

Hackathon Task

Project: AI-Powered Receipt Analyzer with LLM Insights

Quote for Motivation: You don't have to see the whole staircase, just take the first step.

Objective:

Build a system that extracts information from receipt images using **OCR**, categorizes expenses, analyzes spending patterns, and provides **personalized budgeting advice** via an **LLM**.

Tasks / Workflow:

1. Receipt Image Processing

- Accept receipt images as input.
- Apply image preprocessing techniques such as noise reduction, grayscale conversion, contrast enhancement, and thresholding to improve text visibility.
- Use **Optical Character Recognition (OCR)** techniques to extract textual information such as item names, quantities, prices, and totals from the receipt image.

2. Data Parsing & Structuring

- Convert OCR text into structured format (item name, price, quantity).
- Handle OCR errors and clean data.

3. Expense Categorization

- Classify each item into categories (e.g., snacks, dairy, meat, bakery).
- Calculate totals per category and overall spending.

4. Spending Analysis

- Compute percentage of total spending per category.
- Highlight overspending areas or anomalies.

5. LLM Integration for Financial Advice

- Feed structured data into a Large Language Model (LLM).
- Generate **personalized insights** and recommendations for budgeting.

6. Streamlit Web App Development

- Implement a **user-friendly interface** for uploading receipts.
- Display **spending breakdown** and **AI-generated advice** interactively.
- Visualize results with tables, charts, and textual insights from LLM.

7. Testing & Demonstration

- Test with multiple receipts to ensure accuracy.
 - Prepare demo showing the full **workflow**: OCR → Analysis → LLM advice.
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Expected Outcomes:

- Accurate extraction of items and prices from receipts.
- Automatic categorization and spending analysis.
- Clear, actionable, AI-driven financial advice.
- Fully functional working demonstration of end-to-end workflow.

Creating a user interface is optional. If desired, you may use Streamlit to build a simple interface for uploading receipts and displaying analysis results. However, the primary focus of this project should be your logical pipeline, structured processing, analytical reasoning, and clean code implementation rather than the UI itself.

Hint:

- **Image Processing:** OpenCV, Pillow
- **Optical Character Recognition (OCR):** Tesseract OCR, EasyOCR, Mistral OCR, or any other
- **LLM Integration:** Gemini or any other open source LLM

These libraries are only suggested as hints; you are free to use any other tools or technologies based on your preference, research, and project requirements.

BEST OF LUCK

YOU CAN DO IT