Project Proposal

Title: "Smart Flashcards: Thematic Knowledge Card Generation Using Knowledge Graphs"

Group 7:

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1. Problem Statement

Students and learners often struggle with finding concise, structured information when studying new topics. Search engines provide a lot of raw data but lack the ability to generate focused, study-friendly content. There's a need for a system that turns complex knowledge into easy-to-understand flashcards, helping users efficiently learn and test themselves.

2. Proposed Solution

We propose a system that automatically generates **flashcards** based on user-defined topics using **Knowledge Graphs (KGs)** like **Wikidata**. The system will:

- Take user input (e.g., a topic or subtopic).
- Query a KG to extract relevant information.
- Format that data into **concise flashcards** (Q&A, facts, etc.).
- Optionally, use **Large Language Models (LLMs)** to refine the content for clarity and fluency.

3. Project Description

The system will have:

1. **Back-end Logic**:
    - Receives user input, queries the KG using **SPARQL** to retrieve relevant data, and formats it into flashcards.

- Optionally uses LLMs to clarify the information.

2. **User Interface (Optional)**:

   - Built using **Streamlit** or **Gradio**, allowing users to input a topic and receive flashcards based on the retrieved information.
   - Features like **flashcard preview** and **format selection** (Q&A, facts, explanations) will enhance user experience.

3. Methodology

a. **User Input**:
   - Users enter a topic or subtopic through a console cell or simple UI interface (e.g., "Deep Learning", “Knowledge Graphs”).

b. **Knowledge Retrieval**:
   - The backend maps the input to a relevant entity in a KG (e.g., Wikidata), then constructs a **SPARQL query** to gather facts related to the topic.

c. **Flashcard Generation**:

   - The backend processes the retrieved data into flashcards, displaying it as:

     - **Q&A**: “What is deep learning used for?”

     - **Fact-based**: “Deep learning is a subset of machine learning…”

     - **Explanatory**: “Deep learning powers technologies like computer vision and NLP.”

d. **User Interface (optional)**:

   - The UI allows users to interact with the system by entering topics, receiving flashcards, and selecting different formats (e.g., fun fact, Q&A). Users can also regenerate cards or explore related topics.

Expected Impact

- **Educational Value**: The tool will help learners by providing structured, easy-to-understand information tailored to their study needs.

- **Efficiency**: By transforming raw knowledge into digestible flashcards, users can learn faster and track their understanding of a topic.

- **Scalability**: The system can be extended to support different domains and languages, providing a customizable learning tool for various subjects.