AI Powered Personal Finance Management Assistant

15 May 2024

Team Members :
Pritha Choudhury
Sayali Bhaurao Hatwar
Rishabh Hanselia
Deeksha Verma
Akash Mishra

Step 1: Prototype Selection

ABSTRACT :
This report explores the business opportunity for an AI-based personal finance management app. It highlights the growing demand for automated financial tools and personalized financial guidance. The report outlines the key problems faced by consumers in managing their finances, such as lack of time, financial knowledge, and inefficient budgeting tools. It details how an AI-powered app can address these issues by automating tasks, providing personalized insights, and simplifying financial management. The report also explores a prototype product that addresses the before mentioned targets. It concludes that a well-designed AI-powered app can empower users, disrupt the personal finance management market, and capture a significant market share.

1. Problem Statement

Millions of people struggle to manage their finances effectively due to a lack of time, knowledge, and personalized guidance. Existing budgeting and tracking tools are often cumbersome and lack the ability to analyze financial data and provide actionable insights. As a result, many people fall short of their financial goals and experience stress and anxiety around money. The aim is to create an AI Powered Personal Finance Management Assistant in application form.

The key pain points that the AI-based app aims to solve:

- Lack of Time and Knowledge: People are busy and may not have the time or financial expertise to effectively manage their money.
- Inefficient Tools: Current budgeting and tracking tools can be tedious and lack the ability to analyze spending habits and offer personalized recommendations.
- Unreached Financial Goals: Without proper guidance and tools, people struggle to achieve their financial goals, leading to frustration and a sense of powerlessness.

- By addressing these issues, the AI-based app can empower users to take control of their finances and achieve financial security.

2. Market/Customer/Business Need Assessment

There is a growing demand for financial guidance, many people struggle with managing their finances, and there's a growing desire for automated tools and personalized advice. AI can analyze individual spending patterns, financial goals, and suggest personalized strategies for saving, investing, and budgeting. AI can automate routine financial tasks like bill payments, expense categorization, and savings transfers, saving users time and effort. By analyzing large amounts of financial data, AI can provide valuable insights into spending habits, trends, and opportunities for optimization. AI can be used for features like AI-powered financial health checkups, debt reduction plans, and automated savings/investment based on financial goals.

3. Target Specification and Characterization

- Empower users to take control of their finances: The app will provide users with the tools and insights they need to make informed financial decisions and achieve their financial goals. This could include creating and sticking to budgets, managing debt effectively, saving for retirement or a down payment on a house, and building wealth over time.
- Simplify financial management: By automating tasks like expense tracking and categorization, and offering personalized recommendations, the app will make managing finances less time-consuming and stressful.
- Improve financial literacy: The app can provide educational resources and explain financial concepts in a clear and easy-to-understand way, helping users make better financial choices.
- Increase financial security: The app can help users identify areas where they can save money, pay down debt, and build an emergency fund, all of which contribute to greater financial security.

4. External Search

- Gartner Report: "Gartner Report: The Future of Personal Finance" (Focuses on AI in wealth management, but highlights the trend)
- Forbes Article: "Forbes: How AI Is Revolutionizing Personal Finance”
- McKinsey & Company's "Global Banking Annual Review": Offers analysis of trends in digital banking, including the rise of AI and personalized financial services.
- Mint: A popular personal finance management app that utilizes AI algorithms for budgeting, expense tracking, and financial insights. Mint's success story demonstrates the demand for AI-driven financial tools among consumers.
- Acorns: An app that combines automated investing with personal finance management features, showcasing the potential for AI-powered apps to attract users interested in both saving and budgeting.
- J.D. Power's "U.S. Retail Banking Satisfaction Study": Includes insights into consumer satisfaction with digital banking and personal finance management apps, highlighting areas for improvement and innovation.
- TechCrunch, Forbes, and CNBC often feature articles and opinion pieces on fintech trends, including the role of AI in personal finance management.

5. Benchmarking Alternate Products

Eva Money :
Created by Fintel labs, Eva Money is a personalized financial assistant mobile app available for iOS and Android. The app uses artificial intelligence and is also Voice/Chat-enabled. It answers questions related to your personal finances using conversational intelligence and improves overall financial wellness. Further, you can also link all your bank accounts with the Eva Money app and get a complete snapshot of your current financial standing (At present, Eva only supports US banks). That is not all, it can even recommend the best ways to maximize cashback, how to save money, how to improve credit score, and so on.

