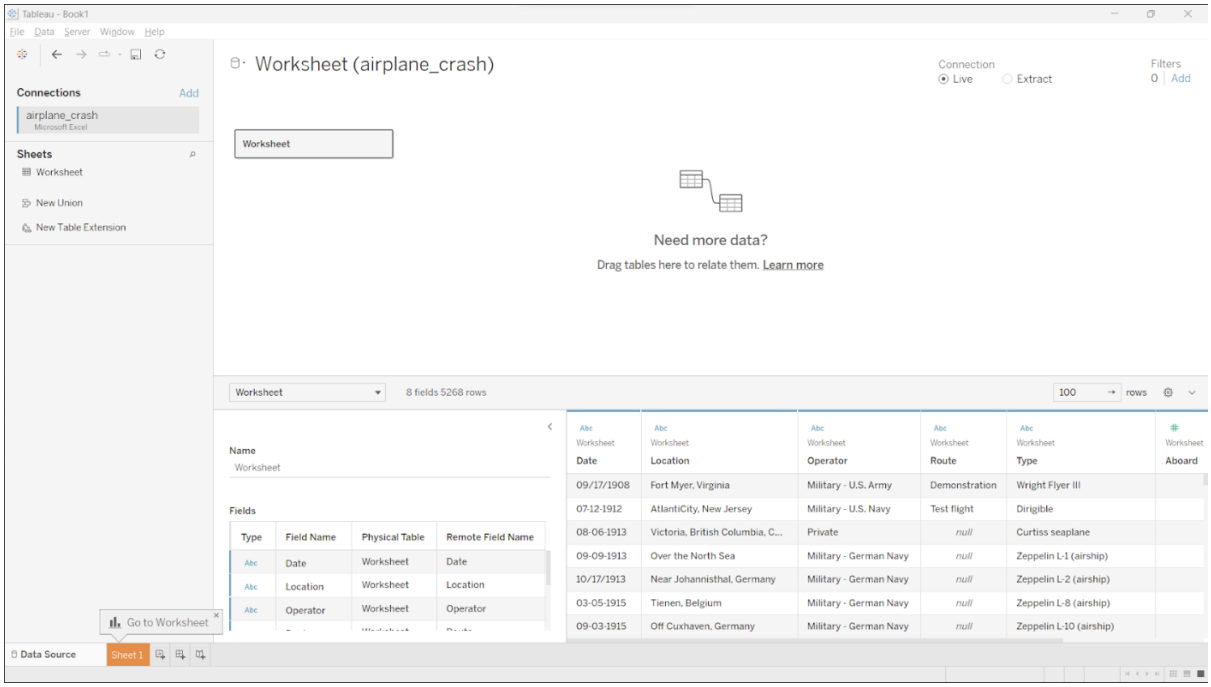

Video link:

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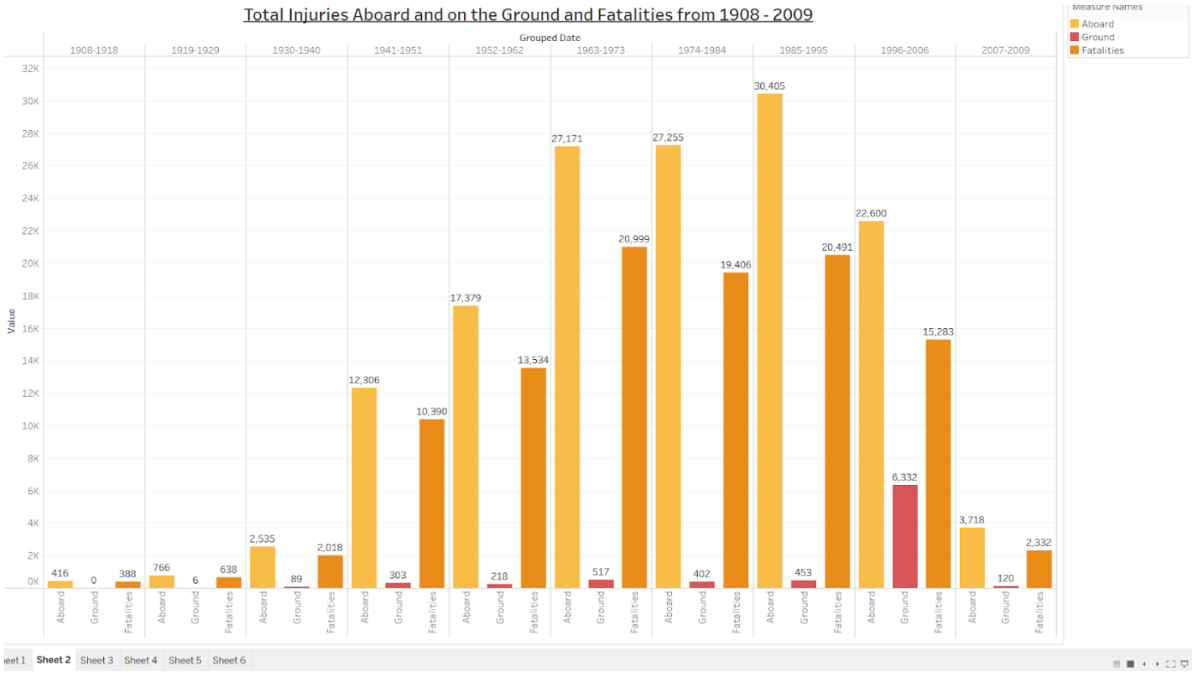
Data virtualization:

Virtualization-1:

Total injuries aboard and on the ground and fatalities from 1908-2009:

This vertical bar graphs shows us the total injuries and fatalities on both ground and aboard.



Video link:

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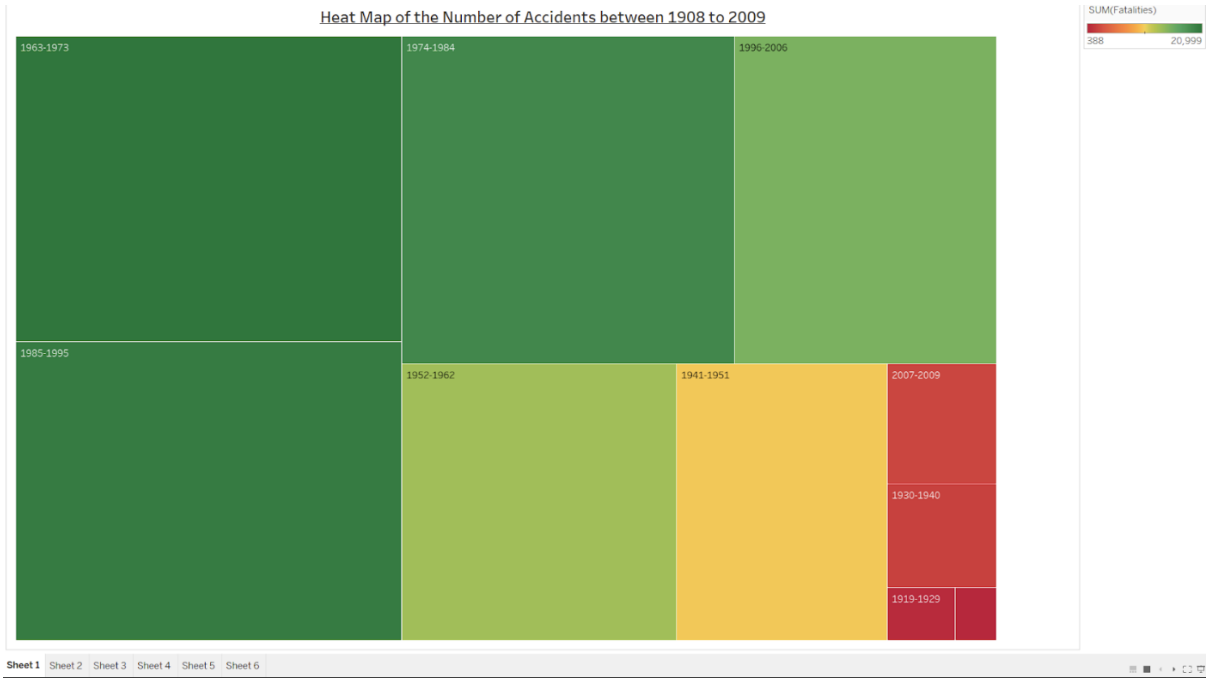
Virtualization-2:

