**Project: Pet Adoption Trends Database (Dogs & Cats – 10 cities , 25 shelters)**

**1. Context**

**India has a large population of stray and shelter animals, including dogs and cats. Animal shelters face challenges such as overcrowding, limited resources, and lack of centralized data. Many animals remain unadopted due to age, breed, or behavioral issues, while some are returned due to mismatched expectations or insufficient adopter preparation.**

**This project builds a comprehensive SQL database to track and analyze pet adoption trends across 10 major cities with 25 shelters (multiple shelters per city).**

**Primary Goals:**

* **Increase adoption rates for dogs and cats.**
* **Reduce returns and improve adoption success.**
* **Monitor shelter operations and capacity.**
* **Understand adopter behavior and preferences.**
* **Support predictive insights for better planning.**

**2. Problem Statement**

**Shelters and animal welfare boards need a data-driven system to analyze adoption patterns and optimize operations:**

**Animal-specific analyses**

* **Adoption rates by type, breed, age, gender, source (Street vs Pedigree).**
* **Average time-to-adoption for puppies vs adults, dogs vs cats.**
* **Identify animals at higher risk of return.**
* **Correlate health, vaccination, neutering with adoption speed and return likelihood.**

**Shelter-specific analyses**

* **Compare adoption success rates across shelters.**
* **Detect overcrowding and monitor capacity utilization.**
* **Track average stay duration per shelter.**
* **Evaluate staff and volunteer performance impact on adoption outcomes.**

**City/Regional analyses**

* **Compare adoption trends across 10 cities.**
* **Track street vs pedigree animal adoption by region.**
* **Analyze seasonal adoption patterns (holidays, summers, monsoon).**
* **Evaluate impact of city-specific initiatives (rescue drives, adoption campaigns).**

**Adopter behavior analyses**

* **Identify loyal adopters and multiple adoption patterns.**
* **Analyze adoption preferences by animal type, breed, age, source.**
* **Determine return rates by adopter demographics.**

**Return/Failure analysis**

* **Analyze reasons for returns: behavior, lifestyle, finances, health.**
* **Identify breeds or age groups most frequently returned.**
* **Evaluate the effectiveness of foster programs in reducing returns.**

**Foster program & medical analytics**

* **Compare adoption success of fostered vs directly adopted animals.**
* **Track vaccination, neutering, illness trends, and treatment costs.**

**Predictive analytics**

* **Predict animals likely to be adopted quickly.**
* **Predict animals at higher risk of return.**
* **Forecast shelter overcrowding and plan interventions.**

**3. Database Design (Tables & Relationships)**

**Core Tables**

| **Table** | **Primary Key** | **Key Columns** | **Notes** |
| --- | --- | --- | --- |
| **Cities** | **city\_id** | **city\_name, state\_name, population** | **10 cities** |
| **Shelters** | **shelter\_id** | **city\_id (FK), shelter\_name, capacity, staff\_count, volunteer\_count, contact, established\_date** | **25 shelters across 10 cities** |
| **Animals** | **animal\_id** | **shelter\_id (FK), animal\_type, breed, age, gender, source, status, intake\_date, animal\_desc, health\_status, vaccinated, neutered, fostered** | **Tracks each animal** |
| **Adopters** | **adopter\_id** | **name, age, gender, city\_id (FK), contact, registered\_date** | **Tracks adopter info** |
| **Adoptions** | **adoption\_id** | **animal\_id (FK), adopter\_id (FK), adoption\_date, fee, mode, returned, reason** | **Tracks adoptions** |
| **Medical\_Records** | **medical\_id** | **animal\_id (FK), vaccination\_status, neutered, last\_checkup, illness, treatment\_cost** | **Tracks health data** |
| **Foster\_Homes** | **foster\_id** | **animal\_id (FK), foster\_parent\_name, start\_date, end\_date** | **Tracks fostered animals** |
| **Shelter\_Staff** | **staff\_id** | **shelter\_id (FK), name, role, performance\_rating** | **Tracks staff contributions** |
| **Adoption\_History** | **history\_id** | **animal\_id (FK), adopter\_id (FK), adoption\_date, return\_date, return\_reason** | **Tracks full adoption and return history** |

**Optional Tables**

* **Feedback: Adopter ratings/comments for adopted animals**
* **Adoption\_Campaigns: Track adoption drives for analysis**

