

PennyPal

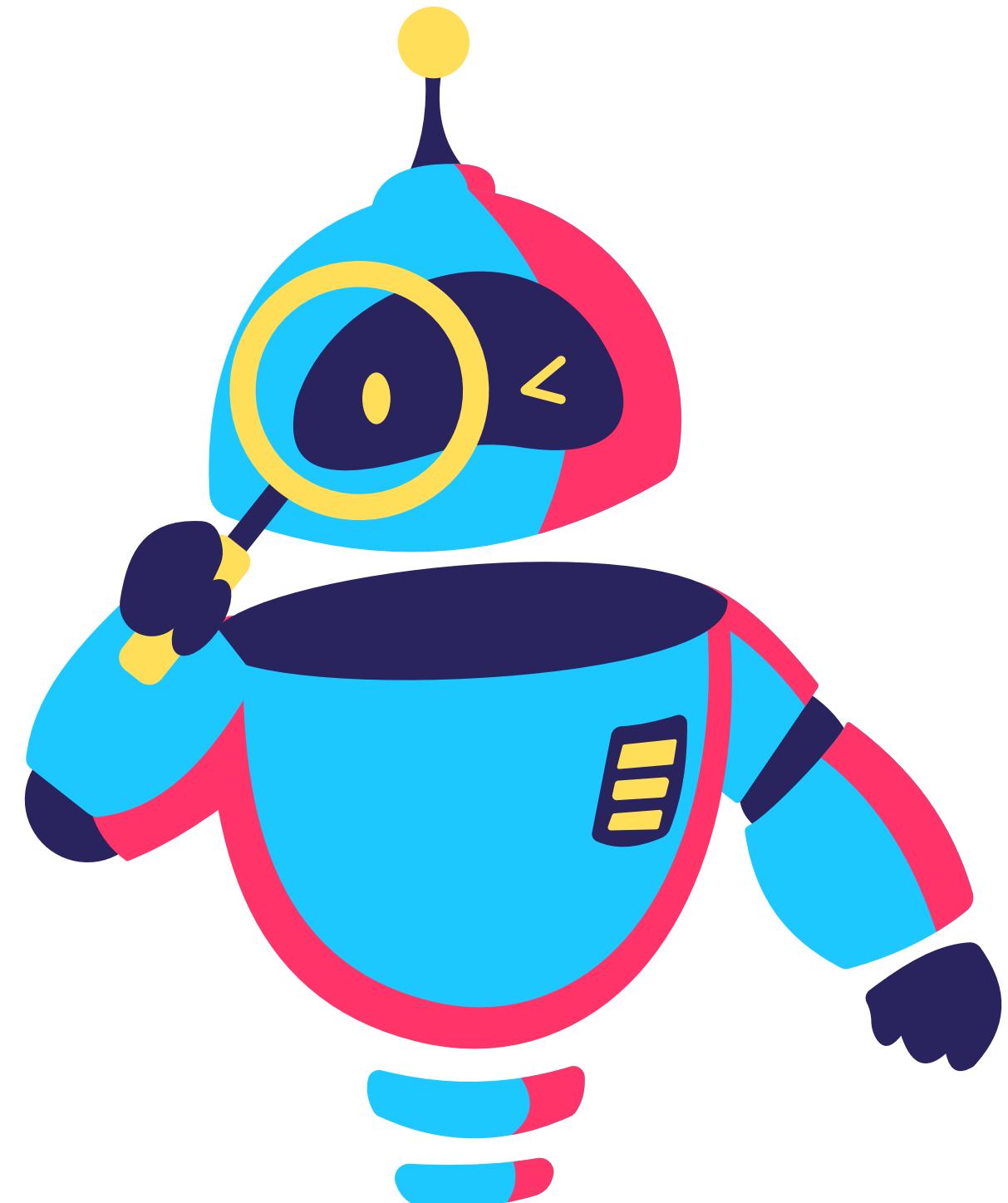
YOUR PERSONAL FINANCE COMPANION

Team: QUACKALICIOUS



Problem Statement

How can we leverage **generative AI** to create a chatbot that provides **personalized financial insights and trend analysis** based on user bank transactions, transforming the way individuals manage their finances?