Number of accidents between 1908-2009:

This heat map shows us the number of accidents between 1908-2009.



video link:

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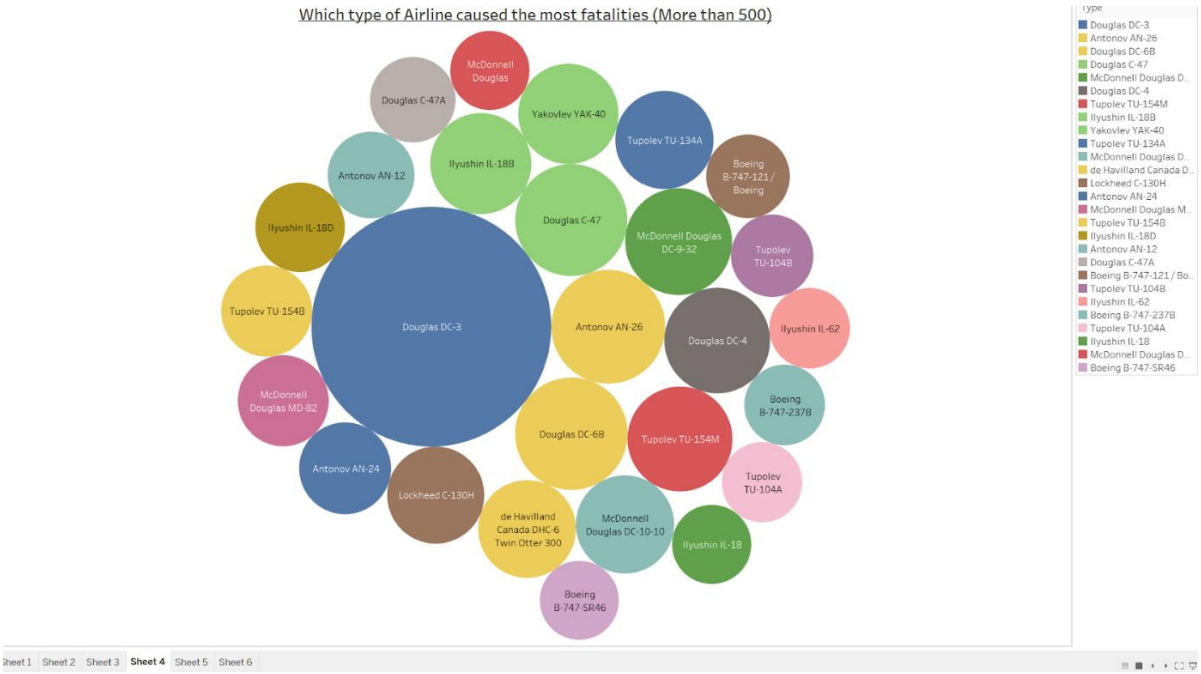
Virtualization-3:

type of airline that caused most fatalities:

This bubble graph provides us with information of most fatalities caused by an particular type of airline.



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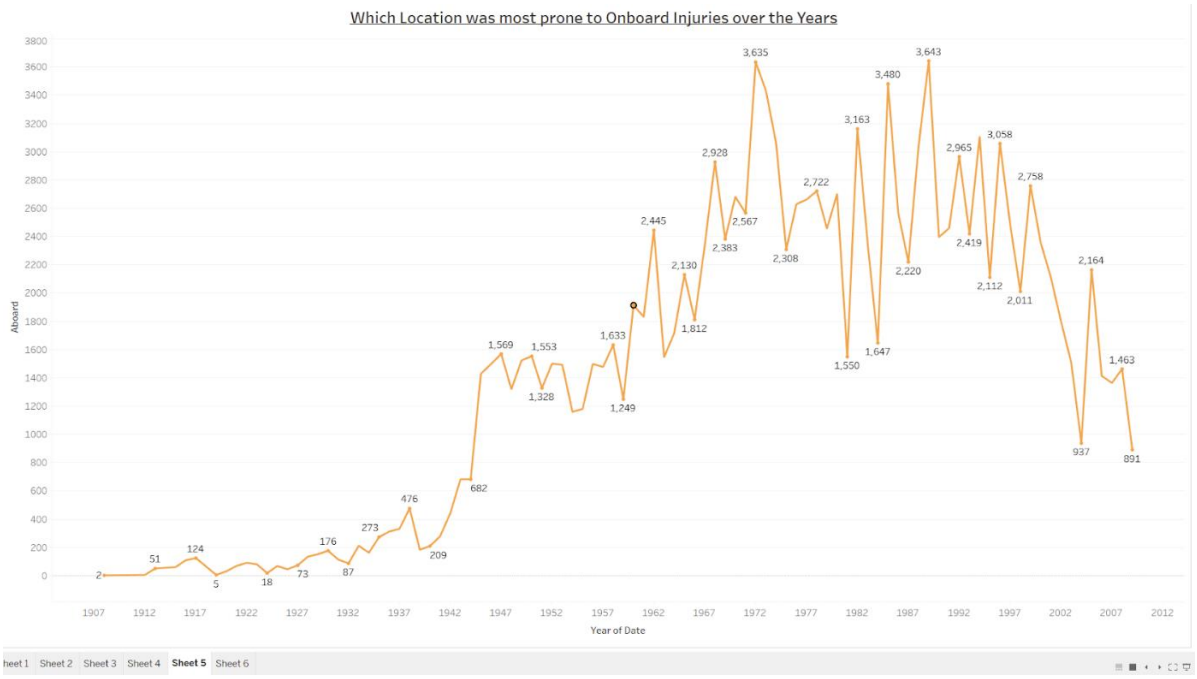
Virtualization-4:

Location prone to most onboard injuries:

This line chart shows us the location which has most injuries.