MintZip :
MintZip is an AI-powered fintech app that delivers end-to-end financial solutions. The MintZip app is also equipped with its flagship product 'Misa' which is an AI-based financial companion and is powered by Conversational AI. According to the company, Misa is the world's most powerful financial chatbot. Talking about how this AI financial chatbot works, it takes in account things like behavioral sciences and financial sciences, and it is continuously training on financial knowledge to deliver the tailored response based on the users specific financial situation.

Olivia.ai :
Created in 2015 by two Silicon Valley entrepreneur, Cristiano Oliveira and former professional motocross pilot Lucas de Moraes, Olivia is a free financial assistant app that uses artificial intelligence and behavioral economics. Basically, this app finds patterns in how someone typically spends its money. And then uses those patterns to create strategies that help users spend less on the same things, freeing up money. Further, Olivia also comes up with challenges for its users based on where they need the most help. And these challenges are created in such a way that it helps the user change its habits and take better control of its finances over time. At present, Olivia is only available on iOS and only in the US and Brazil.

Wizely :
Wizely is another AI-powered money-saving app that allows its users to save little by little, offering the choice of Flexi and Savings Plan. It also claims to be India's first digital piggybank app.
Some of the benefits of Wizely:

- unlimited referral
- pre-booking of desired purchases
- up to 15% additional earnings on Wizely savings on redemption
- the choice to withdraw money savings anytime and anywhere without deductions

AI and ML are at the core of Wizely. Its AI and ML algorithms help the platform to deliver an adaptive learning approach to make it much more convenient for users to save.

6. Applicable Regulations

- Patents on ML algorithms developed
- Laws related to privacy for collecting data from users
- Protection/ownership regulations
- Creating an e-mail service to mail the report to the customers
- Laws related to bank account linking and data collection
- Laws on providing financial advices

7. Applicable Constraints

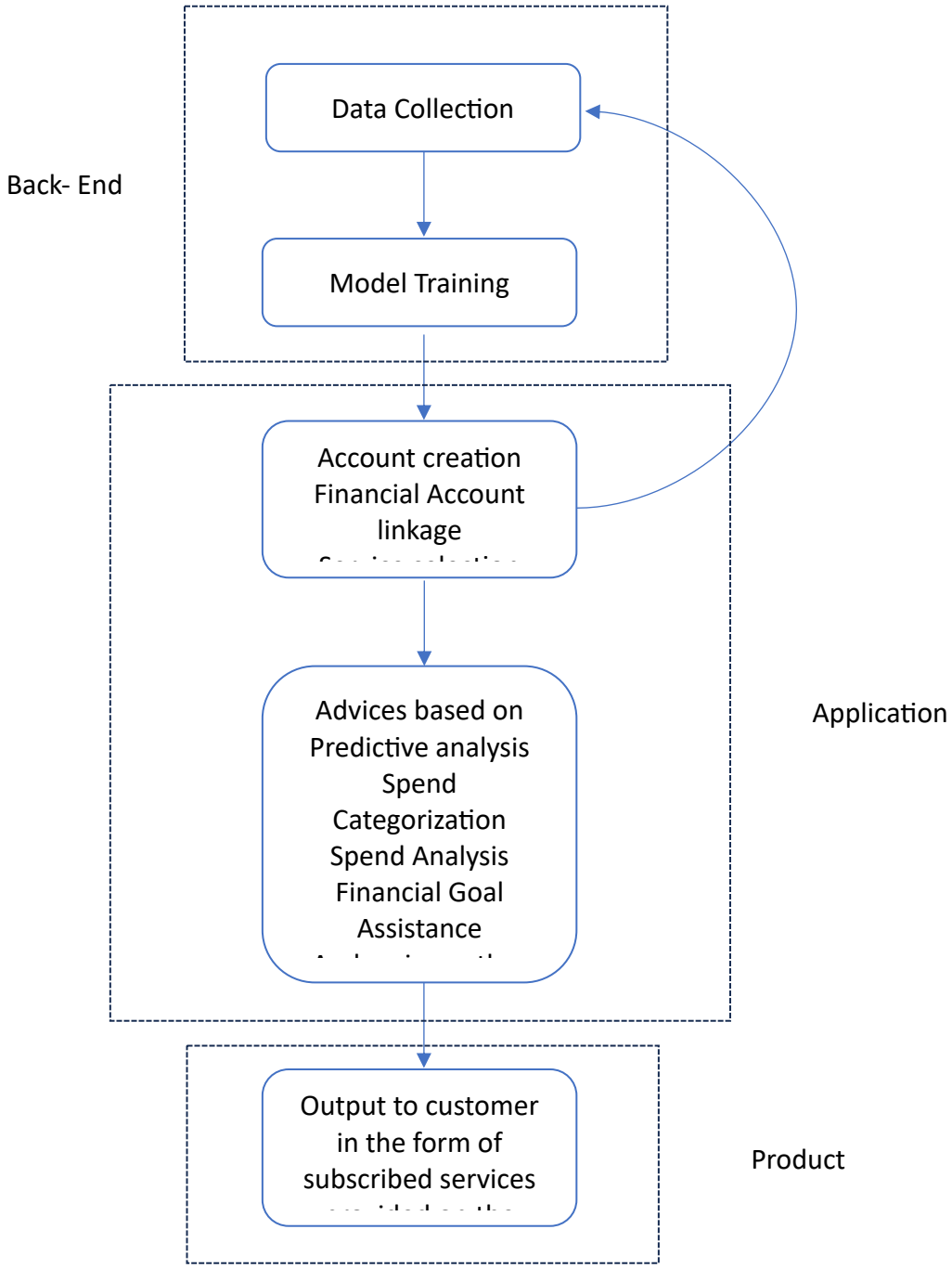
- Requires large amounts of data on financial habits for different customer bases
- Requires a fine-tuned algorithm/model for accurate predictive analysis
- Requires development of a tailored, well optimized application to provide the services
- Requires finance expertise/ domain knowledge to oversee and validate product output as well as during product development phase
- Requires cloud storage for collecting and storing user data
- Requires proper backend services
- Requires adequate security measures as personal financial data is being collected

