AI Developer Assignment — Bookxpert Pvt Ltd

📘 Overview

This project contains two independent AI/ML tasks assigned as part of the **Bookxpert AI Developer Recruitment Assessment**.
Each task demonstrates practical implementation of **Artificial Intelligence** and **Machine Learning** concepts using Python.

🧩 Task 1 — Name Matching System

Objective

To build a **name similarity matching system** that identifies and ranks names most similar to a user-provided input.

Description

The system compares a given name with a list of stored names and returns:

- The **best match** with a similarity score.
- A **ranked list** of the top similar names with their respective similarity scores.

This helps in applications like user data deduplication, fuzzy searches, or typo correction in names.

Tech Stack

- **Language:** Python
- **Library:** rapidfuzz (for fuzzy string matching)

Implementation Details

1. A list of 30+ names (with similar variations) is stored.
2. When the user inputs a name, the system computes similarity scores using the **Levenshtein ratio**.
3. Outputs both:
    - Best-matching name
    - Top 5 similar names ranked by similarity percentage

How to Run

1. Navigate to the Task-1 folder:
2. cd Task-1
3. Install required library:

4. pip install rapidfuzz
5. Run the script:
6. python name_matcher.py
7. Enter any name (e.g., geeta) when prompted.

Sample Input & Output

Enter a name: geeta

Best Match: Geetha (Similarity: 95.00%)

Top Similar Names:

Geetha — 95.00%

Gita — 91.00%

Githa — 88.00%

Gitu — 80.00%

Seetha — 75.00%

🤖 Task 2 — Recipe Chatbot (Local LLM Integration)

Objective

To fine-tune a **local language model (LLM)** and build an AI-powered chatbot that suggests recipes based on user-provided ingredients.

Key Features

- Runs a **local Transformer model** (distilgpt2) using the **Transformers** library.
- Fine-tuned on a **custom recipe dataset (recipes.jsonl)**.
- Provides contextual recipe suggestions based on ingredients.
- Accessible through a **FastAPI web interface** with a simple chat-style frontend.

Tech Stack

- **Language:** Python
- **Framework:** FastAPI
- **Libraries:** Transformers, Datasets, Torch, Uvicorn

- **Frontend:** HTML, JavaScript, CSS

Folder Structure

Task-2/

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├── app.py # FastAPI backend with LLM integration

├── index.html # Web-based chatbot interface

├── recipes.jsonl # Custom fine-tuning dataset (50 recipes)

├── train_recipe_model.py # Fine-tuning script for distilgpt2

├── recipe_model/ # Saved fine-tuned model

├── requirements.txt # Dependencies

└── __pycache__/ # Cache folder (auto-generated)

Setup Instructions

Step 1: Create Virtual Environment

python -m venv venv

venv\Scripts\activate # (Windows)

Step 2: Install Dependencies

pip install -r requirements.txt

Example requirements.txt:

fastapi

uvicorn

transformers

torch

datasets

accelerate

Step 3: Fine-Tune the Model (Optional)

To retrain or improve the model with your dataset:

python train_recipe_model.py

The fine-tuned model will be saved to:

recipe_model/

Step 4: Run the Chatbot API

uvicorn app:app --reload

Visit in browser:
👉 http://127.0.0.1:8000/

Step 5: Chat Interface (index.html)

- Open http://127.0.0.1:8000/ to access the chatbot UI.
- Enter ingredients like:
- egg, cheese
- The chatbot will generate a relevant recipe suggestion using your fine-tuned model.

Sample Input & Output

Input:

egg, onion

Output:

Simple Onion Omelette: Whisk 2 eggs, chop 1 onion. Heat oil in a pan, sauté onions until soft, pour in eggs. Cook until set, fold, and serve.

Troubleshooting

Issue	Solution
Access denied during package install	Use pip install --user <package> or run terminal as **Administrator**
ValueError: pad_token	Add tokenizer.pad_token = tokenizer.eos_token in training script
HTML not loading (404)	Ensure index.html is in the same folder as app.py, or use FastAPI route to serve it

Issue	Solution
Output repetition	Add no_repeat_ngram_size=2 and limit max_new_tokens in generation function

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Future Enhancements

- Add image-based recipe recognition using Vision-Language Models
- Include nutritional value estimation
- Voice command integration
- Enhanced UI with Lottie animations and recipe cards

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