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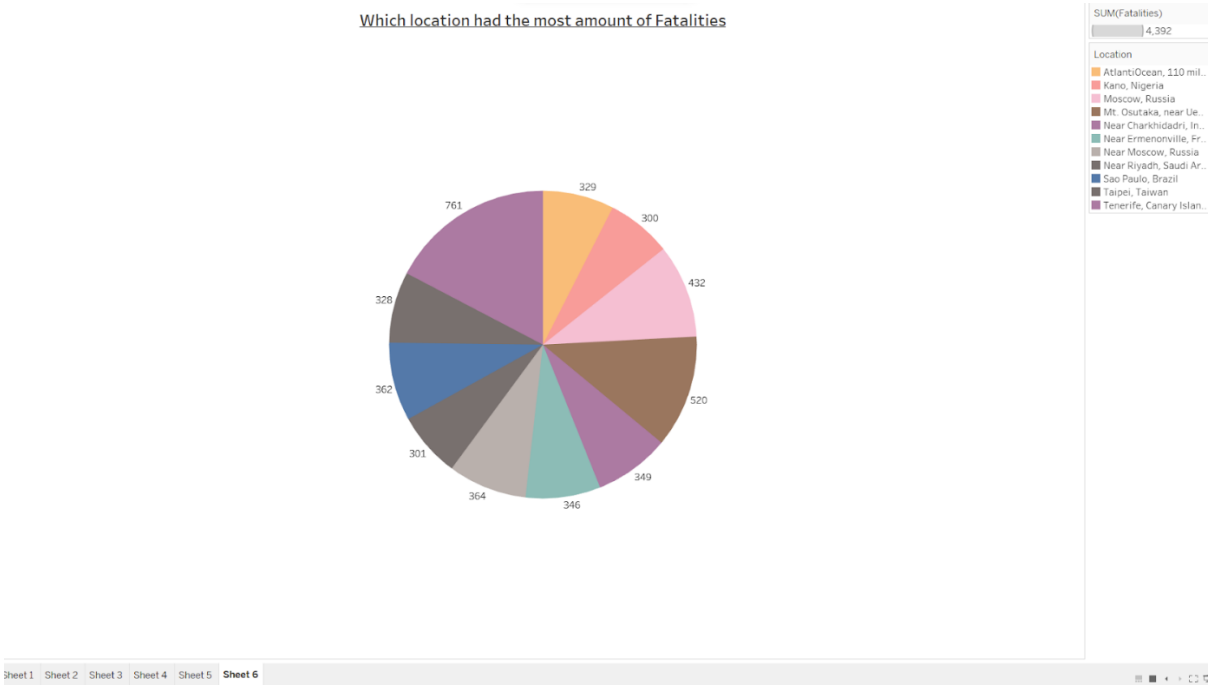
Virtualization-5:

Location with most fatalities:

This pie chart shows us the locations that has most fatalities.



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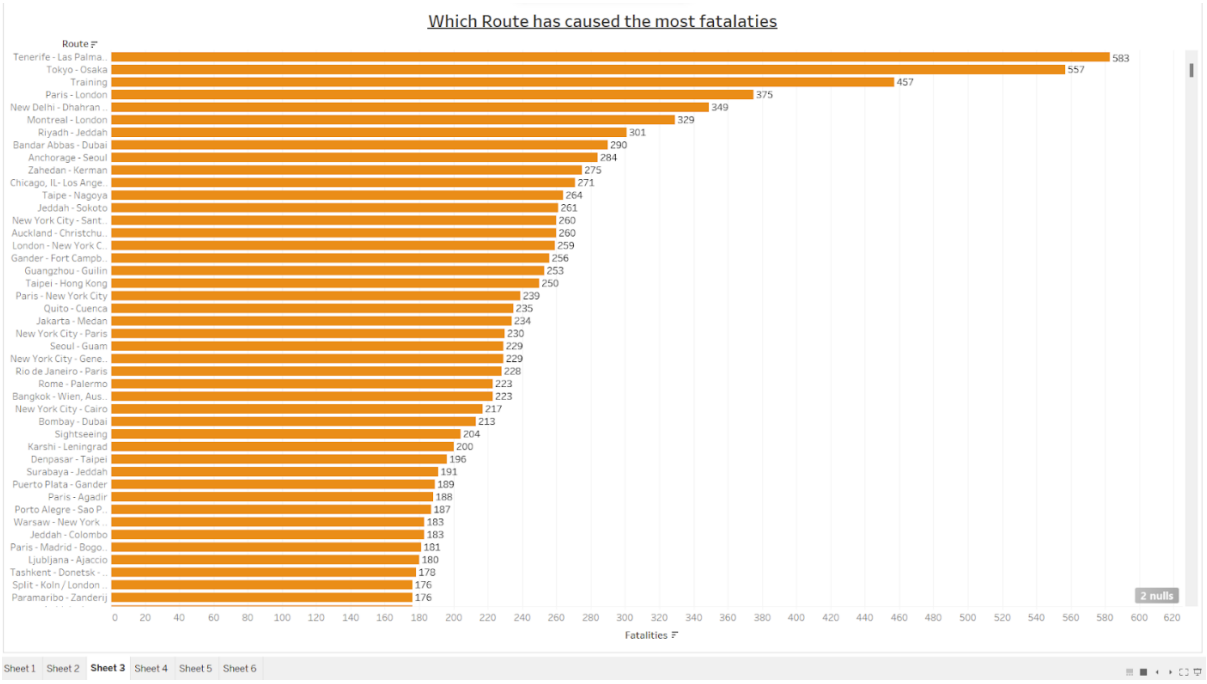
Virtualization-6:

Route that caused most fatalities:

This horizontal bar graph shows us the routes with most fatalities.



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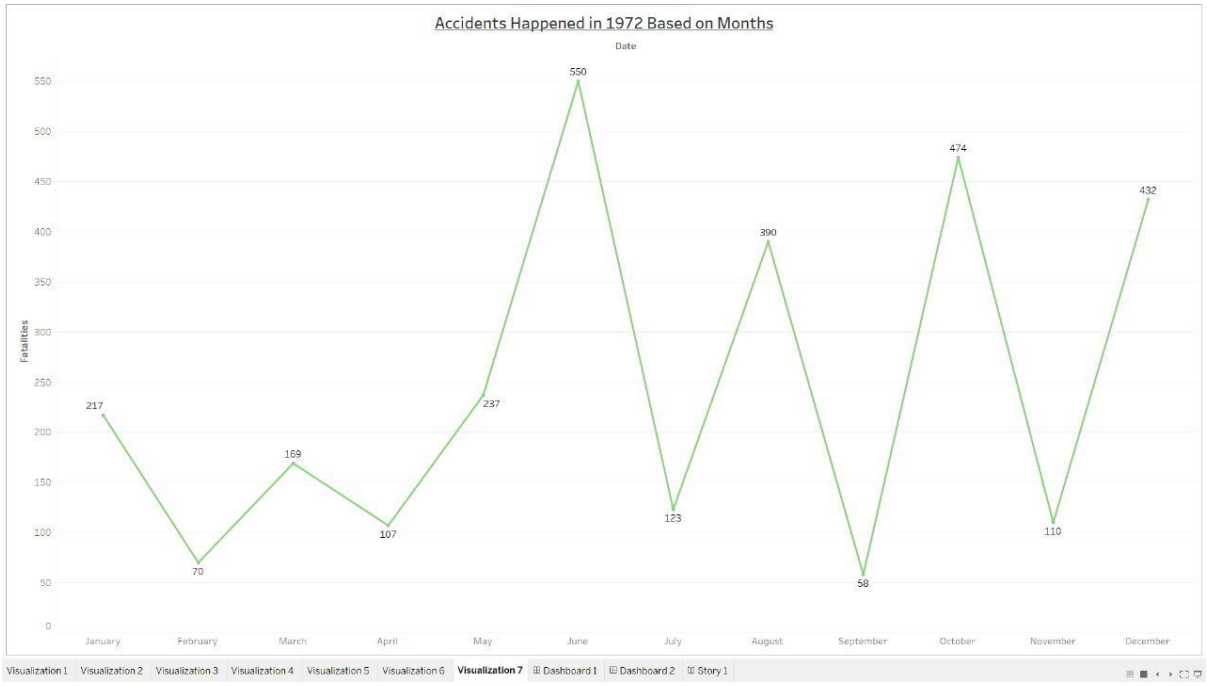
Virtualization-7:

Accidents happened in 1972 based on months:

This line graph shows us the accidents happened in 1972.



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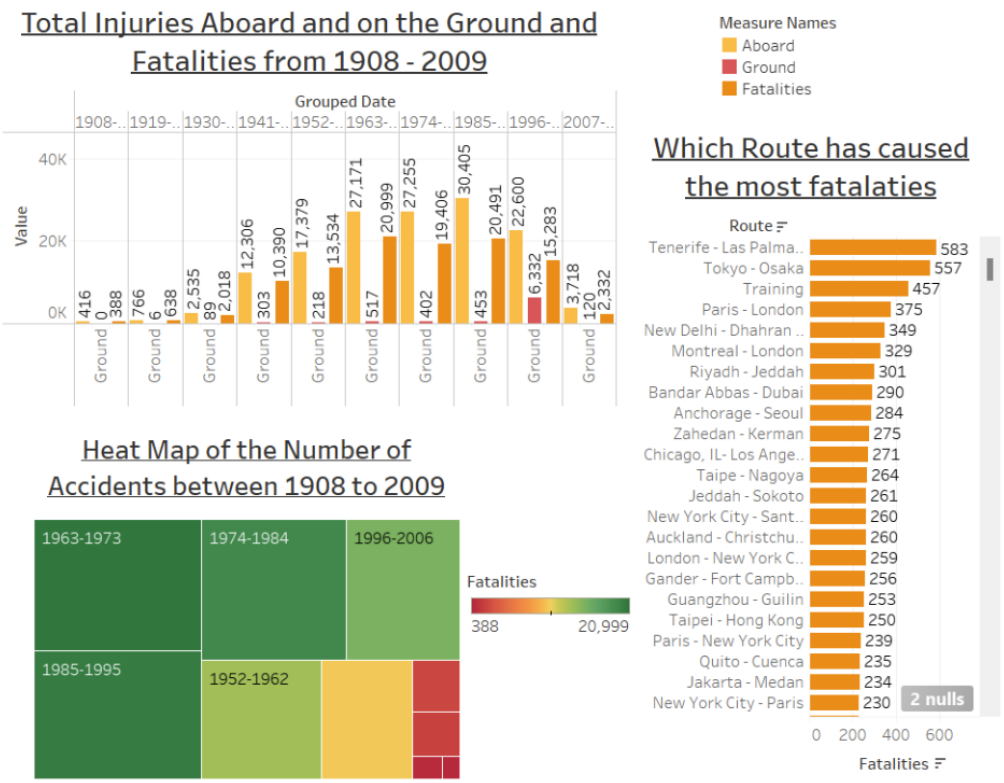

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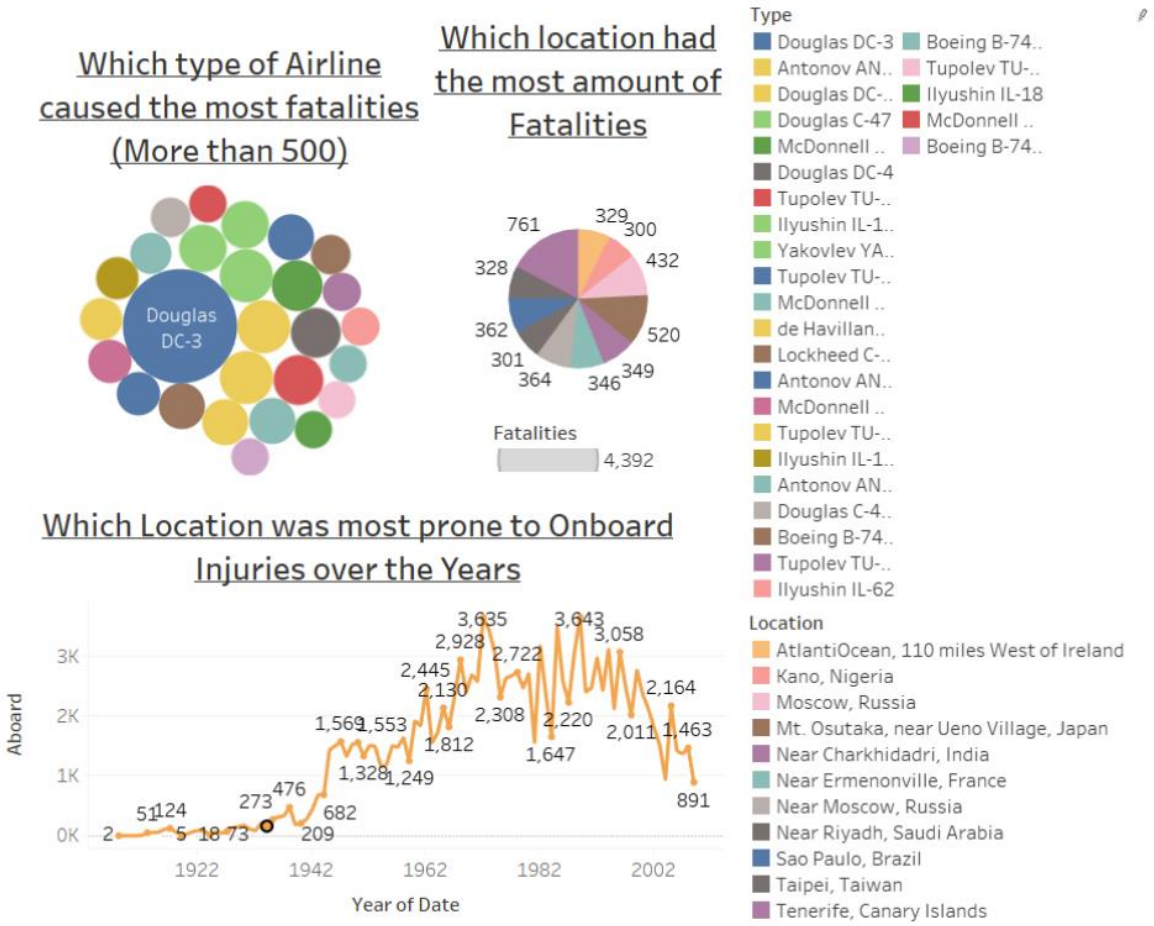

