AuraSpend – Your New Budget Tracker

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COMP3330-Group20 Final Report

https://github.com/BYLinMou/COMP3330-Gp20

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Key Contributions

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- Database management, privacy & security
- Data visualization
- AI integration

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- AI integration
- UI/UX
- GitHub Actions CI/CD

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- UI/UX
- Gamification
- Report & trailer

Introduction

AuraSpend is a next-generation mobile budget tracker with full agentic AI integration and gamification. We have seen a rising demand for budget trackers recently while common budget trackers on the market fail to keep pace with this shift. 72% of young adults (18-35) are actively trying to save more (51%) or pay down debt (24%) (Bank of America, 2025) but existing budget trackers neither make good use of the ever-evolving AI technologies nor provide an engaging gamified experience to help users build a budgeting habit. AuraSpend fixes the issues with Magic Receipt (intelligent receipt scanning), Magic Agent (app-wide agentic chatbot) and Virtual Pets (that make budgeting a game).

Literature Review

We started by ripping apart every popular budget tracker in the Hong Kong App Store:

App Name	AI Features	Gamification Elements	Major Issues	App Store Ratings
Money+ Cute Expense Tracker by	No	No	Bills in budgets; VIP issues; too basic	4.8/5 (16.3K ratings)

Chongqing Zhouhu Technology				
Fortune City: Expense Tracker by SPARKFUL	Yes (Smart notes based on behaviors / locations)	Yes (City-building with expenses)	Lagging / freezing; no transfers / hides; slow upgrades	4.5/5 (10K ratings)
Monny by Greamer	No	Yes (Challenges / achievements)	No transfers / carry-overs; feminine theme; breakdowns lacking	4.7/5 (8.7K ratings)
Spending Tracker - Budget by LightByte	Yes (AI import, receipt scan)	No	Transaction glitches; limited funds / adds; inaccurate views	4.8/5 (4.4K ratings)
Money Manager by RealByte	No	No	No investments; inflexible budgets; account limits	4.7/5 (3.3K ratings)

Despite being rated highly, most of them lack either AI features or gamification elements, while also requiring premium subscriptions for even simple functions like adding more categories, exporting Excel or receiving notifications.

On the other hand, we are fans of the famous productivity app called Forest, which allows users to plan trees by staying focused. Its exceptional success (ranked the #1 paid app in more than 130 countries for years) inspired us to make AuraSpend while replacing trees with a variety of pets. This adaptation leverages proven gamification for habit formation in productivity contexts, with 48% of users reporting positive sentiment toward its features, and extends it to financial management (Rahmillah, 2023), where similar approaches have increased daily active users by 192% and goal completion rates by 86% (Uppaluri, 2025).

On the tech side, we reviewed recent studies on OCR & LLM for receipt parsing and API/backends for mobile usage. A Python script called SmartReceiptAnalyzer was made to examine the feasibility of using intelligent scanning.

- **For receipt scanning,** we originally planned to use PaddleOCR (as stated in the proposal) but quickly pivoted after early prototyping. Running PaddleOCR on a server added unacceptable latency, required heavy server setup, and drained our limited time budget. Modern multimodal LLMs (especially Gemini-2.0-flash-exp and GPT-4o-mini)

proved far superior: they accept the raw receipt image directly and extract information with high accuracy.

- **For LLM APIs,** OpenRouter's single endpoint accesses multiple LLMs (e.g. Gemini/Deepseek) with free tiers (50 req/day) (OpenRouter, n.d.), simplifying mobile integrations without code rewrites. Tutorials highlight Python/JS setups for chatbots like Magic Agent (Medium, 2025). Poe adds token-based access for prototyping, inspiring our BYOK gateway.
- **For backend,** Supabase's Postgres + WebSockets syncs finance data across devices in <100ms, with auth/RLS for secure, private transactions. It outperforms Firebase in SQL flexibility for queries like spending trends, supporting offline-first mobile apps. Ideal for handling 700+ records/month in budgeting tools (Forbes, 2025).