Meet our Team



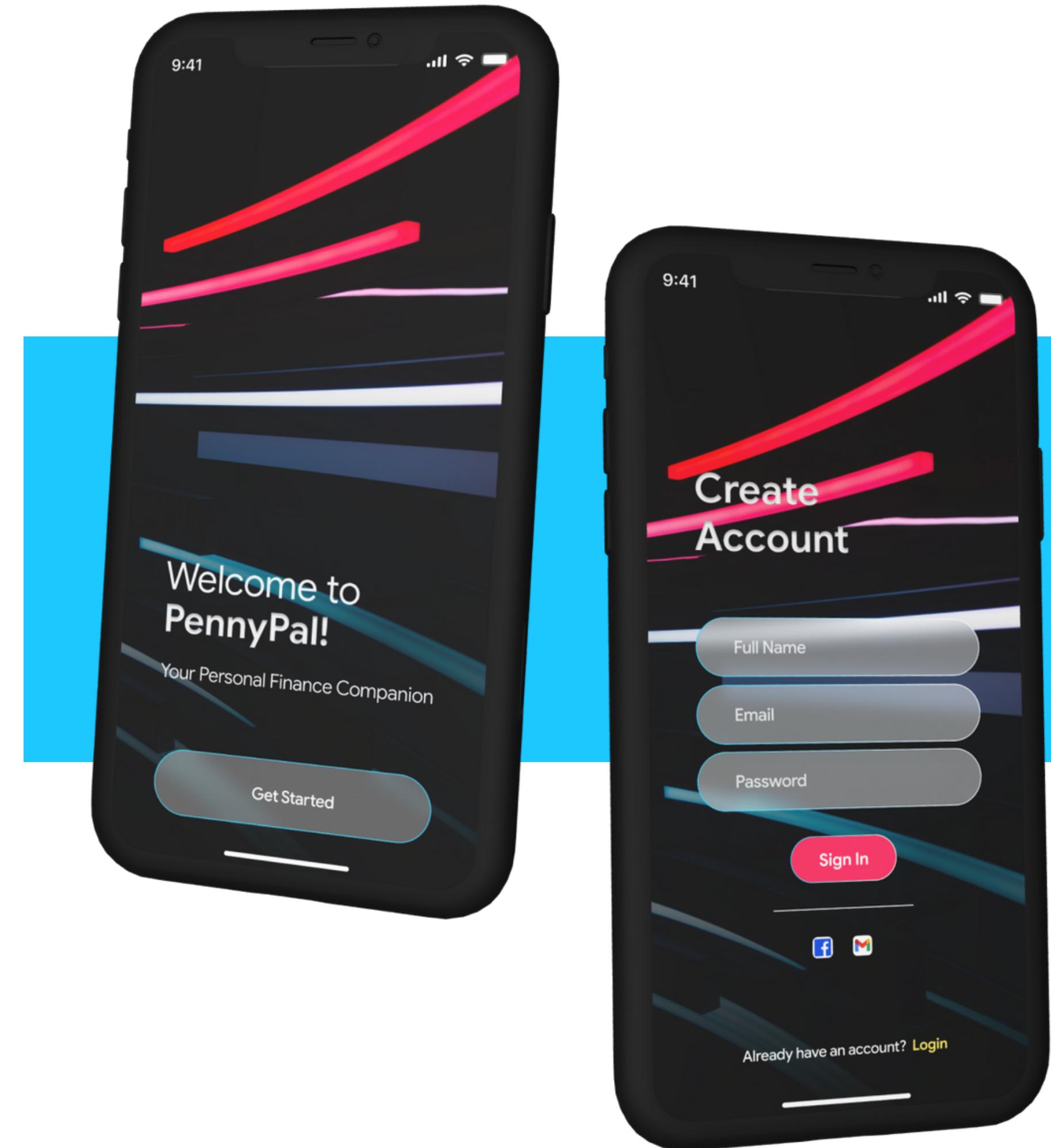
SAMIHA TASNIM DRISTY
Frontend Developer



MUHAMMAD SHOWHERDA AD-DIN
Backend Developer

Our Solution

Introducing **PennyPal**, your personal finance companion. Seamlessly manage your finances with our innovative platform, offering **budget tracking**, **expense recording**, **real-time insights** from our AI-powered **chatbot**, and customizable profile settings. Empower yourself to make informed financial decisions effortlessly.



