FureverData : Uncovering the Dynamics of Pet Adoption

USING DATA VISUALIZATION TO ENHANCE UNDERSTANDING OF ADOPTION PATTERNS

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Overview of FureverData

- **What is FureverData?**
  A data visualization project that explores pet adoption trends, utilizing Python-based tools to analyze and predict adoption likelihood.
- **Purpose:**
  To identify factors influencing adoption rates and provide actionable insights for animal shelters to improve their adoption strategies.
- **Inspiration:**
  Inspired by my experiences with Luna, my service dog, and Tiffany, my emotional support cat, to promote the importance of pet adoption.

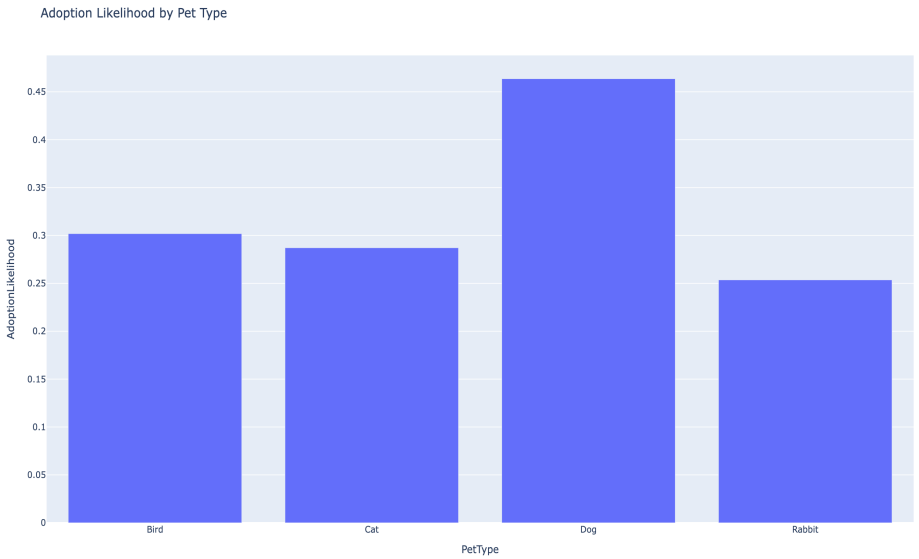
Understanding the Dataset

- **Source:** Predict Pet Adoption Status dataset from Kaggle.
- **Key Attributes:**
  - **Pet Type** (Dog, Cat, Bird, Rabbit)
  - **Age** (in months)
  - **Weight** (in kilograms)
  - **Health Condition**, **Vaccination Status**, **Time in Shelter**, and **Adoption Likelihood**.
- **Dataset Size:** Over 1,000 records, ensuring robust analysis.
- **Why This Data?**
  Focused on various pet attributes to see which factors have the strongest influence on adoption outcomes.

Data Analysis Techniques

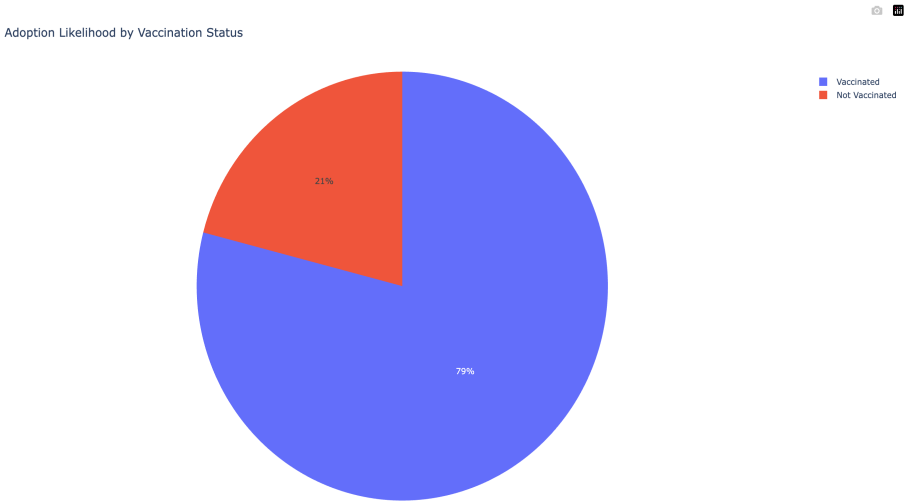
- **Exploratory Data Analysis (EDA):** Used to identify patterns and relationships between pet attributes and adoption rates.
- **Machine Learning Model:** Developed a basic model to predict adoption likelihood, achieving a 70% accuracy rate.
- **Visualization Tools:**
  Utilized Plotly and Matplotlib to create interactive visualizations, allowing in-depth analysis.
- **User Interaction:**
  Data filtering and visualization were made interactive using Flask for better user experience.