**4. Phases & Analysis Questions**

**Phase 1 – Database Setup & Initial Data**

**Goal: Create all tables, relationships, insert initial data (~2500 pets across 25 shelters).**

**Activities:**

* **Create 10 cities × 25 shelters × 100 pets each.**
* **Insert realistic adoptions and returns.**

**Mini-analyses:**

* **How many pets per city, shelter, type, and age group?**
* **Shelter occupancy vs capacity.**
* **Adopter demographics distribution per city.**

**Phase 2 – Basic Data Exploration**

**Goal: Understand raw counts and distributions.**

**Questions:**

1. **Count of animals by type (Dog/Cat) and gender.**
2. **Number of animals by status (Available, Adopted, Fostered, Returned).**
3. **Number of adopters by age group and gender.**
4. **Adoption counts per city and shelter.**
5. **Distribution of animals by source (Street/Pedigree/Owner Surrender).**

**Insights:**

* **Identify shelters with highest/lowest adoption activity.**
* **Determine cities with more street animals waiting for adoption.**

**Phase 3 – Relationships & Joins**

**Goal: Combine data across tables for insights.**

**Questions:**

1. **List adopters and animals they adopted (type, breed, age, shelter, city).**
2. **Shelter-wise adoption counts and average adoption speed.**
3. **City-wise top adopted breeds.**
4. **Animals returned with adopter and shelter details.**
5. **Foster program success: adoption rate after foster care.**

**Insights:**

* **Popular breeds, age groups, and shelter performance.**
* **Compare street vs pedigree adoption success.**
* **Highlight high-risk animals for returns.**

**Phase 4 – Aggregations & Group Analysis**

**Goal: Summarize patterns and trends.**

**Questions:**

1. **Average adoption time by animal type, age group, city, and shelter.**
2. **Adoption counts by breed, gender, and source.**
3. **Shelter adoption success rates (% adopted vs total).**
4. **Top cities by adoption rate.**
5. **Return rates by breed, age, and adopter demographics.**
6. **Average number of animals per shelter vs capacity.**

**Insights:**

* **Identify slow-moving animals and underperforming shelters.**
* **Determine overcrowding risks and adoption bottlenecks.**

**Phase 5 – Subqueries / Conditional Analysis**

**Goal: Deeper insights via nested queries.**

**Questions:**

1. **Adopters with multiple adoptions.**
2. **Animals returned more than once.**
3. **Shelters with adoption rates above/below city average.**
4. **Animals adopted faster than average.**
5. **Street vs pedigree adoption comparison per city.**

**Insights:**

* **Identify loyal adopters for campaigns.**
* **Highlight high-risk animals for returns.**
* **Compare shelter efficiency relative to city averages.**

**Phase 6 – Window Functions & Ranking**

**Goal: Rank and analyze trends over time.**

**Questions:**

1. **Rank shelters by total adoptions.**
2. **Rank animals by adoption speed.**
3. **Rank adopters by number of adoptions.**
4. **Cumulative adoption counts per month per city.**
5. **Top shelters at risk of overcrowding.**

**Insights:**

* **Prioritize shelters for intervention or expansion.**
* **Identify fast-adopted animals for promotional campaigns.**

**Phase 7 – Advanced Analytics & Predictive Insights**

**Goal: Strategic decision-making and planning.**

**Questions:**

1. **Predict animals likely to be adopted fast (age, breed, health).**
2. **Predict animals at risk of return.**
3. **Compare adoption success of fostered vs directly adopted animals.**
4. **Correlate health, neutering, vaccination with adoption speed.**
5. **Seasonal adoption trends by city and animal type.**
6. **Impact of adoption drives and donation campaigns.**
7. **Predict shelters likely to face overcrowding soon.**

**Insights:**

* **Reduce returns proactively via pre-screening.**
* **Optimize foster programs to improve adoption success.**
* **Plan seasonal drives for maximum adoption impact.**

**Phase 8 – Staff & Operational Analytics**

**Goal: Shelter performance insights.**

**Questions:**

1. **Staff performance vs adoption outcomes per shelter.**
2. **Number of adoptions handled per volunteer or caretaker.**
3. **Shelters with efficient adoption processing vs delays.**
4. **Identify shelters requiring additional staff or training.**

**Insights:**

* **Enhance staff allocation and training.**
* **Improve operational efficiency of shelters.**