Given Dataset

	A	B	C	D	E	F	G	H
1	TRANSACTION ID	DATE	TRANSACTION DETAILS	DESCRIPTION	CATEGORY	PAYMENT METHOD	WITHDRAWAL AMT	DEPOSIT AMT
2	TRX20220328123461	1-Jan-24	Fund Transfer From Bank Rakyat	Transfer of funds from Bank Rakyat	Income/Salary	Bank transfer		100,000.00
3	TRX20220328123462	1-Jan-24	Fund Transfer From Bank Islam	Transfer of funds from Bank Islam	Income/Salary	Bank transfer		50,000.00
4	TRX20220328123463	1-Jan-24	Fleet Services	Fees for fleet vehicle maintenance and services.	Utilities		772.00	
5	TRX20220328123464	1-Jan-24	Planning	Fees for planning applications or permits	Other Expenses	Online banking	42.00	
6	TRX20220328123465	1-Jan-24	Electoral & Local Land Charges	Charges for electoral and local land services	Government Services	Online banking	599.00	
7	TRX20220328123466	1-Jan-24	Parking Fines	Fines issued for parking violations	Other Expenses	Online payment	315.00	
8	TRX20220328123467	1-Jan-24	Council Tax	Local government tax levied on residential properties	Government Services	Direct debit	871.00	
9	TRX20220328123468	2-Jan-24	Mortgages	Payments towards mortgage loans	Other Expenses	Direct debit	970.00	
10	TRX20220328123469	2-Jan-24	Business Rates	Taxes imposed on non-residential properties used for business purposes	Government Services	Online banking	675.00	
11	TRX20220328123470	2-Jan-24	Electoral & Local Land Charges	Charges for electoral and local land services	Government Services	Online banking	214.00	
12	TRX20220328123471	2-Jan-24	Business Rates	Taxes imposed on non-residential properties used for business purposes	Government Services	Online banking	813.00	
13	TRX20220328123472	2-Jan-24	Museums	Admission fees or charges for services provided by museums	Other Expenses	Cash	50.00	
14	TRX20220328123473	2-Jan-24	Parking Fines	Fines issued for parking violations	Other Expenses	Online payment	378.00	
15	TRX20220328123474	3-Jan-24	Electoral & Local Land Charges	Charges for electoral and local land services	Government Services	Online banking	247.00	
16	TRX20220328123475	3-Jan-24	Housing Repairs & Keys	Charges for repairs and replacement of keys for housing	Other Expenses	Online payment	42.00	
17	TRX20220328123476	3-Jan-24	Electoral & Local Land Charges	Charges for electoral and local land services	Government Services	Online banking	889.00	
18	TRX20220328123477	3-Jan-24	Parks and Countryside	Charges for access to parks and countryside facilities	Other Expenses	Cash	605.00	
19	TRX20220328123478	3-Jan-24	Fund Transfer From Bank Islam	Transfer of funds from Bank Islam	Income/Salary	Bank transfer		4,000.00
20	TRX20220328123479	3-Jan-24	Grocery Shopping	Expenses for weekly grocery shopping	Groceries	Debit Card	250.00	
21	TRX20220328123480	3-Jan-24	Internet Subscription	Monthly subscription fee for internet service	Utilities	Direct debit	60.00	
22	TRX20220328123481	3-Jan-24	Mobile Phone Bill	Monthly bill for mobile phone usage	Utilities	Online banking	40.00	
23	TRX20220328123482	3-Jan-24	Business Rates	Taxes imposed on non-residential properties used for business purposes	Government Services	Online banking	831.00	
24	TRX20220328123483	3-Jan-24	Business Rates	Taxes imposed on non-residential properties used for business purposes	Government Services	Online banking	100.00	
	Ahmad	Bryan	Charles	Danish	Emily			