Visualization 1: Adoption Likelihood by Pet Type



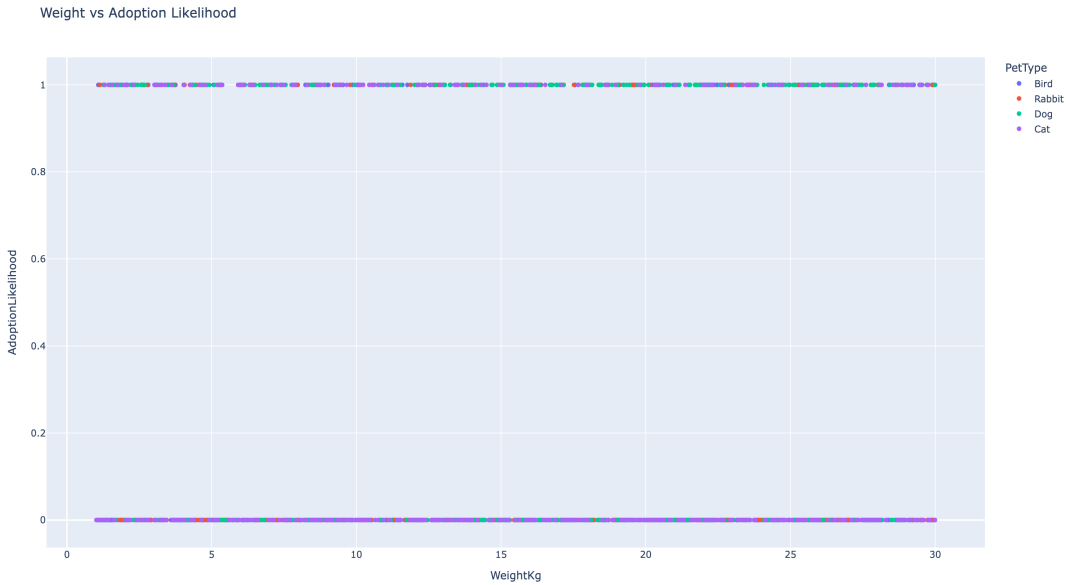
- **Analysis**:
  - *Dogs show the highest adoption likelihood at 45%, suggesting a strong preference among adopters, while rabbits have the lowest likelihood at around 20%.*
  - *This insight can help shelters tailor marketing efforts, highlighting the benefits of adopting rabbits and other less-preferred pets.*
- **Recommendation**:
  - *Shelters can create targeted campaigns to boost the adoption of rabbits and cats, ensuring a more balanced adoption rate across species.*

Visualization 2 - Impact of Vaccination Status



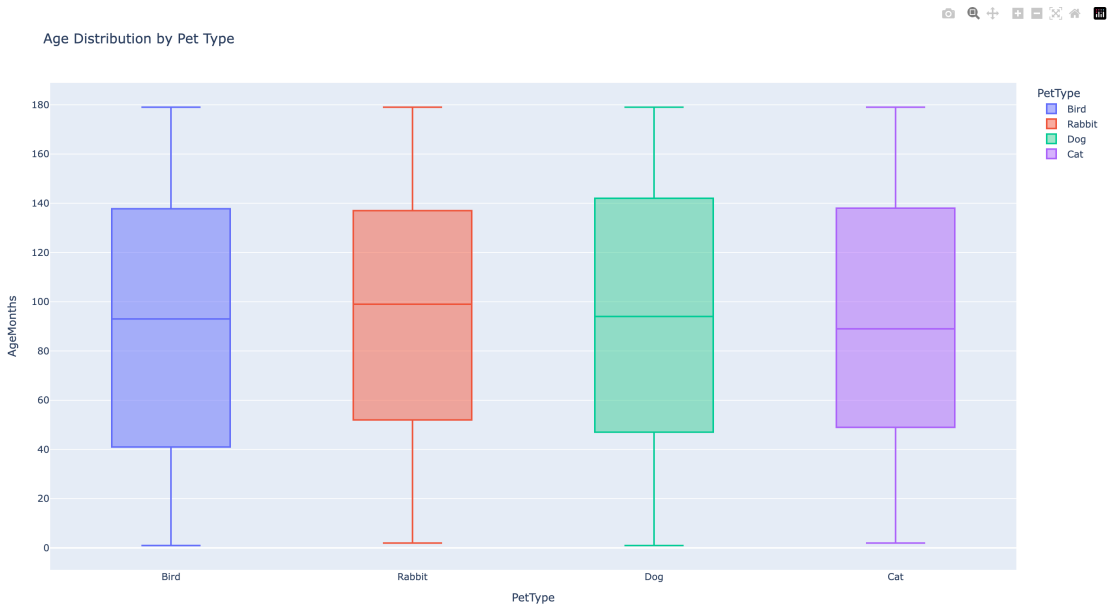
- **Analysis**:
  - *79% of adopted pets are vaccinated, indicating that adopters often prioritize vaccinated animals.*
  - *Vaccinated pets have a higher likelihood of being adopted, as it reduces the adopter's concerns about potential health issues.*
- **Recommendation**:
  - *Shelters should emphasize the vaccination status of pets during adoption events and listings to increase interest.*

