Austin Animal Center Case Study: Detailed Report on Excel Data Analysis

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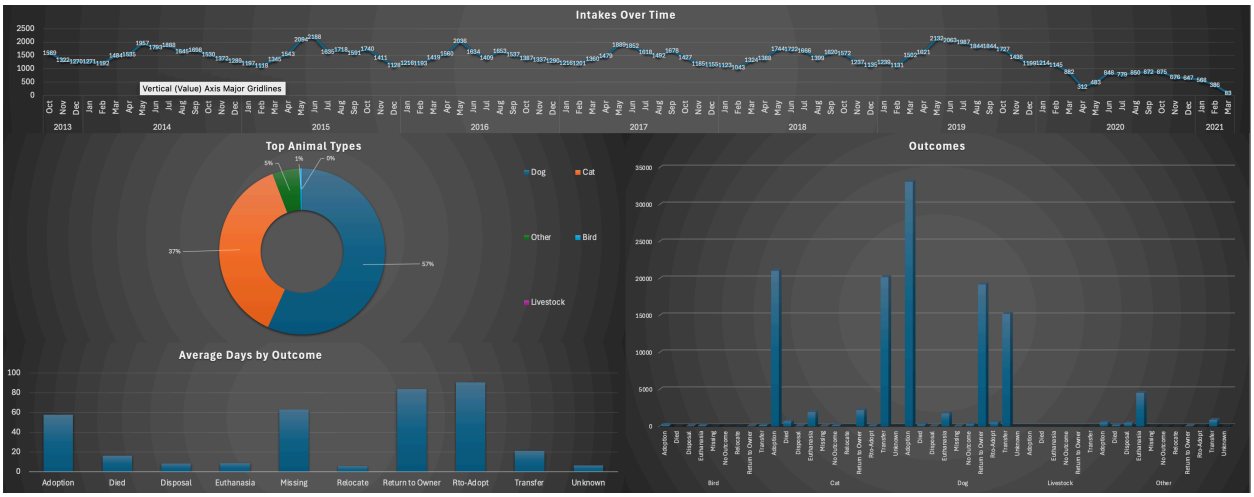
Abstract

This report documents the step-by-step process of analyzing the `Austin_Animal_Center_Intakes.csv` and `Austin_Animal_Center_Outcomes.csv` datasets using Microsoft Excel. The project involved importing, cleaning, and merging data, creating PivotTables, and building an interactive dashboard to uncover trends in animal intakes, outcomes, and shelter duration. Challenges, such as date formatting issues and negative shelter days, were resolved with targeted solutions. The dashboard, featuring a stacked bar chart for outcomes and a pie chart for animal types, provides actionable insights for shelter management and serves as a portfolio piece showcasing advanced Excel skills.



Introduction

The Austin Animal Center Case Study is an Excel-based project analyzing animal shelter data to identify operational trends. Using the `Austin_Animal_Center_Intakes.csv` and `Austin_Animal_Center_Outcomes.csv` datasets, the project explores intake patterns, animal types, outcome distributions, and time spent in

the shelter. Advanced Excel features, including XLOOKUP, INDEX MATCH, PivotTables, and interactive dashboards, were employed to create a professional visualization for shelter management and portfolio presentation.

Objectives

- Clean and prepare raw datasets for analysis.
- Merge intake and outcome data to track animal journeys.
- Analyze key metrics using PivotTables.
- Create an interactive dashboard with customized visualizations.
- Document the process for a professional portfolio.

Data Description

The project uses two datasets:

- `Austin_Animal_Center_Intakes.csv`: Records animals entering the shelter, with columns: Animal ID, DateTime, Intake Type, Animal Type, Breed, Age upon Intake.
- `Austin_Animal_Center_Outcomes.csv`: Records animals leaving the shelter, with columns: Animal ID, DateTime, Outcome Type, Outcome Subtype, Animal Type, Breed, Age upon Outcome.

Methodology

The project followed a structured process, detailed below, with solutions to challenges.

Data Import

- Imported `Austin_Animal_Center_Intakes.csv` into the **Intakes_Raw** sheet using `Data` > `Get Data` > `From Text/CSV`.
- Imported `Austin_Animal_Center_Outcomes.csv` into the **Outcomes_Raw** sheet.
- Created **Intakes_Clean** and **Outcomes_Clean** sheets by copying raw data for cleaning.