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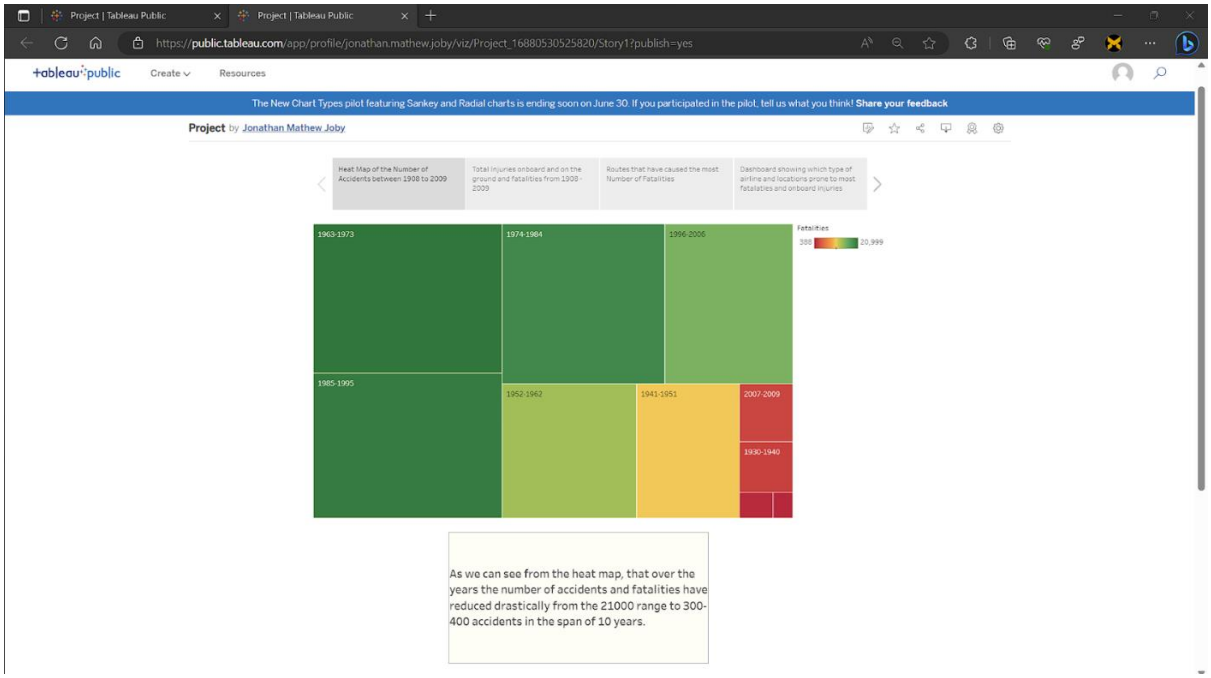

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Uploading to tableau server:

Links:

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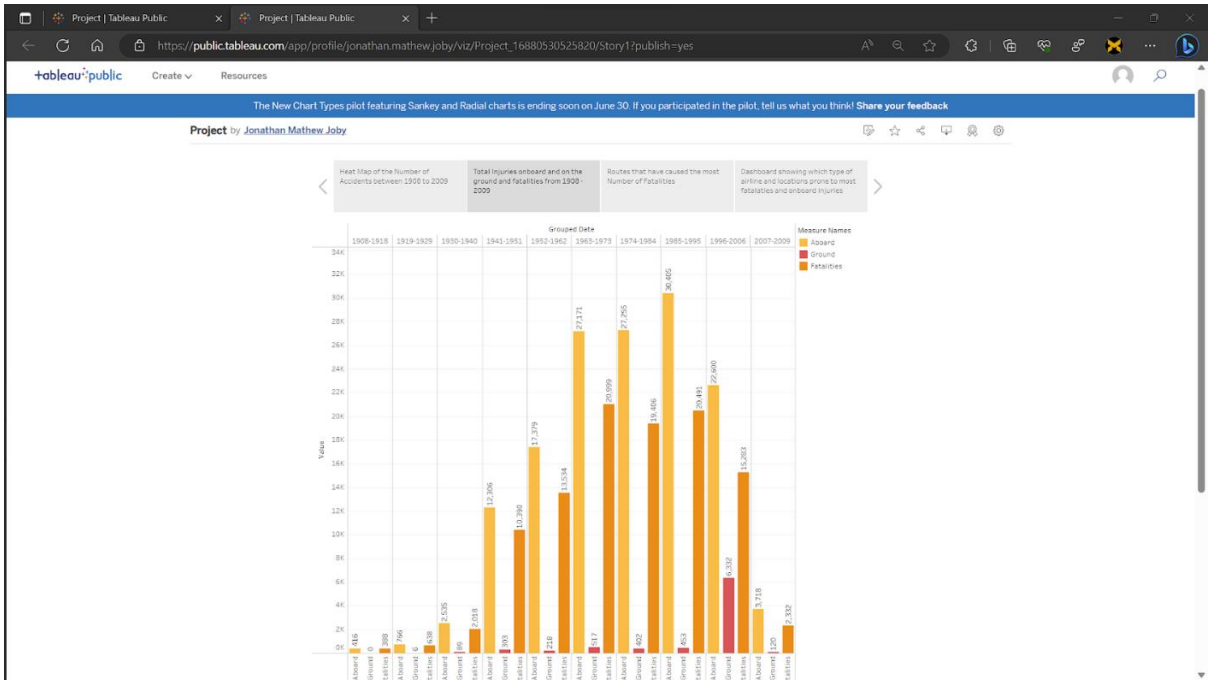

