Faculty of Media Engineering and Technology
German University in Cairo
Dr. Nourhan Ehab

CSEN 903: Advanced Computer Lab, Winter 2025
Project Description

Introduction

Artificial Intelligence has advanced from building rule-based systems to developing adaptive models that learn, reason, and generate new knowledge. This project guides you through a structured, milestone-based workflow to complete the pipeline of AI from statistical prediction to symbolic representation to structured generation.

In the first milestone, the main task is to implement a predictive model using statistical machine learning techniques to capture patterns in data and forecast outcomes. The second milestone extends this foundation by incorporating knowledge graphs, which enable the integration of domain knowledge to improve accuracy and/or explainability. Finally, the third milestone leverages generative models to build an interactive chatbot that can answer queries and provide insights. Together, these milestones highlight the complementary roles of prediction, knowledge representation, and generation in designing intelligent systems.

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Project Themes

The project will be organized around three themes: International Hotel Booking System, English Premier League Companion, and the Airline Customer Assistant.

The International Hotel Booking System project investigates how a customer assistant for international hotel booking can be developed to guide travelers and support hotels in improving service quality. The dataset integrates customer reviews, demographic information, and hotel attributes, capturing both subjective feedback and objective factors such as star ratings, cleanliness, comfort, and facilities. By analyzing these features, the assistant can identify which cities offer the best experiences for specific traveler groups, such as solo travelers, and construct predictive models to estimate value-for-money scores. The result is an intelligent system capable of providing personalized recommendations to help travelers make informed choices while enabling hotels to better understand and respond to customer needs. Dataset Link: International Hotel Booking Analytics

The English Premier League Companion project explores how a data-driven assistant for Fantasy Premier League (FPL) can help players make better decisions by leveraging historical performance data. The dataset combines player statistics, match outcomes, and fantasy game records, capturing features such as goals, assists, clean sheets, minutes played, and opponent strength. By analyzing these attributes, the assistant can identify consistently high-performing players and develop predictive models to forecast player points in upcoming matches. The result is an intelligent system that provides actionable recommendations, enabling managers to optimize their lineups and transfers throughout the season. Dataset link: Fantasy Football and Fantasy Premier League (FPL) Player Data 2024-2025

The Airline Customer Assistant project explores how a customer assistant for holiday flight booking can be built using data-driven insights to improve traveler experience and airline services. The dataset combines booking records, passenger reviews, operational details, and in-flight satisfaction surveys, offering rich features on customer preferences, planning habits, and feedback. By extracting patterns from this data, predictive models can be developed to anticipate booking outcomes, identify key factors influencing decisions, and link operational performance to satisfaction. These insights form the basis for an intelligent assistant that not only predicts and recommends personalized options but also explains its suggestions in a customer-focused manner. Dataset Link: Airline Customer Holiday Booking Dataset

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To ensure fair distribution, **teams will be divided evenly across the three themes**. Once teams are finalized, each team will be asked to submit its preferences by ranking the three themes. Allocation will then follow a **first-come, first-served** method, meaning that earlier submissions will have higher priority in securing their preferred choice. The detailed timeline for team formation and project theme selection will be provided in the Timeline section of this document.

Teams

Each team will consist of exactly 4 members. Fill the following form with your team information: https://forms.gle/tL34BHgB9kjw8c29A
Deadline for filling the form is **Wednesday, 24th of September, 2025 at 11:59 pm.**
Notes:

- Teams of 3 will have a 4th member randomly assigned.
- Teams of fewer than 3 may be dissolved, with members randomly reassigned.

Timeline

- This document is posted on September 20, 2025, along with the team form, with a deadline of September 24, 2025, at 11:59 p.m.
- The teams' list will be posted by the 25th of September.
- Issues regarding the posted teams should be reported by the 26th of September via the course email csen903w25@gmail.com
- The theme preferences form will be posted on the 27th of September, and should be submitted by the 30th of September, 11:59 pm.
- Team assignments to each theme will be posted by the 1st of October.
- Milestone 1 project description will be posted on the 4th of October.

Regulations

- Once the teams' list is posted, **no team modifications will be allowed until the end of the semester.**
- Randomly assigned members are expected to communicate to discuss the themes as soon as the team's list is posted.
- Theme selection will follow the **first-come, first-served** method.
- Questions regarding the project will ***solely*** be handled through Piazza
- Office Hours for the project will be posted per milestone; each theme might have different office hours slots.