User Manual, Key Screens & Features

Installation

- **Android:** Download our latest .apk on our [GitHub Release](#) page.
- **iOS:** Due to Apple Developer Program restrictions, official App Store release is not yet available. However, please pull our main branch on [GitHub](#) and refer to the README for detailed instructions.
- Launch **AuraSpend** from your app drawer and you'll see the sign-in screen on first launch

System Requirements
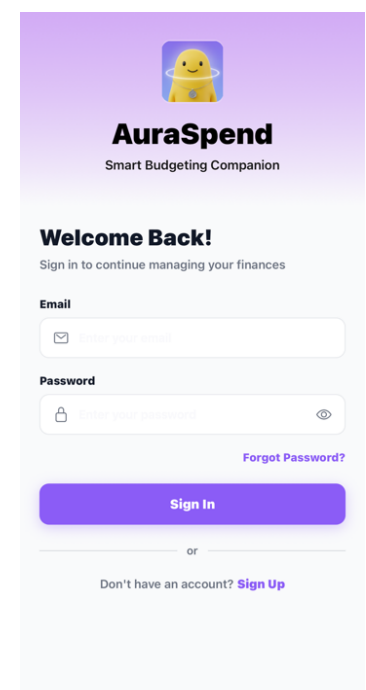
- **iOS:** 13.0 or later
- **Android:** 5.0 or later

Figure 1 Sign-in Screen

OpenAI Configuration (Critical Setup)

Unlike common budget trackers, AuraSpend supports BYOK (Bring Your Own Key), giving you control over the AI models used for Magic Receipt and Magic Agent.

Steps:

1. Navigate to **Settings (Right Tab) → OpenAI Configuration**.
2. **API Key:** Enter your API Key.
3. **Fetch Models:** Tap "Fetch Available Models" to load your account's access list.
4. **Model Selection:**
   a. **Receipt Model:** Select a vision-capable model (e.g., GPT-4o) for Magic Receipt
   b. **Chat Model:** Select a model for Magic Agent.
   c. **Fallback Model:** A backup model if the primary fails.
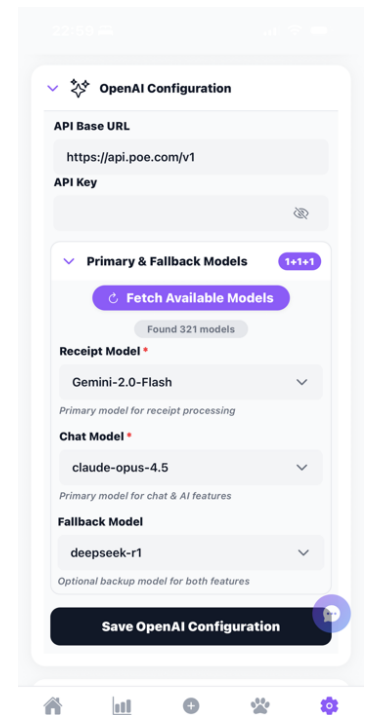5. **Save:** Tap "Save OpenAI Configuration."

Figure 2 OpenAI Configuration

Side Note: Model providers we recommend:

Poe: https://poe.com/api_key

(Free tier: 3,000 tokens per day)

OpenRouter: https://openrouter.ai/settings/keys

(Free tier: 50 requests per day)