8. Business Model

Monetization opportunities:

- Offering the app as a subscription service
- Partnerships with financial institutions
- Affiliate marketing for financial products
- Premium features

9. Final Product Prototype



10. Product Details

The product comprises of an AI powered personal financial assistant in the form of an application that collects user data by linking their financial accounts, credit cards, debit card etc. and uses a fine-tuned ML model to provide predictive analysis that will be used for providing customers with services like:

- personalized financial advices
- finance management assistance
- spend analysis reports
- financial health checkups
- debt reduction plans
- automated savings/investment based on financial goals

The product development and maintenance require a team of financial experts, data scientists, software developers, app developers for initial stages and promotion, marketing experts for later stages.

11. Conclusion

In conclusion, the development of an AI-based personal finance management app presents a compelling business opportunity. The market for financial management tools is vast and growing, with a growing demand for personalized guidance and automated solutions.

This app has the potential to address key pain points faced by consumers, including a lack of time, financial knowledge, and ineffective budgeting tools. By leveraging AI technology, the app can automate tasks, provide personalized insights, and simplify financial management, ultimately empowering users to achieve their financial goals.

Market research suggests a strong potential for AI-powered financial tools, with industry publications highlighting the rise of AI in fintech and venture capital firms actively investing in this space. Analysing user reviews of existing apps can further refine the features and functionalities to address unmet needs in the market.

By focusing on user needs and building a robust and user-friendly AI-powered platform, this app can disrupt the personal finance management landscape and capture a significant share of the market. Further research and development are crucial to refine the app's functionalities and ensure a successful launch.

a. Future Scope/Idea Expansion

The product can be scaled for:

- A product tailored for students
- A product tailored to address needs of business and Enterprises

Task3_FeynnLabs

July 3, 2024

STEP 2. PROTOTYPE DEVELOPMENT

[ ]:
```
# Load Datasets
import pandas as pd

# Load budget data
budget_df = pd.read_csv('/content/Budget.csv')
print("Budget Data:")
print(budget_df.head())

# Load personal transactions data
transactions_df = pd.read_csv('/content/personal_transactions.csv')

# Attempt to infer the date format automatically
transactions_df['Date'] = pd.to_datetime(transactions_df['Date'],␣
 ↪infer_datetime_format=True, errors='coerce')

# Check for any dates that couldn't be parsed
print(transactions_df[transactions_df['Date'].isna()])

print("\nPersonal Transactions Data:")
print(transactions_df.head())
```

```
Budget Data:
                 Category  Budget
0          Alcohol & Bars      50
1          Auto Insurance      75
2            Coffee Shops      15
3  Electronics & Software       0
4           Entertainment      25
Empty DataFrame
Columns: [Date, Description, Amount, Transaction Type, Category, Account Name]
Index: []

Personal Transactions Data:
        Date          Description   Amount Transaction Type  \
0 2018-01-01               Amazon    11.11            debit
1 2018-01-02     Mortgage Payment  1247.44            debit
```

```
2 2018-01-02      Thai Restaurant    24.22            debit
3 2018-01-03  Credit Card Payment  2298.09           credit
4 2018-01-04              Netflix    11.76            debit

              Category   Account Name
0             Shopping  Platinum Card
1      Mortgage & Rent       Checking
2          Restaurants    Silver Card
3  Credit Card Payment  Platinum Card
4        Movies & DVDs  Platinum Card
```

```
<ipython-input-3-51f20a0a8498>:13: UserWarning: The argument
'infer_datetime_format' is deprecated and will be removed in a future version. A
strict version of it is now the default, see
https://pandas.pydata.org/pdeps/0004-consistent-to-datetime-parsing.html. You
can safely remove this argument.
  transactions_df['Date'] = pd.to_datetime(transactions_df['Date'],
infer_datetime_format=True, errors='coerce')
```

