**Patterns from TSA Complaints**

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DSC 640 T301: Identifying Differences & Visualizing Spatial Relationships

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**Patterns from TSA Complaints**

This project explores trends in the TSA Complaints retrieved from the data liberation project for the period from 2015 till 2021.

**Audience**

The intended audience for this project is TSA regional operations managers and analysts. These stakeholders are familiar with operational metrics and the TSA complaint logging process but may not be experts in data visualization or advanced analytics. Given their domain knowledge, visualizations are designed with clarity and insights in mind, avoiding overly technical language while offering sufficient depth to drive decision-making. This audience is likely to value actionable insights, especially those highlighting problematic trends in airport-specific or category-specific complaints.

**Purpose & Call to Action**

The purpose of this project is to uncover patterns in TSA complaints across U.S. airports, categorized by type and subcategory, and spanning multiple years. The analysis shows that a few complaint categories—like Expedited Passenger Screening Program, mishandling of property and screening procedures, Customer Service—consistently dominate.

**Call to Action:** TSA leadership should implement targeted audits and training programs at high-complaint airports, focusing especially on recurring subcategories like “Expedited Passenger Screening Program “, “damaged baggage” and “inappropriate screening procedures.” These insights allow the TSA to not only improve passenger satisfaction but also proactively reduce recurring issues.

**Medium**

* **PowerPoint Presentation:** The story is delivered through a Python-based Jupyter Notebook with embedded visualizations and supplemented by a PowerPoint presentation for executive communication. This dual medium ensures interactivity during analysis and visual clarity during stakeholder review.

**Design**

Design choices are guided by Gestalt principles.

* Color: Reds used to convey urgency and highlight complaint volumes.
* Text: Minimalist labels support quick interpretation.
* Alignment & Spacing: Visuals are consistently formatted for clean comparisons.
* Sizing: Bubble and bar sizes scaled proportionally for intuitive insight.

**Ethical Considerations:**

* The data comes from public sources: https://github.com/data-liberation-project/tsa-complaint-counts and https://github.com/ip2location/ip2location-iata-icao.
* No personal information was present; the analysis is purely on aggregate complaint counts.
* Filtering was transparently conducted to focus on U.S. airports only.
* Geographic mapping was carefully verified using IATA codes and locations.
* Ethical presentation was ensured by avoiding exaggeration or cherry-picked time ranges.

**Presentation Visuals:**

1. **Heat Map – Complaint volume over time and category**:

A screenshot of a graph

AI-generated content may be incorrect.

1. **Spatial Map – Airport-level complaint distribution:** A map of the united states with red dots

   AI-generated content may be incorrect.
2. **Box Plot – Distribution of complaints across months and categories:** **A diagram of a number of companies

   AI-generated content may be incorrect.**
3. **Line Charts – Trends for top complaint subcategories:**

**A graph with blue lines and numbers

AI-generated content may be incorrect.**

1. **Bar Char, Stacked / Grouped Bar Charts – Breakdown of subcategory counts:** **A graph of a number of red and orange colored bars

   AI-generated content may be incorrect.**

A graph of different colored bars

AI-generated content may be incorrect.

1. **Custom Multi-Panel Visuals – Top 3 subcategories by month per category:**

A screenshot of a graph

AI-generated content may be incorrect.

**Analysis Summary:**

* Complaint data is from 2015 – 2021 highlights persistent issues at specific airports across the world.
* The non-US airports are few, hence excluded from the further analysis.
* Most complaints fall into five key categories with ‘Expedited Passenger Screening Program’, ‘Mishandling of Passenger Property’, and ‘Customer Service’.
* Within those, subcategories like ‘\*’ (unknown), ‘TSO’ are most frequently reported.
* Monthly trends reveal a significant downtrend of complaints during the Covid pandemic period.
* Spatial analysis shows clusters of high complaints at major airports, confirming that complaint volume often correlates with passenger traffic – but also reveals some smaller airports with disproportionate issues.

**Call to Action:**

* Prioritize high-complaint airports for internal reviews and compliance audits.
* Focus training efforts on TSA agents in areas of repeated complaint subcategories such as:
  + Expedited Passenger Screening Program
  + Customer Service (TSO)
* Implement feedback loops to monitor progress post-intervention.
* Integrate findings into performance metrics and public transparency dashboards.
* Regularly review subcategory-level trends to proactively adjust policies before complaint spikes escalate.