SEMANTIC BOOK RECOMMENDER WITH LLMS

Presented By : Ahmed Ayman

University of Sadat City| 2025

OVERVIEW

- Overview
- Project Objectives
- Project Components (1/2)
- Project Components (2/2)
- Training Context
- Tools and Technologies Used
- Challenges & Solutions
- Outcomes
- Conclusion

OVERVIEW

During my internship/training, I worked on a project titled "Semantic Book Recommender with Large Language Models (LLMs)".
This project aimed to build a book recommendation system that leverages semantic search, text classification, sentiment analysis, and a user-friendly web interface to provide personalized book recommendations.
The project was part of the DEPI (AI & Data Science - Data Scientist) training program designed by IBM.

PROJECT OBJECTIVES

1. Allows users to search for books using natural language queries (e.g., "a book about a person seeking revenge").

2. Classify books such as "fiction" or "non-fiction" for filtering.

3. Analyzes the sentiment and emotions of book descriptions to enable sorting by tone (e.g., suspenseful, joyful, sad).

4. Provides a user-friendly web interface for seamless interaction.

PROJECT COMPONENTS (1/2)

Text Data Cleaning

- Dataset of 7,000 books from Kaggle.
- Handled missing values and added new features (e.g., book age).
- Visualized data and prepared it for analysis.

Semantic (Vector) Search and Vector Database Creation

- Used sentence-transformers/all-mpnet-base-v2 to generate text embeddings.
- Stored vectors in ChromaDB for fast similarity search.
- Implemented top-10 book retrieval based on semantic similarity.

PROJECT COMPONENTS (2/2)

Text Classification Using Zero-Shot Classification

- Used Facebook/BART-large-mnli model to classify books into fiction/non-fiction.
- Optimized for GPU/CPU performance.

Sentiment Analysis Using LLMs

- Extracted emotions (joy, sadness, suspense) from book descriptions.
- Enabled users to sort books based on emotional tone.

Web Application Development Using Gradio

- Designed a web interface integrating all functionalities.
- Deployed a working Gradio-based book recommender system.

TRAINING CONTEXT

This project was developed as part of the DEPI (AI & Data Science - Data Scientist) training program by IBM.
Key topics covered in the training:

- Data Science Fundamentals
- Python for Data Science
- Machine Learning & MLOps
- Natural Language Processing (NLP)
- Prompt Engineering
- Capstone Project Development

TOOLS AND TECHNOLOGIES USED

- Programming Language: Python

- Libraries & Frameworks:
- Hugging Face Transformers
- Sentence-Transformers
- Pandas, NumPy
- ChromaDB
- Gradio

- Deployment:
- Gradio Web App
- Space on Huggingface

CHALLENGES & SOLUTIONS

First Problem

Handling large text datasets: Used ChromaDB for efficient vector storage.

Second Problem

Classifying books without labeled data: Used Zero-Shot Classification with LLMs.

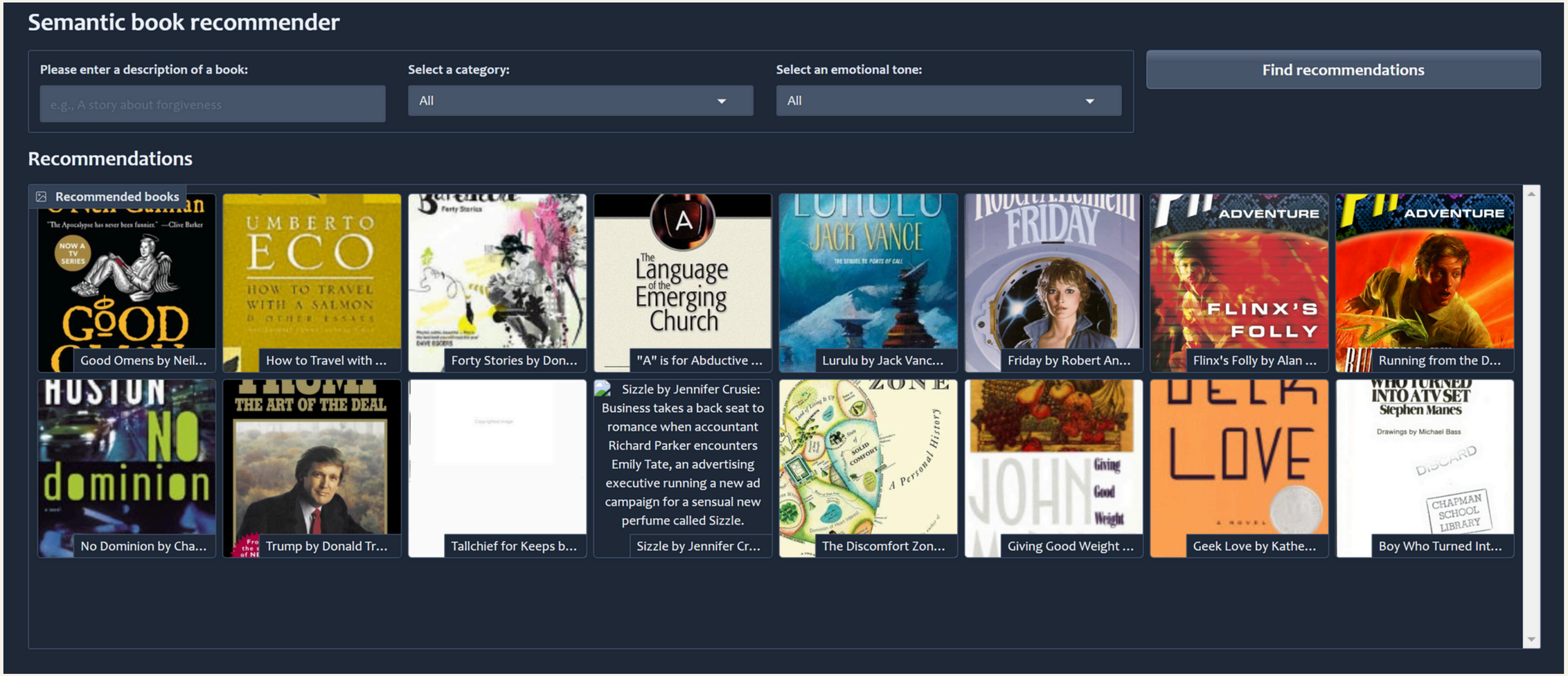
Third Problem

Building a user-friendly interface: Developed a Gradio web application.

OUTCOMES

1. Successfully built a working book recommender system.
2. Users can search books using natural language queries.
3. Books can be filtered by category (fiction/non-fiction).
4. Sentiment-based sorting allows users to discover books by emotional tone.
5. Fully functional web application deployed using Gradio.

FINAL OUTCOME



CONCLUSION

1. **Project Impact: Applied advanced NLP techniques to real-world problems.**

2. **Skills Gained: Data preprocessing, NLP, Machine Learning, Web Development.**

University of Sadat City| 2025

THANK YOU

Presented By : Ahmed Ayman
University of Sadat City
Faculty of Computers and Artificial Intelligence
Digital Egypt Pioneers Initiative (DEPI)