[ ]:
```python
# Spend Categorization using NLP
import spacy

# Load spaCy model
nlp = spacy.load('en_core_web_sm')

# Define a function to categorize transactions using NLP
def categorize_transaction(description):
    doc = nlp(description)
    # Define some simple keyword matching for categories
    if any(token.lemma_ in ['coffee'] for token in doc):
        return 'Coffee Shops'
    elif any(token.lemma_ in ['gas', 'fuel'] for token in doc):
        return 'Gas & Fuel'
    elif any(token.lemma_ in ['grocery'] for token in doc):
        return 'Groceries'
    elif any(token.lemma_ in ['restaurant'] for token in doc):
        return 'Restaurants'
    elif any(token.lemma_ in ['internet'] for token in doc):
        return 'Internet'
    else:
        return 'Other'

# Apply the function to categorize the transactions if not already categorized
transactions_df['NLP_Category'] = transactions_df.apply(
    lambda row: row['Category'] if pd.notna(row['Category']) else␣
 ↪categorize_transaction(row['Description']),
    axis=1
)
```

```
print("\nTransactions with NLP Categories:")
print(transactions_df.head())
```

```
Transactions with NLP Categories:
        Date          Description   Amount Transaction Type  \
0 2018-01-01               Amazon    11.11            debit
1 2018-01-02     Mortgage Payment  1247.44            debit
2 2018-01-02      Thai Restaurant    24.22            debit
3 2018-01-03  Credit Card Payment  2298.09           credit
4 2018-01-04              Netflix    11.76            debit

              Category   Account Name         NLP_Category
0             Shopping  Platinum Card             Shopping
1      Mortgage & Rent       Checking      Mortgage & Rent
2          Restaurants    Silver Card          Restaurants
3  Credit Card Payment  Platinum Card  Credit Card Payment
4        Movies & DVDs  Platinum Card        Movies & DVDs
```

[ ]:
```
# Comparison with Budget
# Merge transactions with the budget based on the NLP-derived category
merged_df = pd.merge(transactions_df, budget_df, left_on='NLP_Category',␣
 ↪right_on='Category', how='left', suffixes=('', '_Budget'))

# Calculate total spending per category
spending_per_category = merged_df.groupby('NLP_Category')['Amount'].sum().
 ↪reset_index()

# Merge spending with budget data
comparison_df = pd.merge(spending_per_category, budget_df,␣
 ↪left_on='NLP_Category', right_on='Category', how='left')

# Provide advice based on comparison
comparison_df['Advice'] = comparison_df.apply(
    lambda row: 'On track' if -row['Amount'] <= row['Budget'] else 'Exceeding␣
 ↪budget', axis=1
)

print("\nComparison of Spending with Budget and Advice:")
print(comparison_df[['NLP_Category', 'Amount', 'Budget', 'Advice']])
```

```
Comparison of Spending with Budget and Advice:
              NLP_Category    Amount  Budget            Advice
0           Alcohol & Bars    539.13    50.0          On track
1           Auto Insurance   1350.00    75.0          On track
2             Coffee Shops    115.54    15.0          On track
```

3	Credit Card Payment	63561.12	NaN	Exceeding budget
4	Electronics & Software	719.00	0.0	On track
5	Entertainment	9.62	25.0	On track
6	Fast Food	330.63	15.0	On track
7	Food & Dining	77.75	NaN	Exceeding budget
8	Gas & Fuel	1715.17	75.0	On track
9	Groceries	2795.21	150.0	On track
10	Haircut	378.00	30.0	On track
11	Home Improvement	19092.87	250.0	On track
12	Internet	1570.88	75.0	On track
13	Mobile Phone	1680.40	65.0	On track
14	Mortgage & Rent	24754.50	1100.0	On track
15	Movies & DVDs	222.19	0.0	On track
16	Music	224.49	11.0	On track
17	Paycheck	93750.00	NaN	Exceeding budget
18	Restaurants	2613.02	150.0	On track
19	Shopping	1973.24	100.0	On track
20	Television	104.78	15.0	On track
21	Utilities	2776.00	150.0	On track

[ ]:

Step 3: Business Modelling

A promising business model for an AI-powered personal finance management app is a **Freemium Model** with tiered subscription plans and additional revenue streams through partnerships and affiliate marketing.

