Case study: DVD Rental Database Exploration Using SQL

Case study Overview

This project focused on advanced SQL analysis of the DVD Rental relational dataset to derive insights into payment trends and inventory distribution. The objective was to demonstrate broad SQL proficiency by applying complex techniques, including JOINs (INNER, LEFT), aggregation (SUM, GROUP BY), and Data Definition Language (DDL) through custom table creation. The analysis yielded actionable findings, such as identifying a band of high-value customers and optimizing inventory.

Case study problem

The objective was to analyze the DVD Rental dataset and uncover insights about customer behavior, payment trends, inventory distribution and film characteristics. The work required filtering, joining, aggregating and summarizing data across several related tables.

Analysis process

The analysis was carried out using a sequence of SQL operations:

- Basic exploration using SELECT, LIMIT and DISTINCT.
- Filtering with WHERE, BETWEEN, LIKE and IN.
- Aggregations using SUM, MIN, COUNT and GROUP BY.
- Sorting with ORDER BY ASC/DESC
- Table relationships using INNER JOIN and LEFT JOIN.
- Set operations using UNION and UNION ALL.
- Data definition and manipulation using CREATE TABLE and INSERT INTO.

Query Outputs

Results were derived from various query blocks, including:

- Top 10 highest payment transactions
- Distinct film ratings
- Film titles containing, ending or starting with “Love”
- Inventory counts by film
- Customers whose total payments fall between $100 and $150
- Gender distribution in a custom user-defined table

Insight derived

- Top five customers with payments between $100 and $150.
- The word “Love” appears frequently in film titles, indicating a popular naming theme.
- Inventory counts show wide variation across film IDs.
- Payments show significant spread, with some exceeding $11.
- Gender distribution in the custom data_lords table is balanced.

How I approached the work

- Began with broad data exploration using SELECT
- Combined data across the payment, customer, film and inventory tables through SQL JOINs.
- Applied pattern matching (LIKE) and conditional filtering to isolate meaningful subsets.
- Used GROUP BY and HAVING to summarize customer-level payment behavior.
- Designed and populated a user-defined table (data_lords) to demonstrate DDL and DML capability.
- Applied UNION and UNION ALL to compare table structures and row behavior.

Impact metrics

- Improved efficiency in exploring relational datasets.
- Strengthened SQL proficiency across querying, joining, aggregation and data modeling.
- Demonstrated ability to derive insights directly from raw relational tables.
- Showed understanding of database structure through custom table creation.
- Developed a reusable SQL workflow applicable to real business datasets.

Business objective

To extract insights from the DVD rental database to understand customer behavior, payment patterns, product availability and metadata characteristics.

Business recommendation

- Engage high-value customers with targeted loyalty incentives.
- Review inventory patterns to optimize stock for frequently rented films.
- Analyze pricing structure by studying payment variations.

- Explore customer preferences reflected in recurring title patterns.