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Course Name: DSC5640-T301 Data Presentation and Visualization (2227-1)

Assignment: Term Project Milestone 1 (Week 1&2)

Instructor: Dr Catherine Williams

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**Airline Safety – Milestone 1**

## **Goal:**

The goal of this summary is to tell a story to the audience with visualization of different metrics to show airline is still one of the safest ways to travel.

## **Data Sources:**

1. **Primary Data:** Airline Safety

This dataset contains the data for 56 airlines that were in the global top 100 as of Dec 2012 and which have operated continuously since 1985.

|  |  |
| --- | --- |
| **Field** | **Definition** |
| airline | Airline (asterisk indicates that regional subsidiaries are included) |
| avail\_seat\_km\_per\_week | Available seat kilometers flown every week |
| incidents\_85\_99 | Total number of incidents, 1985–1999 |
| fatal\_accidents\_85\_99 | Total number of fatal accidents, 1985–1999 |
| fatalities\_85\_99 | Total number of fatalities, 1985–1999 |
| incidents\_00\_14 | Total number of incidents, 2000–2014 |
| fatal\_accidents\_00\_14 | Total number of fatal accidents, 2000–2014 |
| fatalities\_00\_14 | Total number of fatalities, 2000–2014 |

1. **Primary Data:** Accidents and Fatalities Per Year

This dataset contains the data of accidents and fatalities per year from 1946 to 2021. The dataset has been merged into one dataset.

|  |  |
| --- | --- |
| **Field** | **Definition** |
| Year | Year |
| Accidents\_Excl\_SBH | Accidents excluding suicide, sabotage, hijacking |
| Fatalities\_Excl\_SBH | Fatalities excluding suicide, sabotage, hijacking |
| Total\_Accidents | Total accidents including suicide, sabotage, hijacking |
| Total\_Fatalities | Total fatalities including suicide, sabotage, hijacking |
| Passenger\_Accidents | Passenger accidents including suicide, sabotage, hijacking |
| Passenger\_Fatalities | Passenger fatalities including suicide, sabotage, hijacking |
| Passenger\_Cargo\_Accidents | Passenger + cargo suicide, sabotage, hijacking |
| Passenger\_Cargo\_Fatalities | Passenger + cargo suicide, sabotage, hijacking |

1. **Supplemental Data:** Accidentsand Death Rate per Year

This dataset contains total accidents and fatality rate from 1918 to 2022.

Reference: <http://www.baaa-acro.com/statistics>

|  |  |
| --- | --- |
| **Field** | **Definition** |
| Rank | Rank |
| Year | Year |
| Nb of Crashes | Number of Crashes |
| Fatalities | Fatalities |

1. **Supplemental Data:** Total system passenger revenue and enplaned passenger

This dataset contains the consolidated airplane total operating revenue information from the year 1977 to 2021. Extracted another dataset containing the information about the consolidated airplane capacity information from the year 1950 to 2021

Reference: <http://web.mit.edu/airlinedata/www/Traffic&Capacity.html>

|  |  |
| --- | --- |
| **Field** | **Definition** |
| Year | Year |
| Cargo RTMs (mil) | Cargo RPM indicator |
| Departures (000) | Number of Departures |
| Load Factor | Load Factor |
| Passenger Enplanements (000) - Scheduled | Passenger Enplanements |
| Scheduled ASMs (000) | Aircraft ASM indicator |
| Scheduled RPMs (000) | Aircraft RPM indicator |

## **Why did you choose the visualizations you did? What were your findings?**

The above datasets have been used to build the following charts in Tableau to expose the truth behind the negative buzz on air travel. My primary goal is to show the trend of the airlines crashes and usages to show that the airline travel is safe today compared to early days.

1. **Total Air Accidents and Fatalities by Year**

This line chart is to show the total number of air incidents and fatalities occurred between the years 1920 and 2022. This is plotted between year and number of crashes and fatalities. The intention of this chart to show the trend is decreasing for number of crashes and fatalities as year increases. The number of incidents and fatalities are high during 1940’s and 1970’s and gradually decreases for increase in year. This might be due to incorporating various safety measures which makes airline travel safer.

1. **Passenger Flight Accidents and Fatalities Trend**

This plot is also trend chart similar to previous chart. Here, the chart is plotted between year and passenger flight accidents and fatalities compared to previous which is plotted for total number of accidents and fatalities. I have used bar chart to show the accident trend while line chart is used to show fatalities trend. This chart also shows that trend is decreasing for increase in year similar to previous one.

1. **Incidents by Airlines from 1985 to 1999 and 2000 to 2014**

The next 2 plots are the donut charts plotted for number of incidents by airlines for the year ranges 1985 to 1999 and 2000 to 2014. I have chosen only top 15 airline companies by incidents to show in the charts. This is to show the total number of incidents have been reduced between 2000 and 2014 compared to those occurred between 1985 and 1999. In addition, we could see modest correlation between the charts. One of outlier we could see is Russia’s Aeroflot which had an extraordinarily high number of reported incidents in ’85-’99. But many of these incidents are attempted hijackings around the time of the breakup of the Soviet Union. Contrastingly it has relatively low number in the ’00-’14 period. Another observation is Pakistan International Airlines and Ethiopian Airlines have had a persistently high rate of incidents.

The statistical inference from this chart is, some airlines are slightly safer to fly than others.

1. **Total Operating Revenue by Year**

This bar chart is plotted for total operating revenue of airlines against year (for the timeframe 1977 to 2021). We see the trend for operating revenue increases for each year except 2020 and 2021. The decrease in operating revenue for 2020 and 2021 are due to Covid-19. So, from this chart, we could understand that people prefer to travel in airplanes irrespective of few accidents reported.

1. **Number of Passengers onboarded**

This chart is similar to the previous one. This area graph plotted between passenger enplanement and year shows the people’s preference for air travel increase for each year. The decrease in interest for 2020 and 2021 is due to Covid-19 situation.

1. **Auto Deaths vs Airlines Deaths**

This visual use supplemental data of auto fatalities in the USA for the same two periods (’85 - ’99, ’00 - ‘14). The airlines fatalities are filtered for US airlines and compared to the auto numbers. Although there are decreasing trend of incidents in both travels, auto casualties are consistently far greater than air travel. If the facts in the data is to be considered as truth, then this visual clearly shows that just by considering number of fatalities, travelling by road is far more dangerous than travelling by air.

## **How do you plan to present to your internal team?**

I will schedule a meeting with my internal team and go through the visualizations created in Tableau with above observation. In addition, I will prepare and share a power point deck with all the charts and their observation.

## **Ethically what do you need to consider?**

Following are some ethical considerations I have considered in this research.

* Assessing only relevant information required for this analysis
* Validating the data
* Communicating the results appropriately