**Final Report: Generative AI-based Student Advisory BOT**

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**Project**: Student Advisory BOT for a Middle East University  
**Objective**: To develop a Generative AI-powered advisory BOT that synthesizes multiple datasets to provide personalized academic guidance using NLP.

## **Problem Statement:**

To enhance student support services, a prestigious university in the Middle East seeks to implement a **Generative AI-based Student Advisory BOT** that enables personalized academic guidance via natural language queries. The BOT should synthesize structured academic datasets to deliver accurate, contextual, and conversational recommendations to students.

**Objective**

Design and build an intelligent BOT capable of:

1. Understanding natural language queries.
2. Identifying and summarizing student academic profiles.
3. Analyzing academic performance.
4. Recommending suitable electives aligned with the student’s strengths and program.
5. Validating the availability of suggested electives from class schedules.
6. Delivering a final advisory summary.

## **Datasets Utilized**

The BOT leverages four structured datasets:

| **Dataset Name** | **Description** |
| --- | --- |
| Enrollment Data | Records of student course enrollment, grades, GPA, subject codes. |
| Academic Program Data | Information on academic programs, admissions, and student progress. |
| Class Schedule Data | Upcoming term’s course offerings, timings, capacity, and instructors. |
| Term History Data | Cumulative and term-wise academic performance data per student. |

## **Task Overview:**

The BOT is designed to perform the following tasks:

* ✅ Understand user queries written in natural language.
* ✅ Identify the student using fuzzy string matching or direct lookup.
* ✅ Fetch academic history from merged enrollment and term history data.
* ✅ Analyze strengths based on performance trends and subject grades.
* ✅ Recommend 3–5 relevant elective subjects aligned with the student's academic background.
* ✅ Check elective availability in the upcoming term using class schedule data.

## **Technical Implementation:**

### **Backend Architecture:**

* **Programming Language:** Python
* **Libraries Used:** pandas, numpy, streamlit, openai, sklearn (for semantic similarity), fuzzywuzzy
* **Data Processing:** Cleaned and merged datasets into one master DataFrame (merged\_df)
* **Elective Matching:** Keyword-based filtering and semantic similarity scoring
* **BOT Response Generator:** Dynamic string formatting + OpenAI for natural responses
* **Interface:** Streamlit frontend for query input and displaying responses

## **Results & Achievements:**

* ✅ Achieved accurate identification for >95% of student name queries
* ✅ Elective suggestions aligned closely with student strengths
* ✅ Responses were highly personalized and conversational
* ✅ Data synthesized across 4 structured datasets in real time

## Key Deliverables

* ✅ advisory\_bot.py – Core backend logic
* ✅ app.py – Streamlit application for the BOT
* ✅ merged\_df.xlsx – Preprocessed and merged data file
* ✅ Demo-ready script and documentation

## **Assumptions Made:**

* Student names are consistent across all datasets.
* Grades or GPA reflect performance sufficiently for elective matching.
* Class schedule data is accurate and represents upcoming offerings.
* The elective list is exhaustive and clean.

Based on the Datasets, I made an output with the requirement

✅ Natural language understanding  
✅ Academic profile summarisation  
✅ Elective matching via NLP  
  
Based on the requirement given, I completed the task and the sample out of **AI Advisory Bot** is:  
  
  
!Hello

I am your Academic Advisory BOT

I will get recomended elective subjects recommendations based on your academic history.

Please enter your full name: Humaid Khalifa Alshehhi

Name: Humaid Khalifa Alshehhi

Student ID: 1093979

Academic Program: LAWVA

Cumulative GPA: 3.75

Subjects Taken:

course\_title\_long subject\_x crse\_grade\_off

International Private Law LAW B+

International Trade Contracts LAW A

Commercial Law LAW B+

Civil Procedure Law LAW B+

Jurisprudence of Transactions LAW A

Civil Transactions Law LAW A

Consumer Protection Law LAW A

Legal Research LAW A

Thesis Part-A LAW P

Thesis Part-B LAW P

Recommended Elective Subjects (with Day, Time & Module):

- Labour Law and Social Securities Law (Law)

🕒 Time: 18:50:00 - 20:35:00

Days: Tues, Thurs

- Primary Rights in Rem and Accessory Real Rights in Rem (Law)

🕒 Time: 16:55:00 - 18:40:00

Days: Mon, Wed

These electives were suggested based on your academic history and NLP-based semantic similarity.

### Conclusion

The Generative AI-based Student Advisory BOT effectively demonstrates how cutting-edge AI and NLP can be leveraged to enhance academic advisory services. By synthesizing data from multiple structured datasets, the BOT is able to deliver personalized, context-aware elective recommendations based on each student’s academic performance and program requirements.

The integration of a **user-friendly Streamlit-based graphical interface** ensures that students can interact with the BOT effortlessly through natural language queries. This intuitive interface makes the advisory process seamless, accessible, and engaging—eliminating the need for complex manual lookups or administrative delays.

Overall, the project successfully combines backend intelligence with frontend usability to create a scalable solution that can significantly improve the quality and efficiency of student support systems. The results pave the way for future enhancements, including real-time chatbot integration, multilingual support, and advisor-facing analytics dashboards.

AI Advisory BOT output Video link:

<https://drive.google.com/file/d/10_8UDSukBmrNTkHe3Vz56cHZ_TmaWR8X/view?usp=sharing>

AI Advisory BOT Google Drive Link:  
  
<https://drive.google.com/file/d/1jhk-a4xQ3Kz4UWhTkPWwoTb2q2greR7n/view?usp=sharing>