Freemium Model with Tiered Subscription Plans :

Business Model Overview :

1. **Freemium Offering**:
    - **Free Tier**: Offer basic financial management features for free. These could include simple budgeting tools, basic spend tracking, and general financial tips.
    - **Premium Tiers**: Introduce multiple premium tiers with advanced features such as personalized financial advice, in-depth spend analysis, debt reduction plans, automated savings and investment strategies, and financial health checkups.
2. **Subscription Plans**:
    - **Basic Premium**: Includes more detailed spend categorization, financial goal assistance, and basic predictive analysis.
    - **Pro Premium**: Includes everything in Basic Premium plus advanced predictive analytics, personalized financial health reports, and more sophisticated financial planning tools.
    - **Enterprise/Family Plans**: Tailored for families or small businesses, offering multiple user accounts with shared financial goals and reports.
3. **Additional Revenue Streams**:
    - **Partnerships with Financial Institutions**: Collaborate with banks, credit card companies, and investment firms to offer integrated services, such as special offers, loan options, and investment products directly through the app.
    - **Affiliate Marketing**: Promote financial products like credit cards, loans, and insurance policies within the app. Earn commissions on referrals and successful applications.
    - **Data Analytics Services**: Offer anonymized data insights to financial institutions and market researchers.

Step 4: Financial Modelling (equation)

Financial Equation for the Freemium Model

To outline a financial equation for this business model, let's break down the potential revenue streams and associated costs.

Revenue Streams

1. **Subscription Revenue (R_s)**:

$$R_s = N_{fi} \times P_{fi})(\text{upto n}) + \sum(N_{pi} \times P_{pi})(\text{upto m})$$

   where, N_{fi} is the number of free-tier users, P_{fi} is the premium conversion rate for free-tier users, N_{pi} is the number of users in each premium tier ii, and P_{pi} is the price of each premium tier ii.

2. **Partnership Revenue (R_p)**:

$$R_p = (N_{ak} \times C_{ak})$$

   where, N_{ak} is the number of affiliate conversions, and C_{ak} is the commission per conversion from affiliates.

3. **Advertising Revenue (R_a)**:

$$R_a = \sum(A_{vl} \times C_{vl})$$

   where, A_{vl} is the number of ad views and C_{vl} is the cost per view.

Costs

1. **Operational Costs (C_o)**:
   - This includes costs for data storage, servers, security measures, and customer support.

$$C_o = C_{servers} + C_{security} + C_{support} + C_{development} + C_{maintenance}$$

2. **Marketing Costs (C_m)**:
   - Costs associated with acquiring new users and promoting the app.

$$C_m = C_{advertising} + C_{partnerships} + C_{promotions}$$

3. **Development and Maintenance Costs (C_d)**:
   - Initial development and ongoing maintenance of the app, including updates and new features.

$$C_d = C_{initial\_development} + C_{ongoing\_development}$$

Profit Equation :

$$Profit(P) = (R_s + R_p + R_a) - (C_o + C_m + C_d)$$

Market Trends

1. Global Revenue Projection:
    - The finance app market is expected to generate over $1.55 billion in revenue globally by 2023, marking a remarkable 19% increase compared to the previous year. Looking ahead, the total revenue is expected to reach $2.38 billion by 2027.

2. Mobile Payments Adoption:
    - China leads the world in mobile payments adoption. Alibaba and Tencent have overtaken major banks as the primary suppliers of payments, lending, and investment. Revenue from mobile payments increased by 26% in 2020, reaching $1.39 trillion globally.

3. User Adoption:
    - Approximately 63% of smartphone users use at least one personal finance app.
    - Around 2/3 of American smartphone users use a personal finance app to manage their finances3.
    - Google research shows that smartphone users download around 3 personal finance apps to their mobile devices, with 4 in 10 using their devices for managing finance, checking account history, tracking investments, and paying bills4.

These trends highlight ***exponential*** growth and increasing relevance of personal finance tools and services worldwide.

Final Equation :

If the market is growing exponentially, we assume that the total sales x(t) grows exponentially over time. This can be represented as:

$$x(t) = x_0 e^{kt}$$

where:

- x_0 is the initial sales at t=0
- k is the growth rate
- t is time

the profit equation, we get:

$$P = (R_s + R_p + R_a)\, x_0 e^{kt} - (C_o + C_m + C_d)$$

COLAB LINK :

https://colab.research.google.com/drive/1lICo4j9ugsa7YoxMXFf9ACoIt5bw8Ek6