CS5560 Knowledge Discovery and Management

Problem Set (PS-1A)

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We are supposed to build a knowledge graph for the following input (text data).
1. Describe your knowledge about knowledge graph.
2. Why do we want to build such a knowledge graph?
3. What steps are required? Show your own workflow for this task.
4. What are the challenges?
5. Draw a knowledge graph for the given data.

> CHICAGO (AP) — Citing high fuel prices, United Airlines said Friday it has increased fares by $6 per round trip on flights to some cities also served by lower-cost carriers. American Airlines, a unit AMR, immediately matched the move, spokesman Tim Wagner said. United, a unit of UAL, said the increase took effect Thursday night and applies to most routes where it competes against discount carriers, such as Chicago to Dallas and Atlanta and Denver to San Francisco, Los Angeles and New York.

1. Describe your knowledge about knowledge graph.

Answer: It's systematic way of putting facts, people, and places together, to create interconnected search results that are more accurate and relevant. More specifically, the "knowledge graph" is a database that collects millions of pieces of data about keywords people frequently search for on the World wide web and the intent behind those keywords, based on the already available content. With the knowledge graph, users can get information about people, facts and places that are interconnected in one way or the other.

The Knowledge Graph is Knowledge in graph form. The Knowledge Graph is a knowledge base used by Google to enhance its search engine's search results with semantic-search information gathered from a wide variety of sources. It provides structured and detailed information about the topic in addition to a list of links to other sites. The goal is that users would be able to use this information to resolve their query without having to navigate to other sites and assemble the information themselves. The short summary provided in the knowledge graph is often used as a spoken answer in Google Now searches. As of the end of 2016, knowledge graph holds over 70 billion facts.

2. Why do we want to build such a knowledge graph?

Answer: To organize the world's information and make it universally accessible and useful and to provide accurate information in response to users' search queries, within the shortest possible time we require a knowledge graph. Let's say that you're writing about "bugs."

Your success depends, to a large extent, on how well you can guide the search spider to interpret that word correctly. Are you referring to "errors in a computer program"? Or, do you mean" viral or bacterial infections which cause illness"? Or "giving someone persistent trouble"? Or, "insects. "The word "bug" could mean all of the above. With Knowledge Graph optimization, it can tell exactly which meaning you're using, based on your meta description, title, keywords, and content. They can then sync your content with the appropriate user intention.

Building of Knowledge graphs is important for the following reasons:

Human's perspective:

- Combat information overload.
- Explore via intuitive structure.
- Tool for supporting knowledge-driven tasks.

Artificial Intelligence perspective:

- Key ingredient for many AI tasks.
- Bridge from data to human semantics.
- Use decades of work on graph analysis.

3. What steps are required? Show your own workflow for this task.

Answer: Below are the steps involved for building knowledge graph

Knowledge Extraction from Text:

- NLP Fundamentals.
- Information Extraction.

Knowledge Graph Construction:

- Probabilistic Models
- Embedding Techniques.

The steps involved for Natural language processing are:

- Coreference Resolution.

- Entity resolution, Entity linking, Relation extraction
- Dependency Parsing, Part of speech tagging, Named entity recognition.

4. What are the challenges?

Answer: Challenges involved for building the knowledge graph are:

- Chunking.
- Entity coreference.
- Polysemy and word sense disambiguation.
- Relational extraction.

5. Draw a knowledge graph for the given data.