Project Proposal: AI-Powered Personal Spending & Financial Behavior Coach

1. Problem Statement

Consumers generate large amounts of transaction data but lack clear, actionable insight into their spending behavior and long-term financial impact. Most personal finance tools provide basic categorizations and charts without explaining patterns or suggesting meaningful actions. This project aims to build an AI-powered financial behavior coach that converts transaction data into personalized, understandable insights to support better budgeting and saving decisions.

2. Context

Personal finance and fintech applications are widely adopted, yet many still rely on static charts and rule-based categorizations that offer limited behavioral insight. Users often know *where* they spend money but not *how* their habits evolve over time or *what actions* would most improve their financial outcomes.

Recent advances in natural language processing and generative AI make it possible to translate transactional data into clear explanations, summaries, and personalized guidance. This project sits at the intersection of analytics and product intelligence, demonstrating how data science and GenAI can be used to improve financial literacy, engagement, and long-term user value.

3. Client and Stakeholders

Client: Fintech company or digital banking platform

Stakeholders:

- Consumers seeking financial clarity
- Product and analytics teams
- Banks focused on engagement and retention

The client would use these insights to enhance user-facing financial tools and personalize user experiences.

4. Criteria for Success

The project will be considered successful if it:

- Accurately categorizes transactions into meaningful spending groups
- Identifies distinct spending behavior personas using clustering
- Generates concise, user-friendly summaries of spending patterns
- Produces realistic and relevant budgeting or savings recommendations
- Clearly communicates insights in a way that supports business decision-making

5. Scope and Constraints

In Scope:

- Transaction classification using NLP
- Behavioral clustering and descriptive analytics
- Generative AI for summaries and coaching insights

Out of Scope / Constraints:

- No real or personally identifiable financial data
- No regulated or prescriptive financial advice
- Use of public and synthetic datasets only

6. Data Sources

- Kaggle personal finance and transaction datasets
- Open banking sample transaction data
- Synthetic labeled data generated with LLM assistance

7. Methodology

The project will follow an end-to-end data science workflow:

1. Data ingestion, cleaning, and normalization of transaction records
2. NLP-based transaction classification using supervised and rule-assisted methods
3. Behavioral clustering to identify common spending patterns and personas
4. Application of large language models to generate summaries, insights, and coaching-style explanations
5. Development of a recommendation framework that suggests budgeting or spending adjustments based on user behavior

This approach combines traditional machine learning techniques with generative AI to deliver interpretable and actionable insights.

8. Deliverables

- Reproducible Python notebooks and code
- Written project report
- Slide deck summarizing business insights and recommendations