SmartSpend

AI-Powered Personal Finance Assistant

Sprint 1 Presentation

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ASE 485 — Spring 2026

The Problem

- Financial stress is a leading cause of anxiety
- People overspend without realizing it
- Existing budgeting apps require too much manual input
- Generic advice doesn't adapt to individual behavior

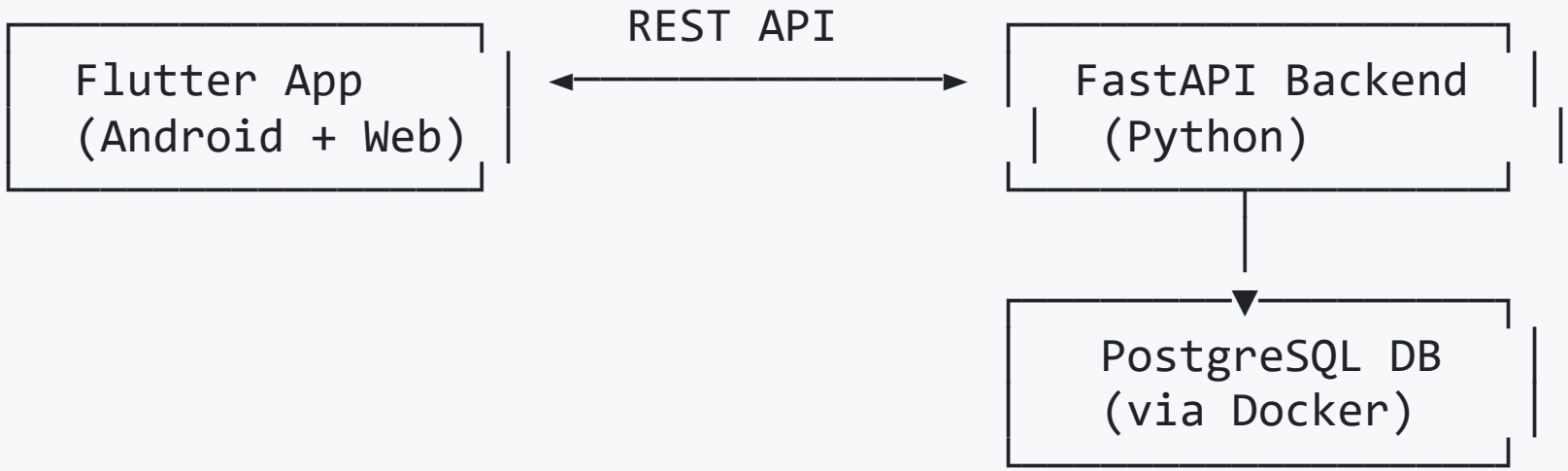
SmartSpend uses machine learning to provide personalized, adaptive budgeting guidance.

My Approach

Build a **full-stack application** that learns from spending patterns:

- **Frontend:** Flutter (Android + Web)
- **Backend:** FastAPI (Python)
- **Database:** PostgreSQL
- **ML:** Scikit-learn for transaction categorization & budget generation
- **Deployment:** Docker containers

Architecture Overview



Sprint 1 Progress — Week by Week

Week	What I Built
4	Project setup — GitHub repo, Docker (docker-compose + PostgreSQL), Flutter & FastAPI scaffolding
5	User authentication — JWT auth endpoints, login/signup screens, DB schema (init.sql, seed.sql)
6	Transaction management — CRUD API endpoints, Flutter UI for adding/viewing transactions
7	Dashboard & visualization — spending breakdowns by category, API services for budgets, goals, recommendations
8	Testing, bug fixes, UI polish (account, settings, analytics screens)

What's Working — Backend

- **FastAPI** server with 5 routers:
  - `/auth` — register & login with JWT tokens + bcrypt passwords
  - `/transactions` — full CRUD (create, list, filter by category, delete)
  - `/budgets` — full CRUD with partial updates
  - `/goals` — full CRUD for savings goals with progress tracking
  - `/recommendations` — read endpoint for ML-driven suggestions
- **PostgreSQL** with 4 tables: users, transactions, budgets, goals
- **Docker Compose** — one command spins up DB + API + pgAdmin

What's Working — Frontend (Flutter)

- **9 screen modules:** Home, Auth, Transactions, Budget, Goals, Analytics, Recommendations, Account, Settings
- **Bottom navigation** with 5 tabs: Home, Transactions, Budget, Goals, Account
- **Service layer** — dedicated API client services for each entity
- **Spending analytics** — category breakdowns, period selector (week/month/year), month comparison
- **Reusable widgets** — summary cards, transaction tiles, goal progress cards, category cards

Demo Highlights

- **Auth flow:** Register → Login → JWT stored → authenticated API calls
- **Transaction management:** Add transactions with amount, category, description, date → view list → delete
- **Dashboard:** Spending summary cards, recent transactions, quick navigation
- **Analytics:** Category breakdown bars, spending by period, month-over-month comparison
- **Budget & Goals:** Create/edit budgets per category, set savings goals with progress tracking

Learning with AI — Topic 1

Sports Betting Analytics

Using AI (Claude, ChatGPT) as a **tutor** to learn:

- **Probability & odds** — how sportsbooks set lines
- **Expected value (EV)** — calculating whether a bet has positive EV
- **Statistical models** — Elo ratings, regression models for predictions
- **Bankroll management** — Kelly Criterion, unit sizing, risk management

Approach: Ask AI to explain concepts, then verify understanding through examples and discussion.

Learning with AI — Topic 2

Stock Market Analysis

Using AI as a **guided learning assistant** to understand:

- **Fundamental analysis** — reading income statements, balance sheets, P/E ratios
- **Technical analysis** — candlestick charts, RSI, moving averages, MACD
- **Portfolio diversification** — asset allocation and risk management
- **Trading strategies** — understanding market mechanics and order types

Approach: Break down complex financial concepts with AI, study real-world examples, deepen understanding iteratively.

AI Tools Used

Tool	How I Used It
Claude / ChatGPT	Tutor for sports betting & stock market concepts — explanations, follow-up Q&A
GitHub Copilot	Code assistance for Flutter widgets, FastAPI endpoints, SQL schemas

Philosophy: Use AI to *explain and teach*, not just provide answers. Ask follow-up questions to build genuine understanding.

Sprint 2 Plan

Week	Goal
9	Budget generation ML model
10	Budget adaptation system
11	Savings recommendations engine
12	Goal setting & progress tracking enhancements
13	Alerts & notifications system
14	Flutter mobile app polish & integration testing
15	Final testing, deployment, Final Presentation

Deployment: Android app + public web application via Docker

Key Dates

- **Project submissions deadline:** 4/25/2026
- **Final Presentation:** 4/27/2026
- **HW4 Deployment deadline:** 5/1/2026

Repositories

- **Capstone Project:** https://github.com/Jolteer/ase485-capstone-finance-ml
- **Learning with AI:** https://github.com/Jolteer/ase485-learning-with-ai

Thank You — Questions?

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