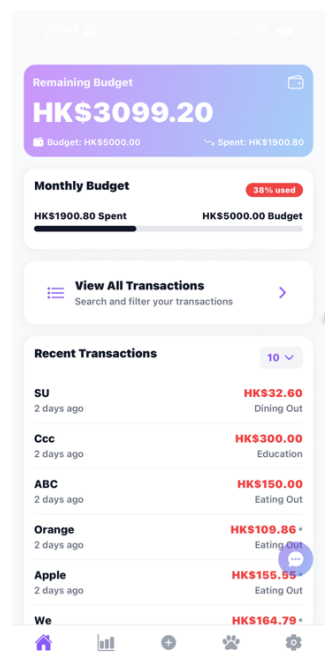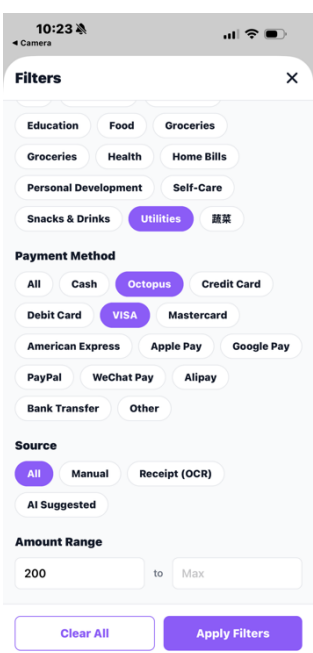## Home, Reports & Settings

Figure 3 Home Screen

Figure 4 Query

Figure 5 Reports

The Home tab provides a quick overview of your finances. Tap the Current Balance card to flip it to the back for detailed balances for different payment methods of your choice. You can use filters to query on all your transaction records. The Reports tab visualizes spending trends, distributions and other statistics using pie/line charts.

Multi-Currency Engine

We built a CurrencyConverter service that uses the Frankfurter API to fetch real-time exchange rates, allowing users to log expenses in foreign currencies (e.g., JPY while traveling) while seeing their budget impact in their home currency (e.g., HKD). You can choose your home currency in the setting profile.
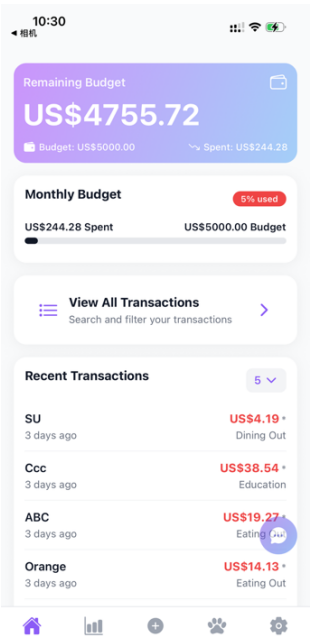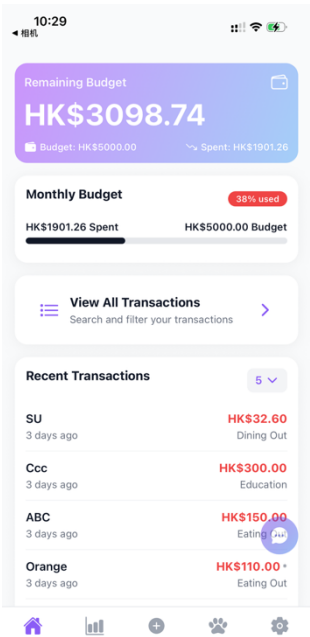

Figure 6.1 Multi-currency

Figure 6.2 Multi-currency

Multi-Language Support

AuraSpend is designed for inclusivity, featuring full localization in both English and Chinese. Powered by react-i18next, the app automatically persists your language preference locally and syncs it to your cloud profile, ensuring a consistent and personalized experience across all your devices.
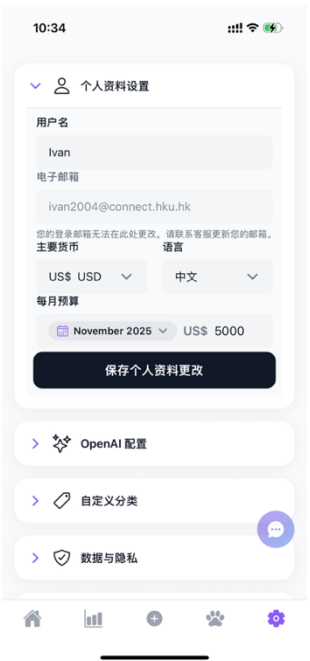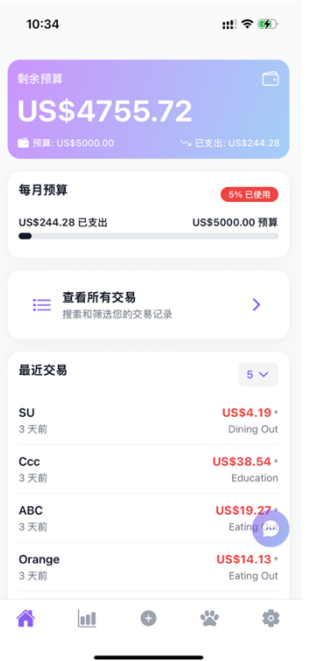