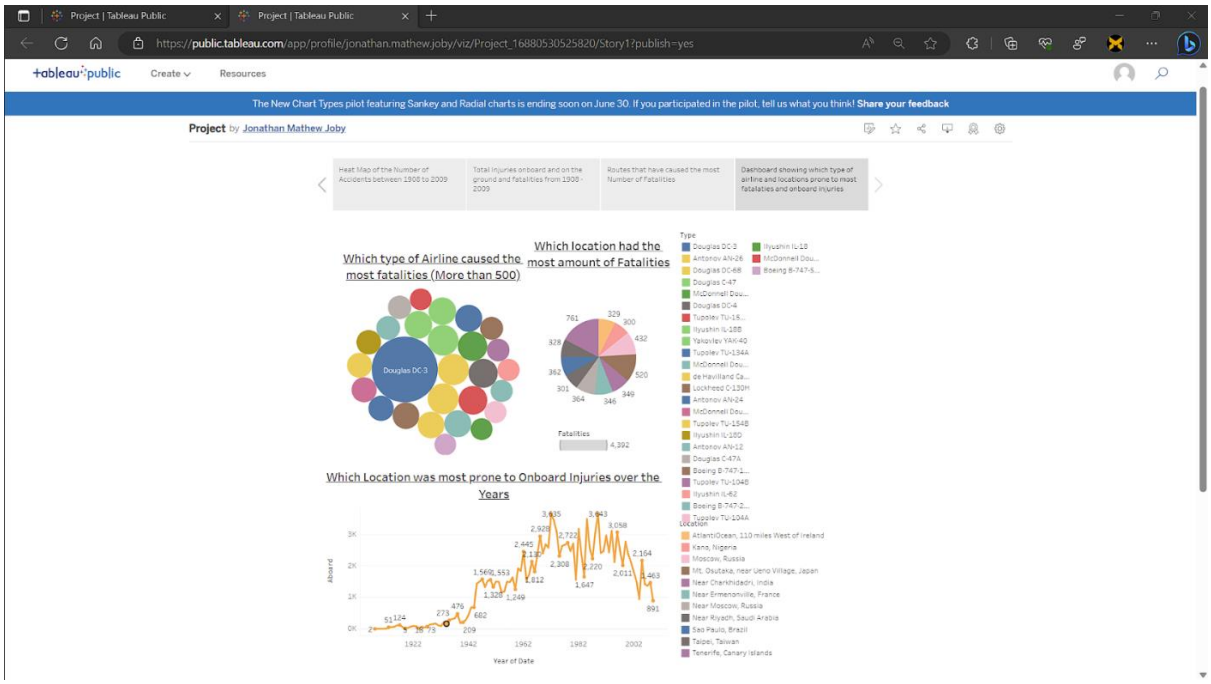

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Web integration/Flask implementation:

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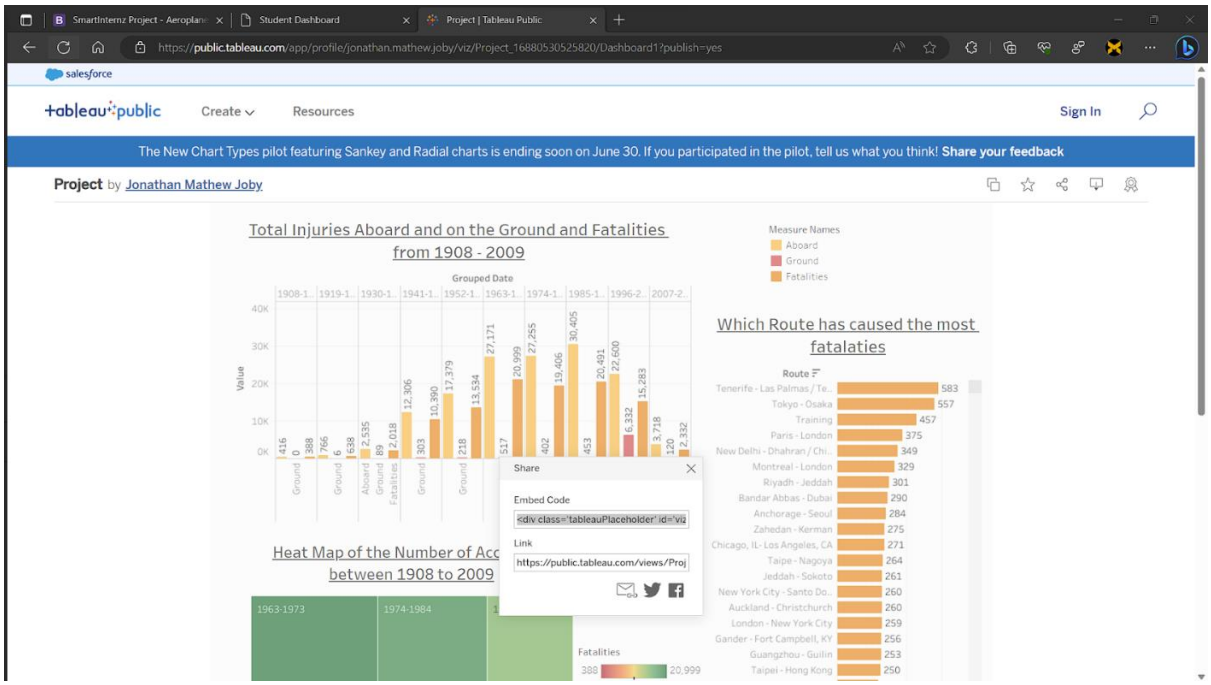
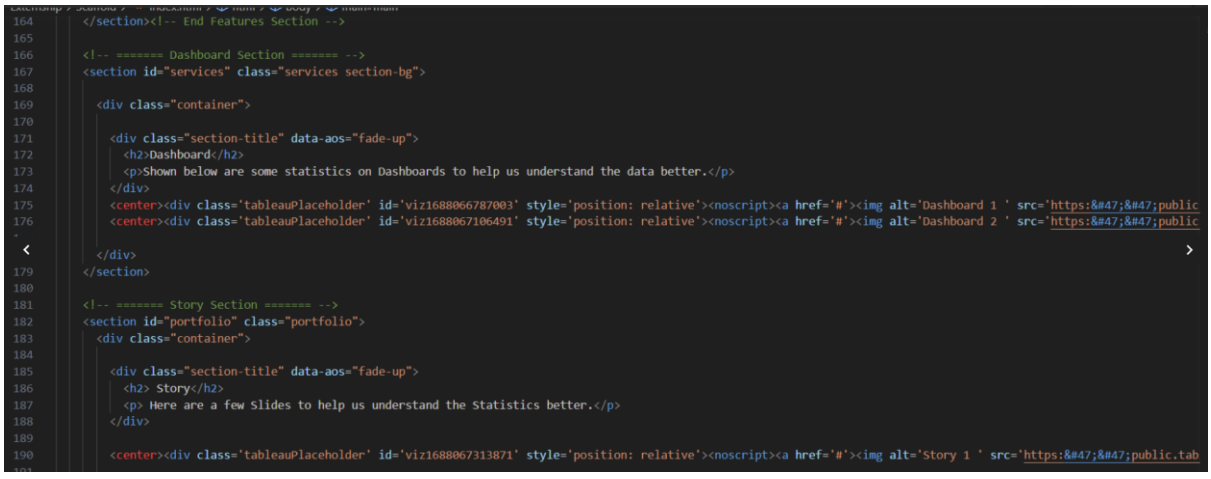


Step-2:

Code:



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      <p>Shown below are some statistics on Dashboards to help us understand the data better.</p>
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      <p> Here are a few Slides to help us understand the Statistics better.</p>
    </div>

