

The slide features a decorative background with three vertical bars on the left side: a dark gray bar, a medium gray bar, and a black bar. In the top right corner, there is a grid of small black dots. A similar, but less dense, pattern of dots is located at the bottom right of the slide.


# **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

10

## Semantic book recommender

Please enter a description of a book:

e.g., A story about forgiveness

Select a category:

All

Select an emotional tone:

All

Find recommendations

## Recommendations

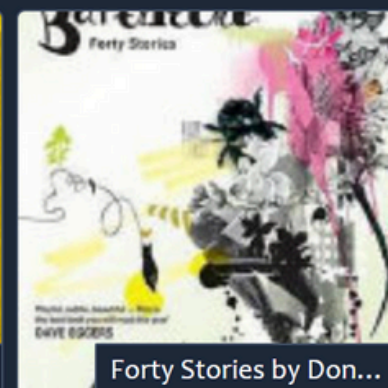
Recommended books



Good Omens by Neil...



How to Travel with ...



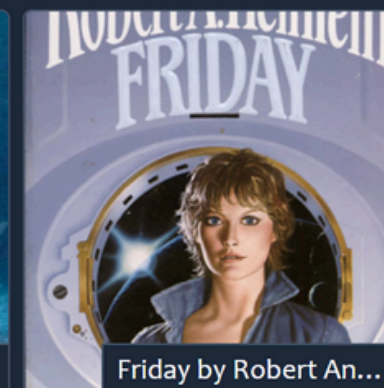
Forty Stories by Don...



"A" is for Abductive ...



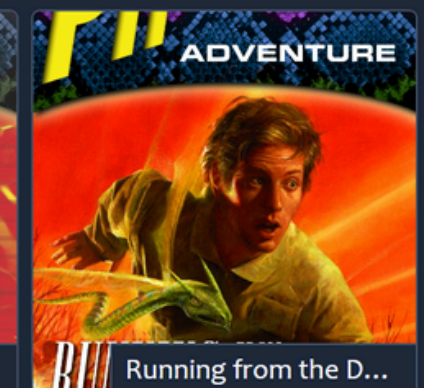
Lurulu by Jack Vanc...



Friday by Robert An...



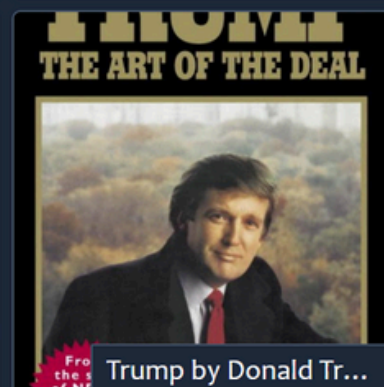
Flinx's Folly by Alan ...



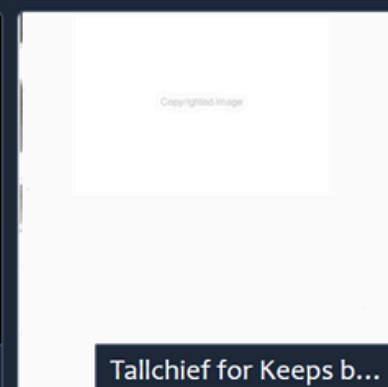
Running from the D...



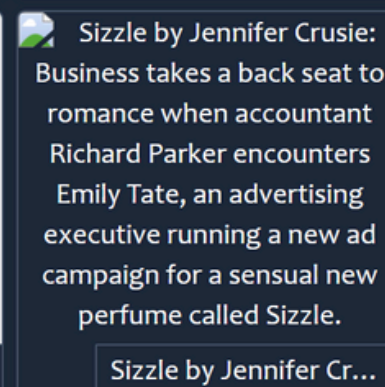
No Dominion by Cha...



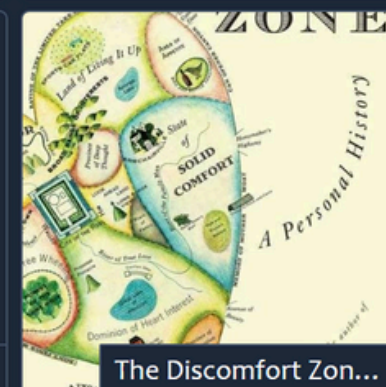
Trump by Donald Tr...



Tallchief for Keeps b...



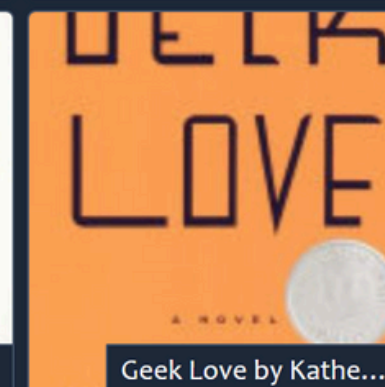
Sizzle by Jennifer Cr...



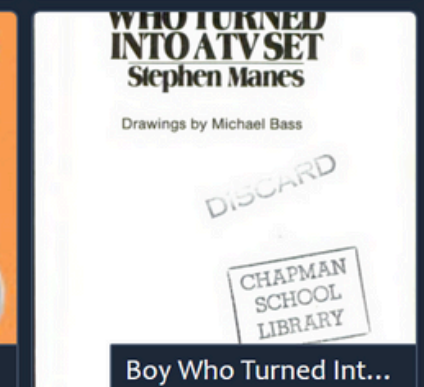
The Discomfort Zon...



Giving Good Weight ...



Geek Love by Kathe...



Boy Who Turned Int...

# CONCLUSION

- 1 Project Impact: Applied advanced NLP techniques to real-world problems.**
- 2 Skills Gained: Data preprocessing, NLP, Machine Learning, Web Development.**



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**THANK YOU**

**Presented By : Ahmed Ayman**

**University of Sadat City**

**Faculty of Computers and Artificial Intelligence**

**Digital Egypt Pioneers Initiative (DEPI)**