Figure 7.1 Multi-language Support

Figure 7.2 Multi-language Support

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Magic Receipt

We use advanced AI to itemize receipts, not just capture the total.

1. Go to the **Add Tab** and select **"Receipt"**.
2. **Capture:** Take a photo or upload a file.
3. Magic Receipt extracts:
    a. Merchant Name
    b. Total Amount & Currency
    c. **Line Items:** Individual items with quantities and prices.
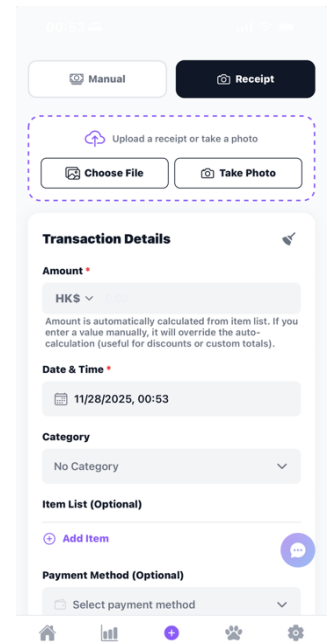   d. Suggested Category & Payment Method.
4. Save the transaction

Figure 8 Magic Receipt

Magic Agent

Access the floating Chat Bubble (bottom-right) to talk to your financial data using natural language.

What You Can Do with It:

- **Queries:** "How much did I spend on coffee this month?"
- **Analysis:** "Am I over budget?" or "Analyze my spending patterns."
- **Complex Chain of Actions:** "Based on my recent transactions, suggest a new categorization and adjust all the current categories.
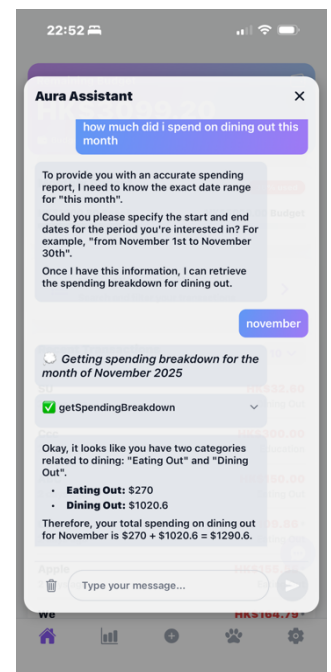- Magic Agent is proven capable of completing all these tasks with ease.

Figure 9 Magic Agent

The Pet System

Your spending habits directly influence your virtual companion. **Earn XP and level up** by regular logging, **maintaining daily streak** and **"Tap to gain +100 XP!"** (cooldown applies). You can also pet it or poke it (gently) which leads to changes in their mood. Buy new pets with XP and tap the pet card to switch to your other pets.

*Need Help? Use **Magic Agent** for instant answers or check **Settings → Help & Support**.*

Technical Contributions

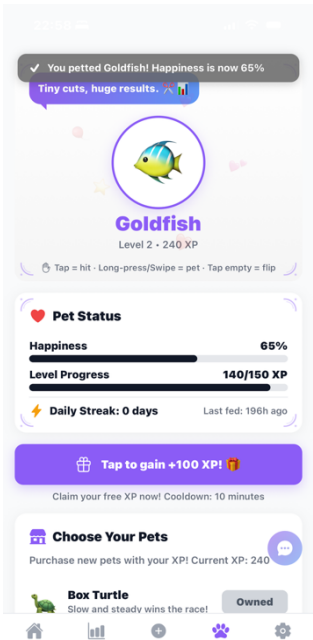The following table summarizes the technical implementation highlights of AuraSpend.