ERD

date	transaction_details	description	category	payment_method	withdrawal_amt	deposit_amt	user_id
1/1/2024	Fund Transfer From Bank Rakyat	Transfer of funds from Bank Rakyat	Income/Salary	Bank transfer	0.0	100000.0	1
1/1/2024	Fund Transfer From Bank Islam	Transfer of funds from Bank Islam	Income/Salary	Bank transfer	0.0	50000.0	1
1/1/2024	Fleet Services	Fees for fleet vehicle maintenance and ser	Utilities	Others	772.0	0.0	1
1/1/2024	Planning	Fees for planning applications or permits	Other Expenses	Online banking	42.0	0.0	1
1/1/2024	Electoral & Local Land Charges	Charges for electoral and local land servic	Government Services	Online banking	599.0	0.0	1
1/1/2024	Parking Fines	Fines issued for parking violations	Other Expenses	Online payment	315.0	0.0	1
1/1/2024	Council Tax	Local government tax levied on residential	Government Services	Direct debit	871.0	0.0	1
1/2/2024	Mortgages	Payments towards mortgage loans	Other Expenses	Direct debit	970.0	0.0	1
1/2/2024	Business Rates	Taxes imposed on non-residential property	Government Services	Online banking	675.0	0.0	1
1/2/2024	Electoral & Local Land Charges	Charges for electoral and local land servic	Government Services	Online banking	214.0	0.0	1
1/2/2024	Business Rates	Taxes imposed on non-residential property	Government Services	Online banking	813.0	0.0	1
1/2/2024	Museums	Admission fees or charges for services pro	Other Expenses	Cash	50.0	0.0	1
1/2/2024	Parking Fines	Fines issued for parking violations	Other Expenses	Online payment	378.0	0.0	1
1/3/2024	Electoral & Local Land Charges	Charges for electoral and local land servic	Government Services	Online banking	247.0	0.0	1
1/3/2024	Housing Repairs & Keys	Charges for repairs and replacement of ke	Other Expenses	Online payment	42.0	0.0	1
1/3/2024	Electoral & Local Land Charges	Charges for electoral and local land servic	Government Services	Online banking	889.0	0.0	1
1/3/2024	Parks and Countryside	Charges for access to parks and countrysid	Other Expenses	Cash	605.0	0.0	1
1/3/2024	Fund Transfer From Bank Islam	Transfer of funds from Bank Islam	Income/Salary	Bank transfer	0.0	0.0	1
1/3/2024	Grocery Shopping	Expenses for weekly grocery shopping	Groceries	Direct debit	0.0	0.0	1
1/3/2024	Internet Subscription	Monthly subscription fee for internet serv	Utilities	Direct debit	0.0	0.0	1
1/3/2024	Mobile Phone Bill	Monthly bill for mobile phone usage	Utilities	Online payment	0.0	0.0	1

Dataset

transactions		
PK	transaction_id	serial
FK	user_id	int not null
	date	date not null default current_date
	transaction_detail	varchar not null
	description	varchar
	transaction_category	varchar not null
	payment_method	varchar
	withdrawal_amt	decimal not null
	deposit_amt	decimal not null

transaction_categories		
PK	transaction_category_id	serial
	transaction_category	varchar not null unique

payment_methods		
PK	payment_method_id	serial
	payment_method	varchar not null unique

users		
PK	user_id	serial
	first_name	varchar not null
	last_name	varchar
	password	varchar not null
	email	varchar unique

conversations		
PK	conversation_id	serial
FK	user_id	int not null
	role	varchar not null
	content	varchar not null

transaction_details		
PK	transaction_detail_id	serial
	transaction_detail	varchar not null unique

