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Class: DSC 640
Git Repo: My AirlineAnalysis.pbix is located in the "Task1-Dashboard"
              folder of the following address:
              https://github.com/adanque/DSC640

Airline Fatality Trends

For my dashboard story, I chose to use Power Bi to present an interactive conversation about airline fatality trends using a combination of design strategies. My intention was to drive my audience to compare and contrast airline performance against the factors showing the highest fatalities per our competing airline operators and the type of plane involved. By using this dashboard, my hope is to highlight which type of planes may be mostly involved and therefore possibly contributing to the fatalities due to a specific phase of its flight or category.

For the design of my dashboard, I incorporated the top left to right and zig zag down user experience design theory per natural eye movement patterns. Using this design, I started with a header that included my title, a total count gauge chart on the top left. Then a sliding filter for the years with an area chart to the right of the filter to display the fatality results per years chosen. For the body, I chose to break into 3 columnar sections divided by a space. To establish that each chart was part of a section, I added borders for each chart and placed the proximity of each next to each other. In the first column, I chose to include a filterable table that lists country and its number of fatalities. Below that I chose to tell the story of how many total fatalities broken down by month. In the middle section, I chose to add 2 filterable horizontal bar charts sorting the fatalities in descending order so to make the highest counts per its category easily accessible and a table that lists the detail available in the category field of my dataset. The 2 filterable horizontal charts include: fatalities by operator and by airplane type. In the third section, I chose to use a donut chart to employ a compare contrast technique to tell the story between phases at the time of the airline fatality. To display the magnitude of effect by location, I added a map that displayed a bubble size relative to the number of fatalities in that country. Under the body of my dashboard, I added one row to include my sources and my student information.
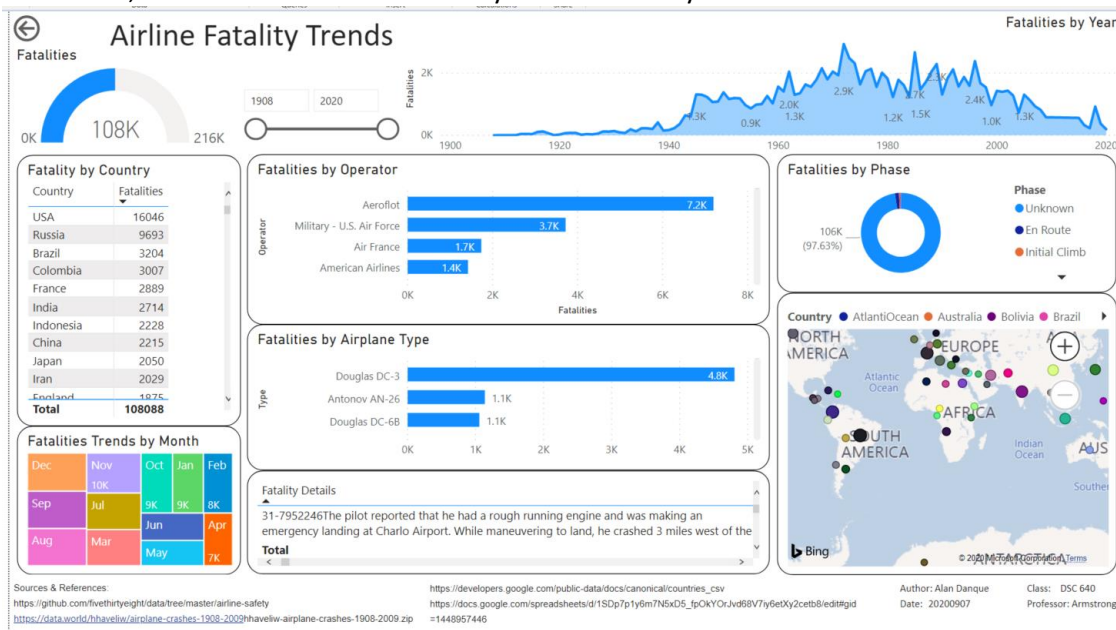
There were some interesting insights noted after creating this dashboard. One was the story told when filtering for France in 1974 where it experienced the most airline fatalities in a year at 346. There it noted that most of the fatalities regarded an airline operator named, "Turkish Airlines" using a plane of type McDonnel Douglas DC 10 only in the months of March and Jul. The fatality details included, "Crash on Takeoff after engine failure in the No 2 engine.