Figure 10 Your Lovely Pet

Features	Technical Contributions & Implementation Highlights
Magic Receipt	• Multimodal LLM extracts raw text → sent together with the original image to API (BYOK) • Built a lightweight receipt-analysis prompt template that returns structured JSON • Client-side image cropping & compression before upload to stay under free-tier
Magic Agent	• App-wide agent powered by the same OpenRouter/Poe endpoint • RAG-style: agent queries Supabase directly via serverless edge functions to fetch real user transactions
Pet System	• Full user auth, Row-level security

	• All transaction CRUD + pet state changes instantly reflected on every logged-in device
BYOK API Design	• Users paste their own OpenAI-compatible key • All LLM calls go through our thin proxy that adds rate-limiting and caching
GitHub Management	• GitHub Actions CI/CD: every push to main auto-builds Android APK + publishes to GitHub Releases • GitHub Secret (Supabase key and signature)

Results of Testing & Issue Analysis

We tested extensively on core AI features using a python script ReceiptSmartAnalyzer and real-user scenarios.

Magic Receipt model benchmarking (20+ Hong Kong receipts - thermal, handwritten, mixed CN/EN):

- Gemini-2.0-flash-exp (via OpenRouter free tier): highest accuracy, fastest consistent response, cheapest ($0 for testing), became our default model
- Claude-3-haiku and Qwen-VL-72B: poor structured extraction and frequent hallucinations, dropped
- All models: latency heavily tied to upstream TPM quotas; not 100% accurate.

One big issue on Magic Agent function-calling is that early versions often ignored tools or looped unnecessarily. We solved this by rewriting system prompt with strict JSON output rules, explicit step-by-step chain-of-thought, and few-shot examples.

Overall, core features are stable and production-ready on free tiers.

Limitations, Challenges & Future Plans

The BYOK Friction

Our decision to offload API costs to the user keeps our server bills at zero, but it might require some technical literacy, which could create a bottleneck at the signup stage.

Reliability of AI

While Magic Receipt handles unstructured data more effectively than traditional regex-based OCR, it introduces probabilistic errors into a domain requiring deterministic accuracy.

Data Privacy & External Dependencies

Although the application utilizes Row Level Security (RLS) within Supabase for internal data storage, the AI functionalities require data egress to third-party providers. This creates a dependency on external privacy policies regarding data processing.

Future Plans

Tiered Authentication & Hybrid API Model

To address the "BYOK Friction," we plan to evolve our authentication system to distinguish between standard and premium users. We aim to deploy an API Gateway that manages distinct usage quotas and assigns managed API keys to users automatically.

- Premium Users: Will enjoy higher rate limits and seamless AI access without manual configuration.
- Standard Users: Will have access to a limited quota of "managed" AI calls.

BYOK Retention

Crucially, we will retain the Bring Your Own Key architecture as an advanced option, allowing users to bypass our gateway limits entirely by using their own credentials.

Enhanced Gamification (Pet Cosmetics)

To further incentivize daily engagement, we will expand the pet system to include a "Wardrobe" feature. Users will be able to spend their earned XP on accessories and clothing for their virtual companions. This adds a layer of visual customization and long-term goal setting to the budgeting experience.

Technologies Learned Independently

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- Supabase: Postgres schema design, Row-Level Security (RLS), realtime subscriptions, and secure direct client access
- Data visualization in React Native

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- Multimodal LLM for receipt parsing, agentic AI setup, prompt engineering for reliable JSON extraction
- BYOK integration, multi-model routing, and client-side caching
- GitHub CI workflow

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- UI/UX in React Native
- Reanimated 3
- Gamification design

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Uppaluri, R. (2025). Gamification: Revolutionizing financial planning systems. World Journal of Advanced Engineering Technology and Sciences, 14(3), 399-409. https://doi.org/10.30574/wjaets.2025.14.3.0158