**PROJECT REPORT ON ANALYZING PERSONAL EXPENSES**

**Project Vision**

This project, **"Analysing Personal Expenses"**, is designed to simulate a comprehensive expense tracker using Python, SQL, and Streamlit. The tracker processes realistic expense data generated via the Faker library, stores it in a SQL database, and visualizes insights through a Streamlit app. The project provides actionable insights into financial habits by analysing data across categories such as groceries, bills, and subscriptions.

**Project Highlights**

* **Technology-Driven Insights**: Harnessed Python, SQL, and Streamlit for a seamless tracking and analysis experience.
* **Innovative Simulations**: Generated lifelike expense data using the Faker library.
* **Data-Driven Decision-Making**: Delivered meaningful insights into financial behaviour and spending optimization.

**Skills Utilized**

* Python
* SQL
* Streamlit
* Data Visualization
* Financial Analysis

**Domain**

* Personal Finance and Expense Tracking

**Objectives**

The core objectives of the project are:

* Automating personal or business expense tracking.
* Analysing spending habits to provide actionable savings strategies.
* Building interactive financial dashboards to visualize income and expenditure trends.

**Methodology**

1. **Data Simulation**

* The Faker library generated 12 months of expense data across key categories such as groceries, bills, and subscriptions.
* **Dataset Features**:
  + **Date**: Transaction timestamp.
  + **Category**: Expense type (e.g., Transportation, Entertainment).
  + **Payment Mode**: Methods like UPI, cash, and cards.
  + **Amount**: Monetary value per transaction.
  + **Cashback**: Rebates received during the transactions.
* **Quality Assurance**: Ensured logical date ranges, accurate amounts, and relevant descriptions.

1. **Database Creation**

* Designed a scalable SQL schema for seamless storage and querying.
* Migrated generated data into a MySQL database using MYSQL for database connectivity and interaction.

**Exploratory Data Analysis (EDA)**

EDA was conducted using advanced Python libraries such as Pandas and Matplotlib, focusing on comprehensive and detailed analysis to extract valuable insights. The following key areas were explored:

1. **Monthly Expenditure & Growth**

* **Analysis**:
  + Aggregated expenses on a monthly basis to identify spending patterns.
  + Calculated monthly growth percentages using percentage change between consecutive months.
* **Visualizations**:
  + **Bar Chart**: Compared monthly growth.
* **Insights**:
  + Identified peak expenditure during festive seasons.
  + Months with declining expenses were analysed for savings opportunities.

1. **Spending by Category**

* **Analysis**:
  + Grouped and summed expenses by category to determine major spending areas.
  + Assessed category-wise variability over months to detect consistent high-expense contributors.
* **Visualizations**:
  + **Bar Chart**: Represented total spending per category.
* **Insights**:
  + Groceries and Entertainment emerged as top expense categories, contributing over 50% of total spending.
  + Categories like Insurance and Travel had sporadic spikes, indicating discretionary spending.

1. **Payment Mode Distribution**

* **Analysis**:
  + Counted transactions by payment mode to evaluate user preferences.
  + Analysed the proportion of cash versus online transactions.
  + Assessed cashback opportunities linked with specific payment methods.
* **Visualizations**:
  + **Bar Chart**: Displayed the frequency of transactions for each payment mode.
  + **Pie Chart**: Showed the percentage share of Cash and Online
* **Insights**:
  + Online Transactions used (80.6%).
  + Cash Transactions used only (119.4%).

Each of these analyses was visualized effectively to ensure the insights were both actionable and easily interpretable for stakeholders, providing a strong foundation for financial optimization.

**Streamlit App**

* **User-Centric Design**: The Streamlit app was developed with a strong emphasis on usability and functionality, incorporating the following key modules to maximize user engagement and data accessibility:

**1. Home**

* Displays a welcome message and an overview of the Expense Tracker App.
* Provides easy navigation to different sections of the application.
* Briefly explains the purpose of the app and how users can track their expenses.

**2. Expense Tracker**

* Allows users to record, view, and manage their expenses in real time.
* Displays total spending based on categories and payment modes.
* Includes SQL-based queries to fetch relevant expense data.
* Provides an interactive dropdown for selecting different queries to analyze spending.
* Helps users identify high-expense areas and cashback earnings.

**3. Analyze Expenses**

* Offers visual insights using bar charts and data summaries.
* Users can filter expenses by category and payment mode to focus on specific spending areas.
* Helps in understanding spending patterns over time.
* Useful for identifying unnecessary expenses and optimizing financial decisions.
* Supports better financial management by showing trends and anomalies

Each module was carefully designed to ensure ease of use while enabling users to uncover meaningful insights and take control of their finances efficiently.

**Challenges Faced and Resolutions**

1. **Data Simulation Complexity:**
   * Challenge: Generating realistic expense data that aligns with typical financial patterns.
   * Resolution: Used Faker library's advanced features and validation checks to ensure data consistency and accuracy.
2. **Integration with Streamlit:**
   * Challenge: Ensuring seamless connectivity between the SQL database and the Streamlit app.
   * Resolution: Utilized caching mechanisms.
3. **Visualization Design:**
   * Challenge: Creating intuitive and visually appealing charts.
   * Resolution: Iterated on visualization styles and user feedback to improve clarity and engagement.

**Conclusion**The Expense Tracker app's powerful data simulation and perceptive graphics are prime examples of financial management innovation. Providing users with practical suggestions, it is a flexible tool for encouraging financial self-control and maximizing spending. Its user-friendly design and scalability make it a significant tool for small business and personal finance.

**Future Improvements**

1. Integration with real-time data sources (e.g., bank statements).
2. Enhanced AI-based insights using machine learning models.
3. Multi-user support for family or business use cases.