FATALITIES BY CATEGORY

Fatality Details	Fatalities
Crashed on takeoff after engine failure in the No. 2 engine.	8
During a steep climb at an airshow, the airplane was observed to level off very abruptly and then begin a dive. The plane broke apart and exploded before crashing into a residential area killing 8 people and seriously injuring 60 others. The pilot, possibly startled by a close encounter with a Mirage jet photographing the TU-144, overreacted causing a compressor stall. The aircraft then went into a dive and broke apart after the aircraft's design capacity was exceeded.	6
Fire aboard the aircraft in the aft right toilet was reported and an emergency descent made. The plane was heavily damaged by fire before fire fighters could rescue passengers. Most fatalities were due to CO before rescuers could reach passengers. The fire started in the aft right toilet either from an electrical short or discarded cigarette.	123
Midair collision. Convair crew improperly assessed collision-course situation. Contributing factor was poor quality of radio transmissions. All sixty-eight aboard the DC-9 were killed while the Convair landed safely.	68
The aircraft crashed shortly after takeoff from Orly Airport in Paris, France. Climbing through FL110 the aircraft lost the rear cargo door, resulting in explosive decompression and damage to the cabin floor and control cables. The aircraft lost control and crashed in a forest at a high rate of speed. The service subcontractor and the flight engineer neglected to check the locking mechanism through a recently installed viewport to verify the door was latched properly. In	346
Total	**551**

Fatality Details

Crashed on takeoff after engine failure in the No. 2 engine.
During a steep climb at an airshow, the airplane was observed to level off very abruptly and then begin a dive. The plane broke apart and exploded before crashing into a residential area killing 8 people and seriously injuring 60 others. The pilot, possibly startled by a close encounter with a Mirage jet photographing the TU-144, overreacted causing a compressor stall. The aircraft then went into a dive and broke apart after the aircraft's design capacity was exceeded.
Fire aboard the aircraft in the aft right toilet was reported and an emergency descent made. The plane was heavily damaged by fire before fire fighters could rescue passengers. Most fatalities were due to CO before rescuers could reach passengers. The fire started in the aft right toilet either from an electrical short or discarded cigarette.
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The aircraft crashed shortly after takeoff from Orly Airport in Paris, France. Climbing through FL110 the aircraft lost the rear cargo door, resulting in explosive decompression and damage to the cabin floor and control cables. The aircraft lost control and crashed in a forest at a high rate of speed. The service subcontractor and the flight engineer neglected to check the locking mechanism through a recently installed viewport to verify the door was latched properly. In addition, although a service bulletin stipulated that the locking pin should be extended, it was mistakenly shortened causing the latch to release after the cabin was pressurized. On June 12, 1972, an American Airlines DC-10 lost its cargo door shortly after taking off from Detroit Michigan. Using mainly engine thrust the crew was able to land safely. The cause was a defect in the latching mechanism on the door.
Total

To prepare the data used for this dashboard, I created two python scripts. One for the data wrangling to clean up the data and to unify the two historical airline fatality data sets. And a second to perform the exploratory data analytics to understand the distribution and relationships of the contained fields. After pulling the dataset, I found that I needed latitudes and longitudes per country to enable a map presentation of the data. I then imported a country lat-long data file and used the Power Bi DAX language to create a formula for the country name to allowed me to join on the country name fields. Data sources:

- [Accidents and Fatalities Pery Year](#)
  https://docs.google.com/spreadsheets/d/1SDp7p1y6m7N5xD5_fpOkYOrJvd68V7iy6etXy2cetb8/edit#gid=1448957446
  Supplemental data
- [Crash Datasets](#), Data.World
  Airplane Crashes 1908-2009
  DATASET BY **HOZEFA HAVELIWALA**
  https://data.world/hhaveliw/airplane-crashes-1908-2009

  To get country lat and long addresses, I also used: countries.csv.
  https://developers.google.com/public-data/docs/canonical/countries_csv

Below are screenshots of the python scripts created for this task.