roles		
PK	role_id	serial
	role	varchar not null unique

Data preprocessing and cleaning

Read the csv files and created a “;” separated file since the original file had random “,”

```
ahmad = pd.read_csv('ahmad.csv', sep=';')
bryan = pd.read_csv('bryan.csv', sep=';')
charles = pd.read_csv('charles.csv', sep=';')
danish = pd.read_csv('danish.csv', sep=';')
emily = pd.read_csv('emily.csv', sep=';')
```

```
# fill missing values
ahmad['withdrawal_amt'] = ahmad['withdrawal_amt'].fillna(0)
ahmad['deposit_amt'] = ahmad['deposit_amt'].fillna(0)
bryan['withdrawal_amt'] = bryan['withdrawal_amt'].fillna(0)
bryan['deposit_amt'] = bryan['deposit_amt'].fillna(0)
charles['withdrawal_amt'] = charles['withdrawal_amt'].fillna(0)
charles['deposit_amt'] = charles['deposit_amt'].fillna(0)
```

Filling the missing values

Fixing the date with PostgreSQL format

```
# fix date column with PostgreSQL format
ahmad['date'] = ahmad['date'].map(lambda x:fix_data(x))
bryan['date'] = bryan['date'].map(lambda x:fix_data(x))
charles['date'] = charles['date'].map(lambda x:fix_data(x))
danish['date'] = danish['date'].map(lambda x:fix_data(x))
emily['date'] = emily['date'].map(lambda x:fix_data(x))
```

Data preprocessing and cleaning

```
# convert to float  
ahmad['withdrawal_amt'] = ahmad['withdrawal_amt'].astype(float)  
ahmad['deposit_amt'] = ahmad['deposit_amt'].astype(float)  
bryan['withdrawal_amt'] = bryan['withdrawal_amt'].astype(float)  
bryan['deposit_amt'] = bryan['deposit_amt'].astype(float)  
charles['withdrawal_amt'] = charles['withdrawal_amt'].astype(float)  
charles['deposit_amt'] = charles['deposit_amt'].astype(float)
```

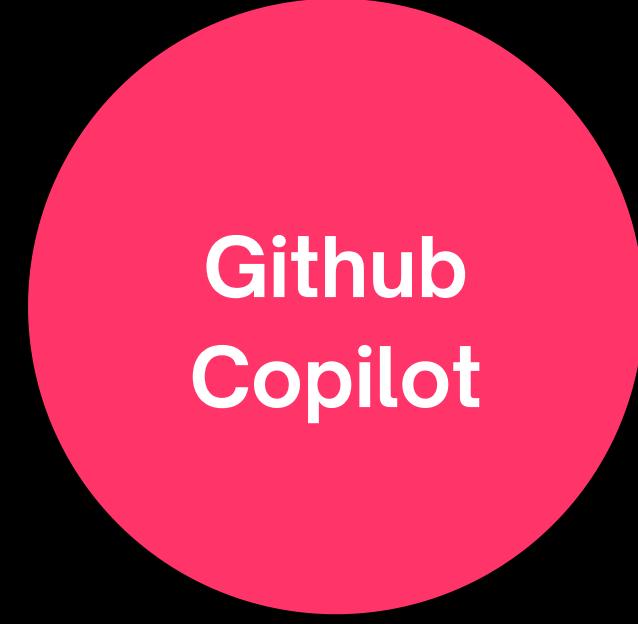
Convert to float withdrawal and deposit amount

Dropping transaction id and adding user id column

```
# drop transaction id column  
ahmad.drop(columns=['transaction_id'], inplace=True)  
bryan.drop(columns=['transaction_id'], inplace=True)  
charles.drop(columns=['transaction_id'], inplace=True)  
danish.drop(columns=['transaction_id'], inplace=True)  
emily.drop(columns=['transaction_id'], inplace=True)  
  
# add user id column  
ahmad['user_id'] = 1  
bryan['user_id'] = 2  
charles['user_id'] = 3  
danish['user_id'] = 4  
emily['user_id'] = 5
```

Model Research

Accuracy Percentage



87.3%

74.9%*

80%

NLP powered code generation

PennyPal UI



Unique Value Propositions

Comprehensive Financial Management

PennyPal offers a holistic solution for personal finance management, including expense tracking, budgeting, and personalized insights through AI-driven chatbot capabilities.

