1. The Problem Statement

Modern retail businesses generate vast amounts of transaction data, yet often struggle to convert raw numbers into strategic growth. The core challenge addressed in this project is the **fragmentation of data**: moving from raw, messy CSV files to a structured, cloud-accessible environment that supports real-time decision-making.

Specifically, this project solves:

- **Data Integrity:** Cleaning and transforming 4,000+ records to ensure accuracy in reporting.
- **Accessibility:** Transitioning data from a local machine to a **Neon PostgreSQL Cloud** database to enable remote access.
- **Actionable Insights:** Bridging the gap between a database and an executive-level dashboard to track KPIs.

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2. Project Deliverables

Deliverable #1: Cloud Data Architecture

- Established a secure connection between Python (ETL layer) and **Neon Cloud PostgreSQL**.
- Successfully resolved cloud credentialing and authentication hurdles to allow seamless data flow.

Deliverable #2: Advanced ETL Pipeline

- Developed a robust Python notebook in **Google Colab** to automate data cleaning and feature engineering.
- Ensured data persistence by architecting a workspace that bypasses local environment limitations.

Deliverable #3: Business Intelligence Dashboard

- Designed a high-fidelity **Power BI** dashboard using **DAX** to visualize retail trends.
- Integrated **DirectQuery** to allow the dashboard to communicate directly with the Cloud SQL database.

Deliverable #4: Technical Documentation & Portfolio

- Published a comprehensive **GitHub Repository** containing the SQL schema, Python scripts, and the .pbix report file.
- Authored a professional **README** that details the technical workflow and business impact for potential employers.