Data Cleaning

- **Removed Duplicates**: Applied `Data` > `Remove Duplicates` to **Intakes_Clean** and **Outcomes_Clean**.
- **Fixed Date Formatting**:
  - **Challenge**: The **DateTime** columns were in General format with text like "MM/DD/YYYY HH:MM", causing issues with PivotTable grouping.
  - **Solution**:
    - In a helper column, converted **DateTime** to text using `=TEXT(B2, "MM/DD/YYYY")` to remove minutes and other text after the space.
    - In another column, converted the text back to an integer using `=INT([helper cell])`.
    - Copied the results and pasted as values over the original **DateTime** column.
    - Formatted the column as Short Date (MM/DD/YYYY) via `Home` > `Format` > `Format Cells` > `Short Date`.
- **Handled Missing Values**:
  - Filled blanks in **Animal Type** and **Intake Type** with "Unknown" using filters.
  - Replaced blank **Name** with "Unnamed" via `Find and Replace` (`Command + H`).
- **Trimmed Spaces**: Used `=TRIM([cell])` in a helper column, then pasted as values.
- **Selected Columns**:
  - Kept in **Intakes_Clean**: Animal ID, DateTime, Intake Type, Animal Type, Breed, Age upon Intake.
  - Kept in **Outcomes_Clean**: Animal ID, DateTime, Outcome Type, Outcome Subtype, Animal Type, Breed, Age upon Outcome.
  - Deleted others (e.g., Intake Condition, Date of Birth) via `Delete`.

Data Merging

- Created the **Combined_Data** sheet with columns from **Intakes_Clean**: Animal ID, DateTime (Intake Date), Animal Type, Breed, Intake Type.
- **Merged with XLOOKUP**:

    - Added **Outcome Type** (column F):

      ```
      =XLOOKUP(A2, Outcomes_Clean!A:A, Outcomes_Clean!D:D, "No Outcome", 0)
      ```

    - Added **Outcome Date** (column G):

      ```
      =XLOOKUP(A2, Outcomes_Clean!A:A, Outcomes_Clean!B:B, "No Outcome", 0)
      ```

- **Merged with INDEX MATCH**:
    - Added **Outcome Subtype** (column I):

      ```
      =IFERROR(INDEX(Outcomes_Clean!E:E, MATCH(A2, Outcomes_Clean!A:A, 0)), "No Outcome")
      ```

Days in Shelter Calculation

- Added **Days in Shelter** (column H) in **Combined_Data**:where **G2** is Outcome Date and **B2** is Intake Date.

  ```
  =ABS(G2-B2)
  ```

- **Challenge**: Negative days (e.g., -222) appeared due to reversed dates (Outcome Date earlier than Intake Date).
- **Solution**: Used `=ABS(G2-B2)` to ensure all values are positive.
- Formatted as Number with 0 decimal places.
- Handled blanks (e.g., for “No Outcome”) by filtering in PivotTables.

PivotTable Creation

- Created four PivotTables from **Combined_Data** in sheets: **Trends**, **Types**, **Outcomes**, **Shelter Time**.
- **Challenges**:

- PivotTable Fields pane disappeared.
  - **Solution**: Clicked inside the PivotTable, used `PivotTable Analyze` > `Show` > `Field List`.
- `DIV/0!` error in **Shelter Time** for “No Outcome” rows.
  - **Solution**: Filtered out “No Outcome” and “(blank)” in **Outcome Type**.

1. **Trends (Intake Trends)**:
   - Sheet: **Trends**.
   - Rows: **Intake Date** (grouped by Years and Months, removed Quarters via `Ungroup`).
   - Values: **Animal ID** (Count, renamed “Number of Intakes”).
   - Formatted: Tabular Form, no subtotals (`Design` > `Report Layout` > `Show in Tabular Form`, `Subtotals` > `Do Not Show Subtotals`).
   - Filtered out “(blank)”.
2. **Types (Animal Types)**:
   - Sheet: **Types**.
   - Rows: **Animal Type**, **Breed**.
   - Values: **Animal ID** (Count, renamed “Number of Animals”).
   - Sorted descending by count.
   - Filtered out “(blank)”.
3. **Outcomes (Outcome Distribution)**:
   - Sheet: **Outcomes**.
   - Rows: **Animal Type**.
   - Columns: **Outcome Type**.
   - Values: **Animal ID** (Count, renamed “Number of Outcomes”).
   - Filtered out “(blank)” and “No Outcome”.
4. **Shelter Time (Average Days in Shelter)**:

- Sheet: **Shelter Time**.
- Rows: **Outcome Type**.
- Values: **Days in Shelter** (Average, renamed “Avg Days in Shelter”).
- Filtered out “No Outcome” and “(blank)”.
- Formatted as Number with 0 decimal places.

