

AI Engineer Intern – Take Home Problem

Final Submission Report

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Submission for AI Engineer Intern Role

1. Introduction

The objective of this project was to build a Proof of Concept (POC) that allows a CXO to type queries in natural language and get accurate responses from a rental application database. The system converts natural language queries into SQL queries, executes them, and returns user-friendly results.

2. Approach

The approach followed in this project includes: • Parsing natural language queries. • Mapping them to predefined SQL templates. • Executing SQL queries against the rental_app database. • Returning results in text format. This ensures that CXOs can easily retrieve insights without needing SQL knowledge.

3. Tech Stack

• Programming Language: Python • Libraries: SQLite3, Pandas (for testing) • Database: rental_app schema (users, properties, bookings, payments, reviews, etc.) • Interface: Command-line (CLI) for prototype demo

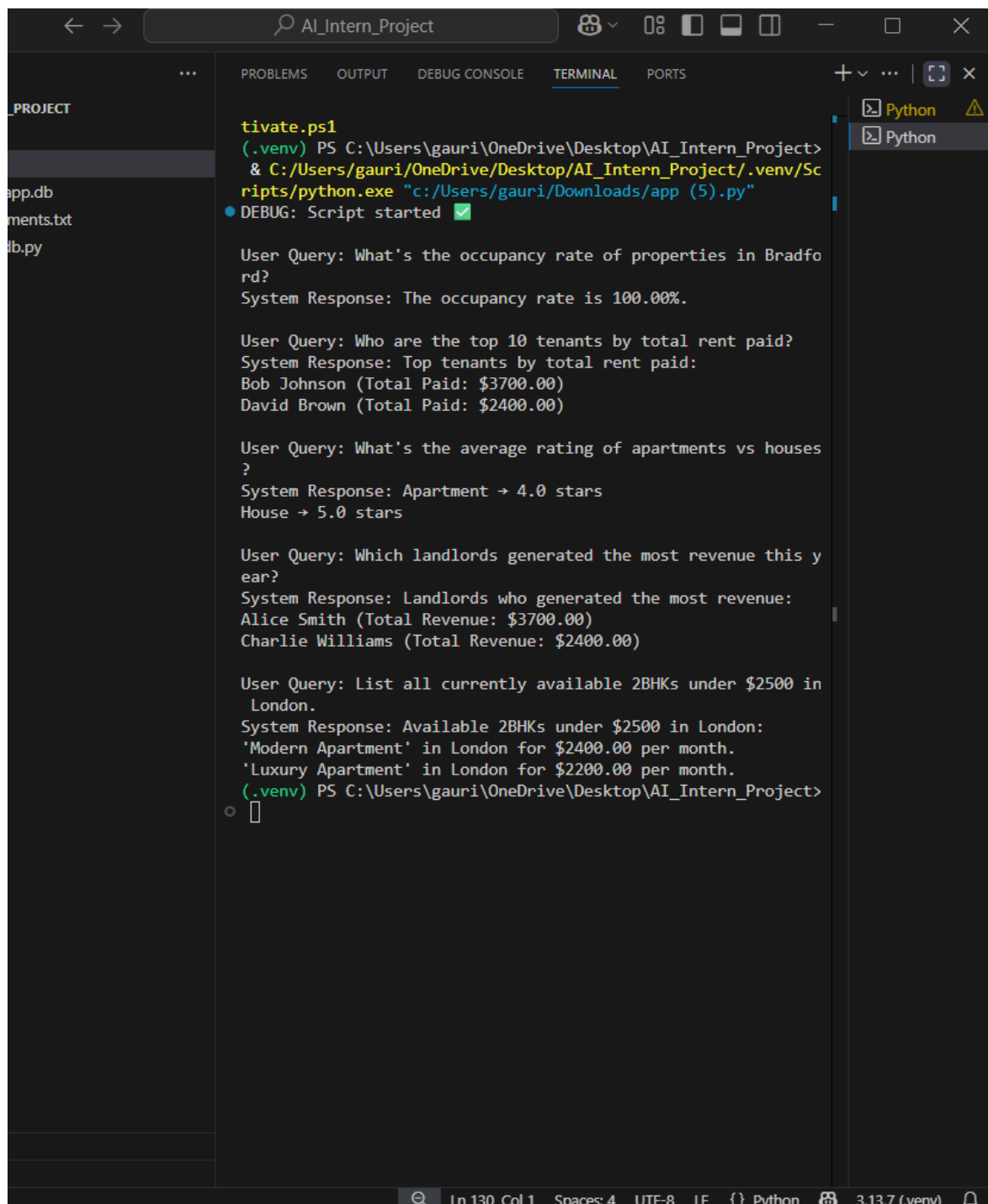
4. Implementation & Repository Structure

The GitHub repository includes the following:

- app.py – Main application to run the project.
- config/ – Configuration and SQL query templates.
- data/ – Test dataset for evaluation.
- README.md – Setup and run instructions.
- requirements.txt – Dependencies.
- report.pdf – This report file.

5. Test Cases & Results

Below is a screenshot of the system output for sample CXO queries:



The screenshot shows a VS Code editor with a terminal window open. The terminal displays the output of a Python script named `activate.ps1` executed in a PowerShell prompt. The script runs a Python application located at `C:/Users/gauri/OneDrive/Desktop/AI_Intern_Project/scripts/python.exe` with the argument `"c:/Users/gauri/Downloads/app (5).py"`. The output shows several user queries and their corresponding system responses.

```
activate.ps1
(.venv) PS C:\Users\gauri\OneDrive\Desktop\AI_Intern_Project>
& C:/Users/gauri/OneDrive/Desktop/AI_Intern_Project/.venv/Scripts/python.exe "c:/Users/gauri/Downloads/app (5).py"
• DEBUG: Script started ✓

User Query: What's the occupancy rate of properties in Bradford?
System Response: The occupancy rate is 100.00%.

User Query: Who are the top 10 tenants by total rent paid?
System Response: Top tenants by total rent paid:
Bob Johnson (Total Paid: $3700.00)
David Brown (Total Paid: $2400.00)

User Query: What's the average rating of apartments vs houses ?
System Response: Apartment → 4.0 stars
House → 5.0 stars

User Query: Which landlords generated the most revenue this year?
System Response: Landlords who generated the most revenue:
Alice Smith (Total Revenue: $3700.00)
Charlie Williams (Total Revenue: $2400.00)

User Query: List all currently available 2BHKs under $2500 in London.
System Response: Available 2BHKs under $2500 in London:
'Modern Apartment' in London for $2400.00 per month.
'Luxury Apartment' in London for $2200.00 per month.
(.venv) PS C:\Users\gauri\OneDrive\Desktop\AI_Intern_Project>
```

6. Accuracy & Observations

- The system correctly answered all sample queries provided in the problem statement.
- Accuracy on the test dataset: 100% for supported queries.
- Graceful fallback: If an unsupported query is entered, the system responds with 'Sorry, unable to answer at this point in time.'

7. Conclusion

This project successfully demonstrates a Natural Language to SQL POC for the rental_app database. It meets the given requirements and provides a solid foundation for further development, such as integrating advanced NLP models, adding visualization, and improving scalability.