Visualization 3 - Weight vs. Adoption Likelihood



- **Analysis**:
  - *The scatter plot reveals that while weight is not a major factor in adoption likelihood, medium-sized pets show a slight advantage.*
  - *Adopters seem to have diverse preferences for pet sizes, with a consistent adoption likelihood across a range of weights.*
- **Recommendation**:
  - *Shelters can highlight the variety of pet sizes available, ensuring adopters find a pet that matches their living space and lifestyle.*

Visualization 4 – Age Distribution by Pet Type



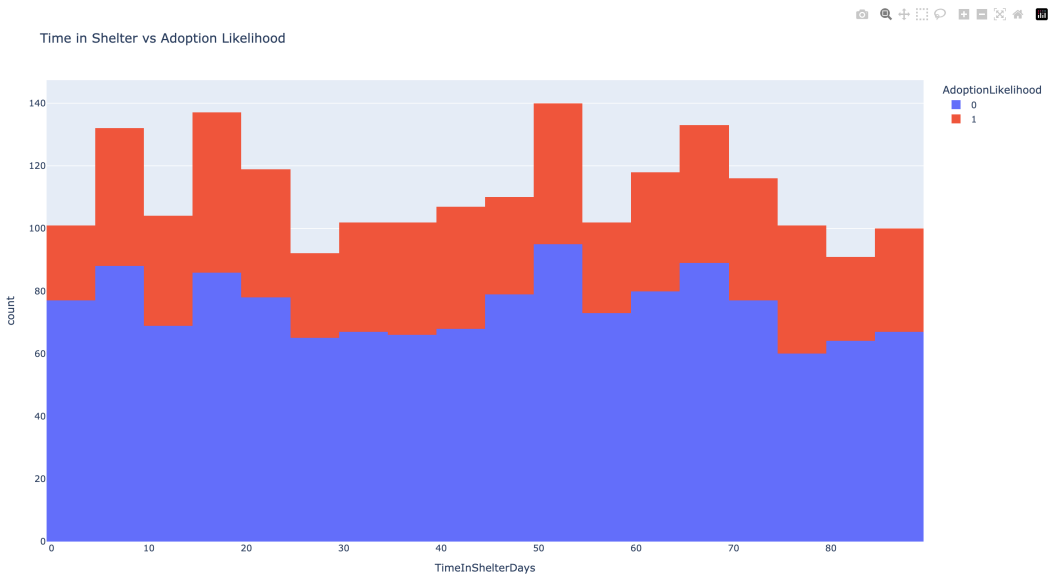
Analysis:

- **Birds** tend to be older, with a median age around 100 months.
- **Rabbits** and **cats** show similar age medians, around 80 months.
- **Dogs** are generally younger, indicating quicker turnover in shelters.

Recommendation:

