Syntactic and dependency parsing play a crucial role in various natural language processing (NLP) applications. One of the most important applications is in Information Retrieval and Question Answering

In Information Retrieval and Question Answering Systems, the main goal is to understand the meaning of a user's query and to retrieve relevant information from a large corpus of documents. To do this effectively, the system must “understand” the syntactic and semantic structure of the query and the documents. Parsing is needed to help extract structured representations of sentences, allowing the system to interpret the relationships between words and phrases accurately.

For example, when asking Google a question such as: "What is the capital of France?", dependency parsing helps identify that "capital" is the subject of the question, "France" is the object, and "is" is the linking verb. This understanding is crucial for the system to identify that it needs to retrieve information about the capital of France from the documents.

Another example would be, when searching through a corpus of articles. Parsing is used to analyze and understand the structure of each document. For instance, a document may contain the sentence: "Paris, the capital of France, is known for its rich history."

Dependency parsing extracts the relationships, such as "Paris" being the subject, "capital" as the predicate, and "France" as an attribute. This enables the system to link this information to the

user's query about the capital of France and rank this document as relevant.

In more complex queries like "List the top five tallest buildings in New York City," parsing is used to identify the semantic roles of different elements. For example, "top five" is associated with ranking, "tallest buildings" as a category, and "New York City" as the location. The system can then retrieve and rank documents that discuss the tallest buildings in New York City.

After identifying relevant documents, parsing helps in extracting answers. If the answer to a user's query is embedded within a sentence in a document, dependency parsing can assist in locating the syntactic relationships and extracting the relevant part of the sentence as the answer. This feature is found in Google’s highlighting the answer from a phase, from an article etc containing the relevant part.

In summary, dependency parsing enables the system to understand user queries, analyze the content of documents, and extract meaningful answers.