Data-Driven Insights

Leveraging advanced analytics and machine learning, PennyPal provides actionable insights into spending patterns, savings goals, and future financial projections, empowering users to make informed decisions.

User-Centric Approach

With intuitive interfaces and customizable features, PennyPal prioritizes user experience, offering tailored solutions to address individual financial needs and goals effectively.

Continuous Improvement

Through regular updates and enhancements, PennyPal is committed to optimizing user experience, implementing user feedback, and staying ahead of emerging trends in fintech innovation.

Potential Problems

Database Performance and Scalability

Testing database schemas and server-side graph generation may complicate database management, impacting app **performance** and **scalability** as user data increases.

Model Accuracy and User Engagement

Fine-tuning AI models for chatbot interactions is crucial for delivering **accurate** insights and engaging user experiences. However, achieving optimal performance may demand significant resources and expertise.

Sending data to GPT

GPT API usually only receives **one** table schema. One of the queries send database data to GPT which can be prevented through **prompt** engineering

Data Security and Privacy

Storing **sensitive** financial data requires robust security measures to prevent breaches and unauthorized access. Implementing encryption and ensuring compliance with **privacy** regulations are vital for user trust.

Gamification and User Adoption

Incorporating gamification elements, such as rewarding users for meeting budgets, can **boost** engagement. However, **balancing** motivation with user privacy is essential to ensure user adoption and maintain trust.

Key Impact



Financial foresight
and Literacy

Financial
Empowerment

Time and Cost
Savings

Improved Financial
Well-being

Goal-Oriented
Conversation

Competitor Analysis

FEATURES	YNAB.	Emma	mint	PennyPal!
Expense Tracking	✓	✓	✓	✓
Budgeting Tools	✓	✓	✓	✓
AI-powered Insights Chatbot Functionality				✓
Spending Visualization		✓		✓

Marketing Strategy

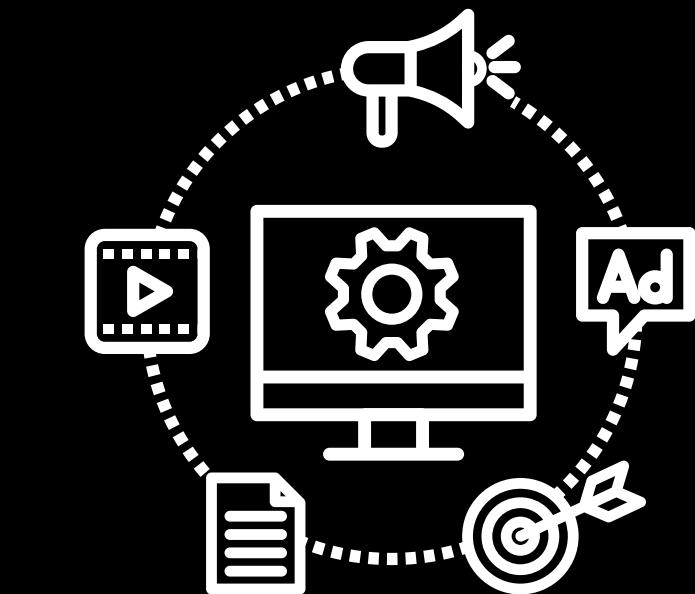


Social Media Campaigns

We will utilize platforms like Facebook, Instagram, and Twitter to create **engaging content**, share user testimonials, and run targeted **ad campaigns** to reach potential users interested in personal finance management.