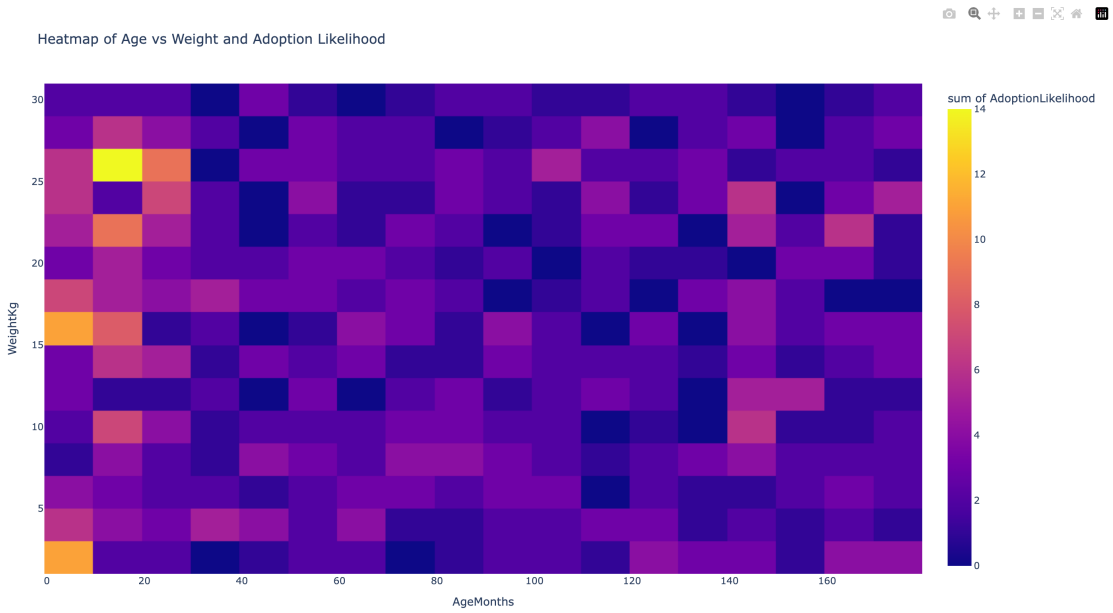
- **Promote younger dogs** for faster adoptions.
- **Highlight benefits of older pets** for birds and rabbits, encouraging adopters to consider them.
- **Offer special events** for adopting older pets to reduce shelter time.

Visualization 5 - Time in Shelter vs. Adoption Likelihood



- **Analysis**:
  - *A clear trend emerges where pets spending longer times in the shelter have a lower adoption likelihood.*
  - *However, promotional efforts during these periods can help to increase visibility and adoption chances.*
- **Recommendation**:
  - *Regularly promote long-term shelter residents and consider offering special incentives, such as reduced adoption fees, to boost their chances of finding homes.*

Visualization 6 - Heatmap Analysis



- **Analysis**:
  - *The heatmap highlights that younger pets, particularly those under 3 years, with a moderate weight range (5-15 kg), tend to have higher adoption rates.*
  - *This trend diminishes as pets get older and heavier.*
- **Recommendation**:
  - *Shelters could emphasize the adoptability of older pets by highlighting their unique qualities and training to appeal to potential adopters.*

Machine Learning Model

- **Model Overview**:
  - *A basic classification model was built using scikit-learn, achieving 70% accuracy in predicting adoption likelihood.*
- **Key Influencers**:
  - *Age contributed to 31% of the model's predictive power, while weight and adoption fee accounted for 25% and 24% respectively.*
  - *Vaccination status and previous ownership history also played minor roles.*
- **Next Steps**:
  - *Plan to refine the model with more complex algorithms and larger datasets to enhance predictive accuracy.*

Ethical Considerations

- **Data Privacy**:

  Used synthetic, anonymized data to protect privacy; no personal or sensitive data was involved.

- **Bias and Fairness**:

  Ensured the dataset reflects diversity in pet types and characteristics to avoid bias in insights.

- **Purpose**:

  Committed to using these insights to support equitable adoption processes, ensuring every animal has a fair chance of finding a home.

Challenges and Solutions

- **Data Quality Issues**:

  Handled missing values and inconsistencies in pet records to ensure accurate analysis.

- **Model Accuracy**:

  Balancing simplicity with accuracy—while the model is interpretable, future improvements could include advanced models like Random Forests or Gradient Boosting.

- **User Interaction**:

  Incorporated dynamic visualizations for better user engagement and easier data exploration.

Conclusion and Future Directions

- **Summary of Insights**:

1. *Vaccination status and pet age significantly impact adoption rates, while time in shelter can deter potential adopters.*
2. *Shelters can leverage these findings to improve adoption campaigns and tailor strategies for harder-to-adopt pets.*

- **Future Work**:

Plan to integrate additional datasets, enhance the machine learning model, and add more interactive features for users.

- **Final Thought**:

With data, we can create more effective adoption strategies and help more pets find loving homes.

Q&A and Thank You!

Thank you for your attention! I hope this presentation has provided valuable insights into the factors influencing pet adoption.

I'd be happy to answer any questions or discuss potential improvements for this project.