Work Integrated Learning Programmes Division
M.Tech. in AIML
NLP Applications
S1-25_AIMLCZG519

Assignment 1 – PS-9

General Instructions :

1. **The experiment is preferred to be conducted on the BITS OSHA Cloud Lab.**
2. **Attach a screenshot of the OSHA Lab portal that displays the student's credentials as proof of access and usage.**
3. **No extension on the deadline**
4. **Any queries regarding this problem statement should be addressed to Vasugi I, vasugii@wilp.bits-pilani.ac.in (Course LF)**

PART A

Problem Statement: Knowledge Graph Application

Objective

Develop a web-based Knowledge Graph application that allows users to input and visualize relationships between entities. The application should offer a user-friendly interface to add relationships, query the graph, and display the results dynamically.

Requirements

Front-end Development (3 Marks)

- Design a web-based front end using a framework of your choice
- Provide user input fields to add entities and their relationships.

User Input

- Enable users to:
  - Manually enter entity–relationship pairs through text fields, or
  - Upload datasets in **CSV format** for bulk input.

- **Use Case for Input:**
- **Transportation Network –** capturing relationships between cities, transportation routes, stations, and transit modes (Ex. buses, trains, airports).
- Include dedicated fields for:
    - Entity 1
    - Relationship
    - Entity 2

- Allow users to query the graph and visualize the results.

Visualization

- Display the Knowledge Graph visually within the webpage.
- Ensure the visualization updates dynamically whenever new relationships are added.

Graph Management and Querying (3 Marks)

Backend Implementation

- Use **Flask** to build the backend for managing requests and responses.
- Use **NetworkX** to construct, update, and query the Knowledge Graph.

Functionality

- Implement API endpoints to:
    - Add relationships
    - Query the graph and return results

Integration (2 Marks)

- Integrate the front end and back end into a cohesive application.
- Process user inputs, update the graph accordingly, and return the results.
- Display graph updates and query outputs in a clear, user-friendly manner.

Task B: Enhancement Plan (2 Marks)

Provide detailed documentation outlining how the Knowledge Graph application can be enhanced to improve its visual representation, making the graph more intuitive, interactive, and informative for users.

PART B

Literature Survey (5 Marks)

Topic : “Hallucination Reduction Strategies in Retrieval-Augmented Generation”

Deliverables:

PART - A

- A well-documented code (Python and frontend) for the knowledge graph application.
- Instructions for running the application locally.
- A brief report explaining the design choices and any challenges faced during implementation.
- A set screenshots that explains the entire flow of the application to be included in the report.
- Task-B to be submitted as a .pdf document.

PART – B

A well-documented literature review to be presented as a .pdf document