**“AI-Powered Banking Analytics: Automated Power BI Documentation, Churn Prediction, and Transaction Forecasting”**

**Project Workflow**

1. **Data Acquisition (Kaggle)**

* Dataset sourced from Kaggle (credit card / banking dataset).
* Contains customer demographics, credit card transactions, and account details.
* Cleaned and transformed data in **Power BI** for dashboard building.

1. **Interactive Power BI Dashboard**

* Built **two key analytics pages**:
  1. **Customer Churn Insights** → shows churn risk, drivers, segmentation.
  2. **Transaction Forecasting** → predicts future monthly transactions with confidence bands.
* Added **KPI cards, slicers, and professional formatting**.
* Ensured design follows **TD Bank business needs**: customer risk, forecasting, and governance.

1. **Automated Documentation (Python + VPAX)**

* Exported the **Power BI data model (VPAX)** using **DAX Studio**.
* Created a **Python script** to automatically generate:
  + Word doc with model documentation.
  + Excel file with tables, relationships, and fields.
  + ER diagram image.
* This automation saves analysts **hours of manual work** and enforces governance.

1. **Churn Prediction Model (Python + Power BI)**

* Built a **Random Forest model** for churn prediction.
* Output:
  + Customer-level **churn probability**.
  + Risk categories (Low, Medium, High).
  + Feature importance (drivers of churn).
* Exported predictions to Excel → Imported into Power BI.
* Added **Churn Risk Dashboard**:
  + Distribution of churn risk.
  + Top churn drivers (feature importance bar chart).

1. **Transaction Forecasting Model (Python + Prophet)**

* Used **Prophet (Facebook’s forecasting library)** to model monthly transaction volumes.
* Forecasted next **12 months** with confidence intervals (yhat\_lower, yhat\_upper).
* Exported results to Excel → Integrated into Power BI.
* Added **Transaction Forecasting Dashboard**:
  + Actual vs Forecast line chart (with confidence band).
  + KPI cards (Next Month Forecast, YoY Growth).
  + Clustered column chart for recent 12 months.

1. **End-to-End Data & AI Pipeline**

* **Data Source (Kaggle) → Power BI Dashboard → Automated Documentation → AI/ML Models → Power BI Insights.**

**File Details:**

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| **File / Folder Name** | **Description** |
| .idea/ | PyCharm IDE configuration folder (auto-generated). |
| **Churn Prediction + Forecasting.py** | Main Python script for churn prediction (Random Forest) and transaction forecasting (Prophet). |
| **churn\_model.pkl** | Saved machine learning model (Random Forest) for churn prediction. |
| **Churn\_Predictions.xlsx** | Excel output of churn probabilities and risk categories per customer. |
| **Credit Card Financial Dashboard.pbix** | Power BI dashboard file (interactive BI report). |
| **Credit Card Financial Dashboard.pdf** | Exported PDF version of the Power BI dashboard. |
| **credit\_card.xlsx** | Kaggle dataset (credit card transactions / account features). |
| **customer.xlsx** | Kaggle dataset (customer demographic and account info). |
| **DocumentationGenerator.py** | Python script that parses VPAX model and generates automated Power BI documentation. |
| **Feature\_Importance.xlsx** | Feature importance scores from churn model (top churn drivers). |
| **forecast\_model.pkl** | Saved Prophet model for forecasting monthly transactions. |
| **LICENSE** | License file for open-source/public sharing. |
| **model.vpax** | Exported Power BI data model (via DAX Studio) for documentation. |
| **PowerBI\_Documentation.docx** | Word output of auto-generated Power BI documentation. |
| **PowerBI\_Documentation.xlsx** | Excel output of auto-generated Power BI documentation. |
| **PowerBI\_ER\_Diagram.png** | Entity-Relationship diagram image generated from Power BI model. |
| **README.md** | Markdown summary file for GitHub/Kaggle. |
| **Transaction\_Forecast.xlsx** | Excel output containing actuals + forecast (Prophet) with confidence bounds. |