DSC640 > DSC640 > Task1-Dashboard > EDA.py   EDA ▾   Git:

Exercise_1_2.py ×   DataWrangle.py ×   EDA.py ×   NLTK.py ×

```python
18  import warnings
19  import matplotlib.cbook
20  warnings.filterwarnings("ignore", category=matplotlib.cbook.mplDeprecation)
21
22  print("Generate Pandas Profile for dfs8")
23  from pandas_profiling import ProfileReport
24
25  adf = pd.read_csv(".\\datasets\\UnifiedDataSet.csv")
26  bprof = ProfileReport(adf)
27  bprof.to_file(output_file='EDA_AirSafety_PandasProfileReport_output.html')
28
29
```
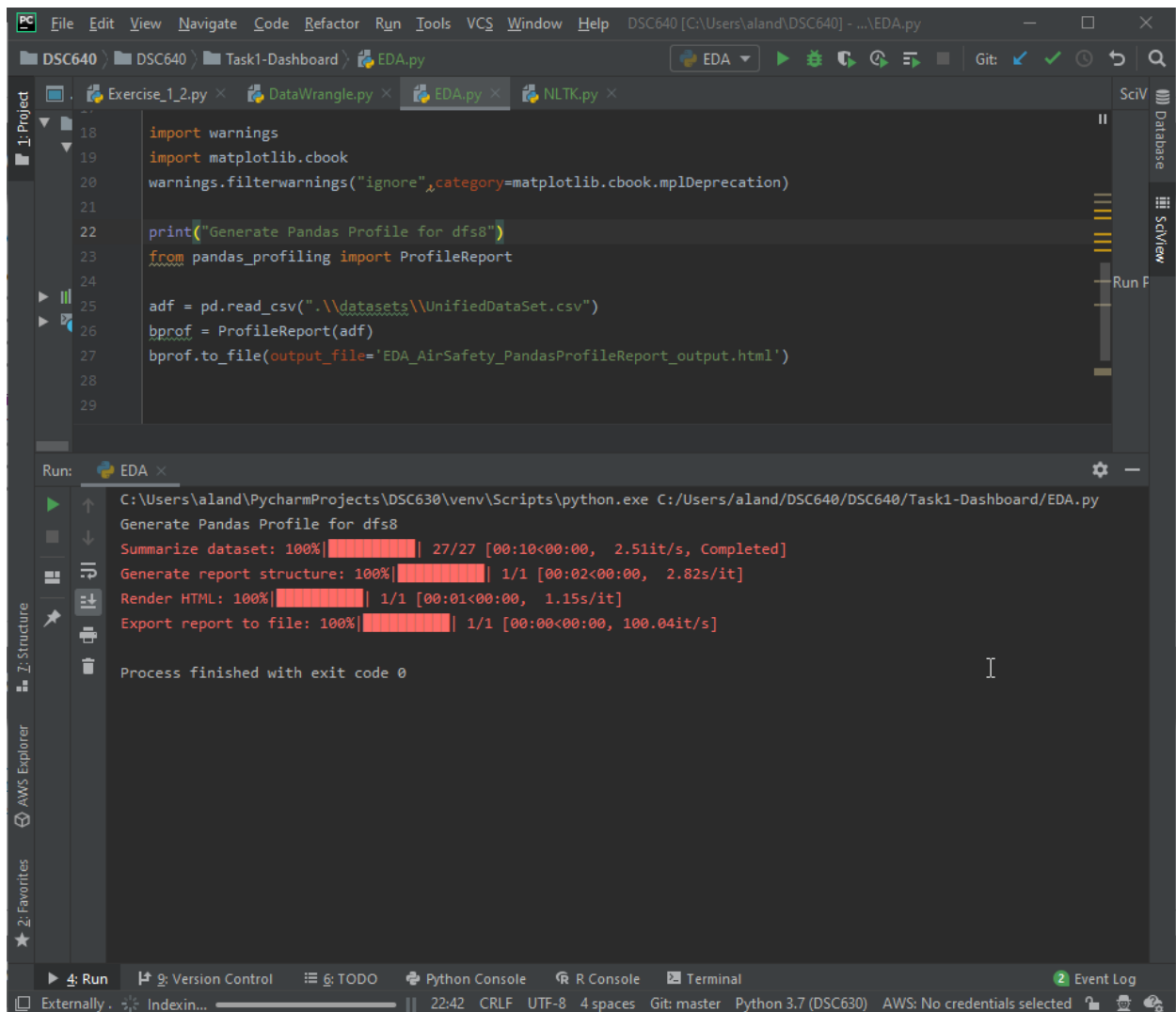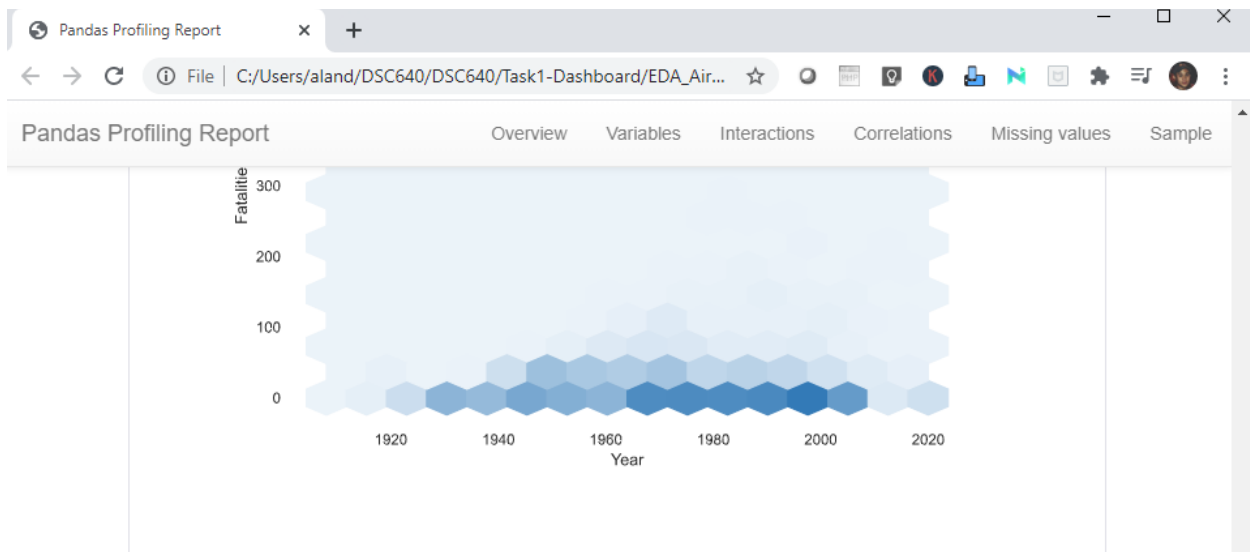
Run: EDA ×

```
C:\Users\aland\PycharmProjects\DSC630\venv\Scripts\python.exe C:/Users/aland/DSC640/DSC640/Task1-Dashboard/EDA.py
Generate Pandas Profile for dfs8
Summarize dataset: 100%|          | 27/27 [00:10<00:00,  2.51it/s, Completed]
Generate report structure: 100%|          | 1/1 [00:02<00:00,  2.82s/it]
Render HTML: 100%|          | 1/1 [00:01<00:00,  1.15s/it]
Export report to file: 100%|          | 1/1 [00:00<00:00, 100.04it/s]

Process finished with exit code 0
```

▶ 4: Run   ⑨ 9: Version Control   ☰ 6: TODO   Python Console   R Console   Terminal   Event Log

Externally .   Indexin...   22:42   CRLF   UTF-8   4 spaces   Git: master   Python 3.7 (DSC630)   AWS: No credentials selected

Correlations

Pearson's r   Spearman's ρ   Kendall's τ   Phik (φk)   Toggle correlation descriptions