    <center><div class='tableauPlaceholder' id='viz1688067313871' style='position: relative'><noscript><a href='#'><img alt='Story 1 ' src='https:&#47;&#47;public.tab
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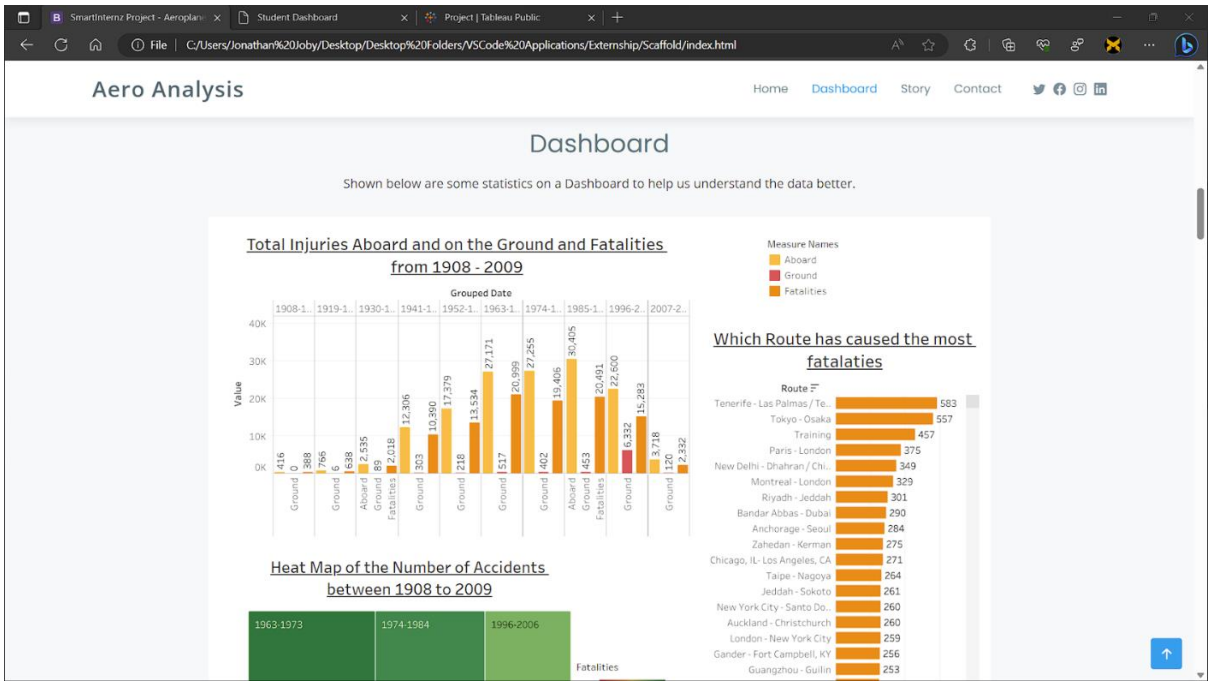
Step-3:

Dashboard on website:



Video link:

Part-1:

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part-2:

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Performance Testing:

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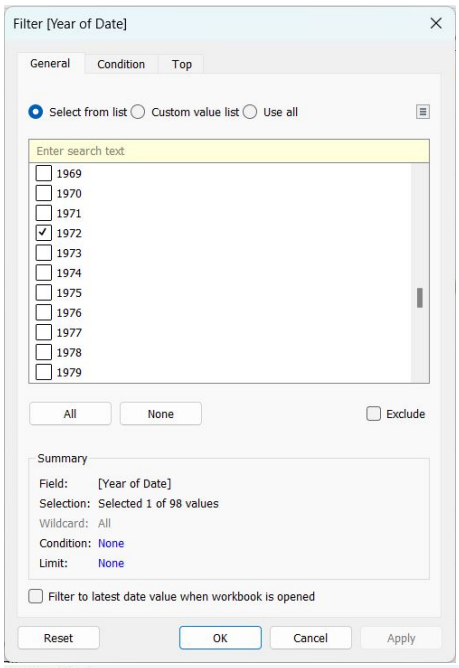
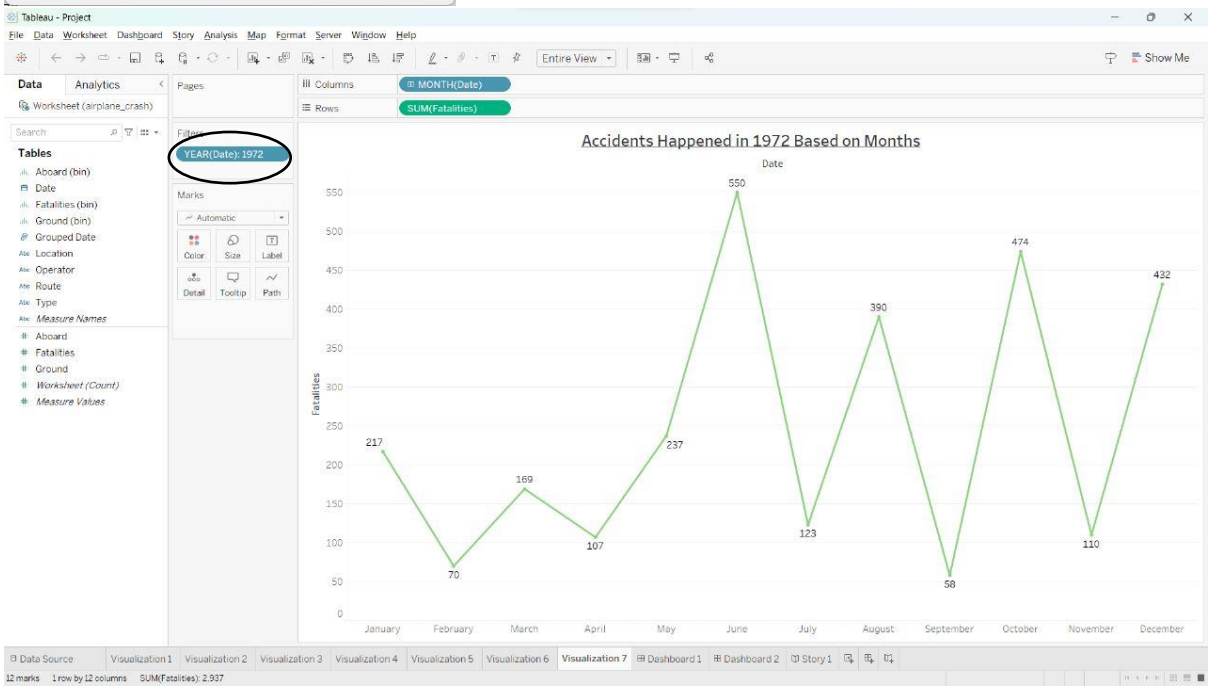