Content Marketing

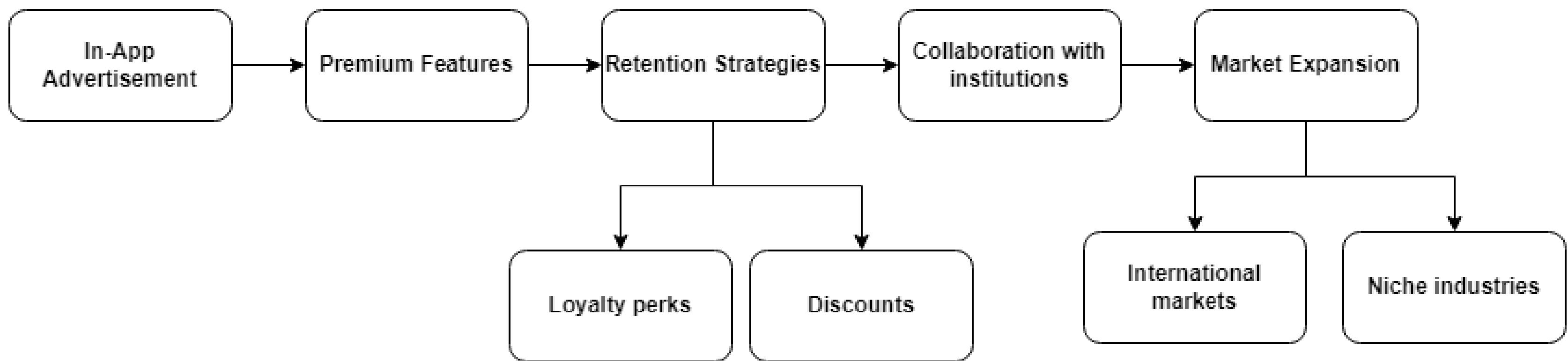
We will create valuable content such as **blog posts, articles, and videos** on topics related to personal finance management, budgeting tips, and AI-driven insights, establishing PennyPal as a thought leader in the industry and **drive organic traffic** to the app.

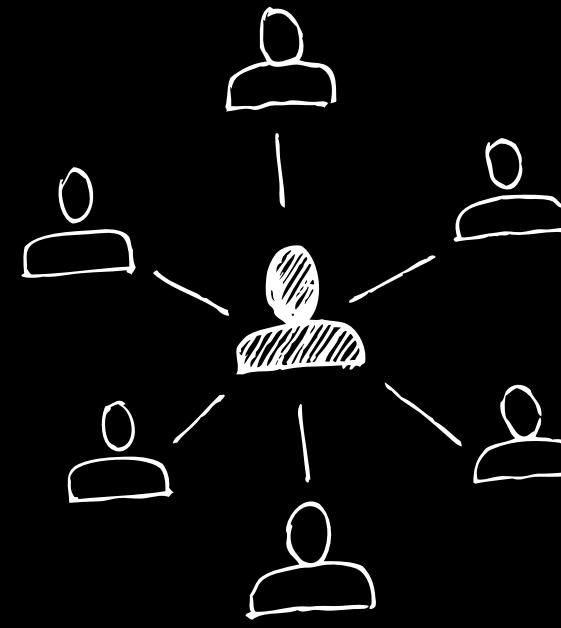


App Store Optimization (ASO)

We will **optimize** the app's listing on app stores by using relevant keywords, compelling visuals, and clear descriptions to improve visibility and **attract organic downloads** from users searching for finance management apps.

Business Plan





Targeted User

01 Millennials and Gen Z individuals

who are seeking simplified and intuitive financial management solutions.

02 Busy professionals

who are looking for efficient ways to track expenses, set budgets, and plan for future financial milestones.

03 Small business owners and freelancers

who are seeking tools to streamline expense tracking, invoicing, and financial reporting.

Future Improvements

01 Subscription and Recurring Cost Management

Identify frequently used subscriptions and notifying users

02 Predictive Analytics

Analytics will be enhanced through rigorous finetuning

03 Emotional Intelligence Integration

Finetuning will help analyze user language and sentiment to tailor chatbot responses.

04 Integration with External Services

Secure connections with financial institutions for automatic data import and enhanced account management features.

THAN
YOU