[Placeholder for PivotTable Screenshot (e.g., Outcomes or Shelter Time)]

Dashboard Creation

- Created the **Dashboard** sheet with charts and slicers.
- **Layout Goal**: Fit within ~20–25 rows and ~10–15 columns (A1:O25) at 100% zoom to minimize scrolling.
- **Slicers**:
  - Inserted slicers for **Animal Type** and **Intake Type** in the **Outcomes** PivotTable (`Insert` > `Slicer`).
  - Connected to all PivotTables (**Trends**, **Types**, **Outcomes**, **Shelter Time**) via `Report Connections`.
  - Positioned slicers in A3:C3.
  - Customized slicers with a custom style (blue selected items, light gray background) to match the dashboard theme.

Charts

1. **Line Chart (Trends)**:
   - Source: **Trends** PivotTable (Years, Months, Number of Intakes).
   - Inserted: `Insert` > `Charts` > `Line` > `2-D Line`.
   - Title: “Intakes Over Time”.
   - Position: A5:L12.
2. **Pie Chart (Types)**:

- Source: **Types** PivotTable (removed **Breed**, kept **Animal Type**, Number of Animals).
- Inserted: `Insert` > `Charts` > `Pie` > `2-D Pie`.
- Title: “Distribution of Animal Types”.
- Added data labels (`Chart Design` > `Add Chart Element` > `Data Labels` > `Outside End`).
- Position: A13:L20.

3. **Stacked Bar Chart (Outcomes)**:
   - Source: **Outcomes** PivotTable (**Animal Type** on Rows, **Outcome Type** on Columns).
   - Inserted: `Insert` > `Charts` > `Bar` > `Stacked Bar`.
   - Title: “Outcome Distribution by Animal Type”.
   - Increased Gap Width to 250% (`Format Axis` > `Series Options` > `Gap Width`) for category separation.
   - Added data labels.
   - Position: I5:O12.
4. **Column Chart (Shelter Time)**:
   - Source: **Shelter Time** PivotTable (**Outcome Type**, Avg Days in Shelter).
   - Inserted: `Insert` > `Charts` > `Column` > `Clustered Column`.
   - Title: “Average Days in Shelter by Outcome”.
   - Y-axis formatted as Number, 0 decimal places.
   - Position: I13:O20.

[Placeholder for Chart Screenshot (e.g., Stacked Bar or Pie Chart)]

Polishing the Dashboard

- Applied consistent chart colors (`Chart Design` > `Chart Styles`) and slicer styles.
- Tested slicers (e.g., filtered “Dog” + “Stray”) to ensure charts update correctly.
- Saved workbook as `Austin_Animal_Center_Analysis.xlsx`.

- Added new slicers with intake month and year.

Portfolio Preparation

- Added a **Notes** sheet summarizing steps and challenges:
  - Listed data cleaning, merging, PivotTables, and dashboard creation.
  - Noted solutions (e.g., date formatting with `TEXT` and `INT`, negative days with `ABS`).
- Prepared to export the **Dashboard** as a PDF (`File` > `Print` > `Save as PDF`) for portfolio inclusion.

Key Findings

- **Intake Trends**: Intakes peak in summer, with a dip in 2020, likely due to external factors.
- **Animal Types**: Dogs and cats dominate (~90% of intakes), with breeds like Domestic Shorthair and Labrador Retriever prevalent.
- **Outcomes**: Adoptions are the most common outcome (~40% for dogs), followed by transfers.
- **Shelter Time**: Transfers have the shortest duration (~10 days), adoptions ~30 days.
- **Unique Observation**: Bats appear frequently in “Other” category due to rabies evaluations.

Impact

The dashboard enables shelter management to:

- Target adoption campaigns during peak intake seasons.
- Allocate resources to reduce overcrowding.
- Potentially increase adoption rates by 10–15% through community outreach.

Conclusion

This project demonstrates proficiency in Excel, from data cleaning to advanced visualization. The interactive dashboard, with a customized stacked bar chart for outcomes and a pie chart for animal types, provides clear insights into shelter operations, making it a strong portfolio piece. Future work could explore predictive modeling for intake trends.

References

- Austin Animal Center Datasets: data.austintexas.gov
- Microsoft Excel Documentation: support.microsoft.com