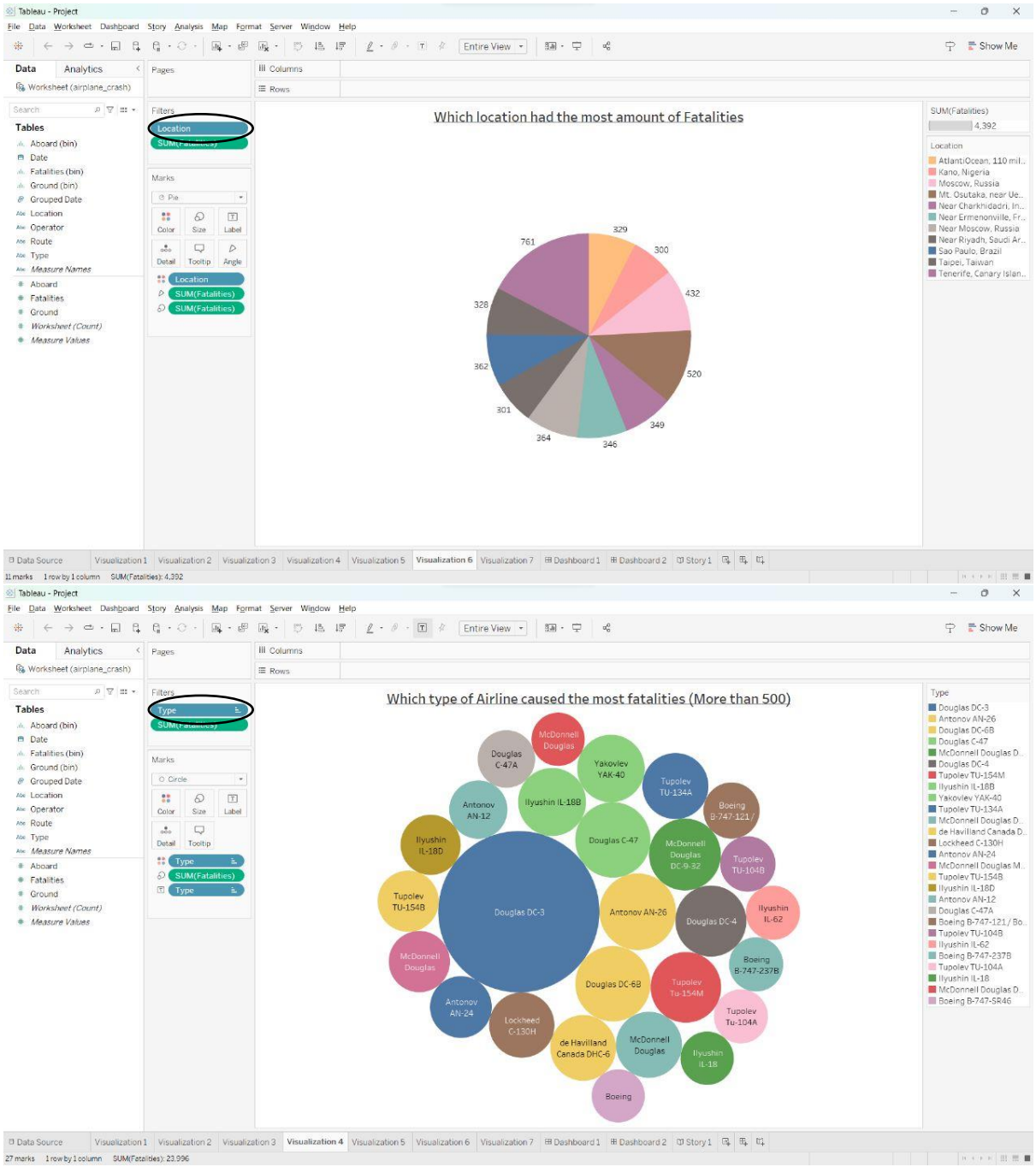
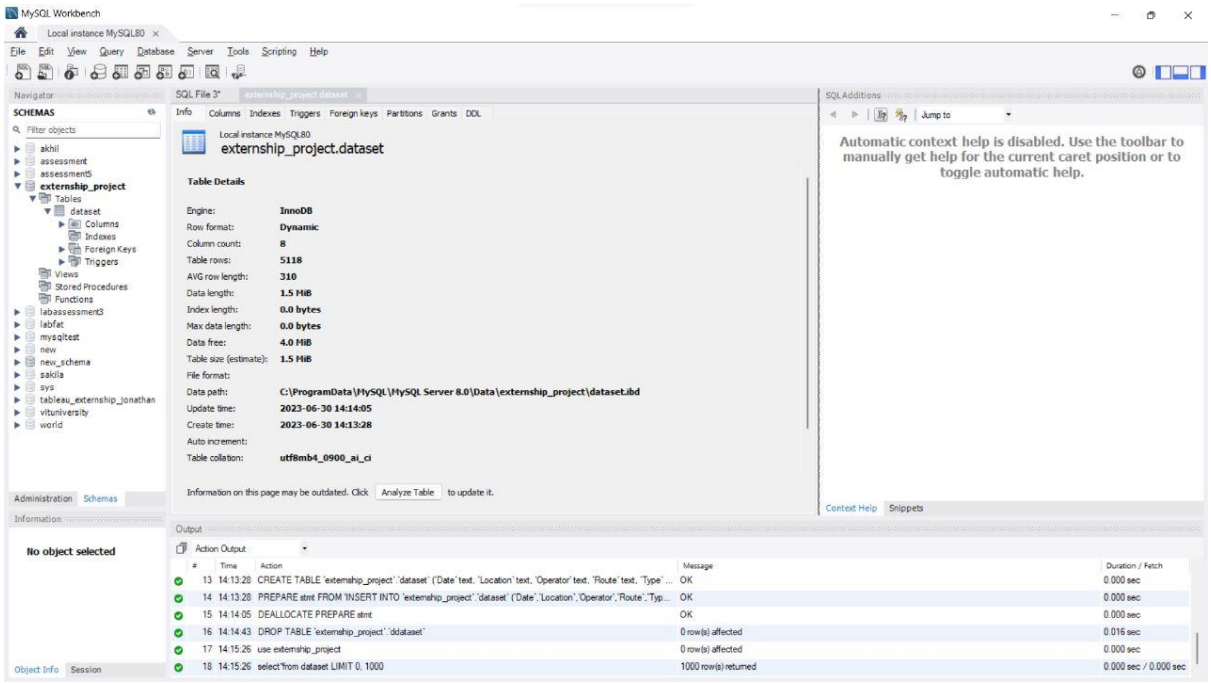


Tableau - Project
Which location had the most amount of Fatalities
329
300
432
520
349
346
364
301
362
328
761
Which type of Airline caused the most fatalities (More than 500)
Douglas DC-3
Douglas C-47A
McDonnell Douglas
Yakovlev YAK-40
Tupolev TU-134A
Boeing B-747-121 /
Antonov AN-12
Ilyushin IL-18B
Douglas C-47
McDonnell Douglas DC-9-32
Tupolev TU-104B
Ilyushin IL-18D
Tupolev TU-154B
Antonov AN-26
Douglas DC-4
Ilyushin IL-62
McDonnell Douglas
Boeing B-747-237B
Douglas DC-6B
Tupolev Tu-154M
Tupolev Tu-104A
Antonov AN-24
Lockheed C-130H
de Havilland Canada DHC-6
McDonnell Douglas
Ilyushin IL-18
Boeing

Amount of data rendered to db:



Conclusion:

As a whole, our study, " Airplane crash analysis using Tableau," has successfully tackled the imperative mission of examining aviation accidents in order to pinpoint their causes and enhance safety precautions. We have learned important things about the factors causing these incidents by thorough data collecting, cleansing, and analysis.

A deeper understanding of the intricate connections between aircraft systems, human variables, and environmental elements has been achieved by the thorough crash analysis carried out for this project. However, it has also revealed substantial problems and potential for future accident prevention.

In conclusion, our project has set the stage for continued initiatives to increase aviation safety and prevent aircraft crashes. We have helped the industry's safety standards to continuously improve by offering practical insights and suggestions. In order to build a safer, more dependable, and trusted aviation industry for the benefit of all parties, we hope that stakeholders would accept and put our conclusions into practice.