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a. Define NLP in your own words

The term "Natural Language Processing" (NLP) refers to the area of artificial intelligence that studies how computers and human languages interact. It is concentrated on the creation of algorithms, models, and methodologies that enable computers to comprehend, decipher, and produce human language. It entails duties including question answering, sentiment analysis, text summarizing, and language translation.

b. Describe the relationship between AI and NLP

The study of how computers and human languages interact is known as natural language processing, or NLP, and it is a branch of artificial intelligence (AI). Language translation, text summarization, sentiment analysis, and question answering are a few examples of jobs that fall under the purview of NLP. The goal of AI, in contrast, is to develop intelligent systems that are capable of carrying out tasks that traditionally require human intelligence, such as learning, problem-solving, and decision-making. NLP is only one of the many technologies that fall under this umbrella. In conclusion, NLP is an area of artificial intelligence that focuses solely on tasks using natural language.

c. Write a sentence or two comparing and contrasting natural language understanding and natural language generation

Both NLU and NLG are subfields of natural language processing (NLP), each with its own purposes. A computer system's NLU is its capacity to comprehend human language and extrapolate meaning from text, whereas its NLG is its capacity to generate language that is similar to that of humans. In numerous applications, including chatbots, language translation, and text summarization, NLU and NLG both play critical roles.

d. List some examples of modern NLP applications

Examples of current NLP uses are determining emotions in written content, automatic translation, shortening texts, providing answers through text, labeling text, identifying people, places and organizations in text, converting speech to written text, converting written text to speech, and creating chatbot-like systems.

e. Write 3 paragraphs describing each of the 3 main approaches to NLP, and list examples of each approach

1) Approach based on rules: In this method, NLP tasks are carried out in accordance with a set of predetermined rules and patterns. The rules are used to examine and comprehend the text and are often hand-coded by specialists in the field. A straightforward grammar checker that looks for spelling and punctuation mistakes in a

sentence is an illustration of a rule-based approach. Another illustration is a part-of-speech tagger that classifies each word in a sentence according to its grammatical function.

2) Statistics approach: To complete NLP tasks, this strategy combines statistical and machine learning methods. The system completes the task utilizing the patterns it learned through training on a big text dataset. One illustration of a statistical strategy is the use of statistical models by machine translation systems to translate text between languages. Another example is a machine learning-based system for assessing the sentiment of messages.
3) Neural approach: In this strategy, neural networks are used to carry out NLP tasks. The system leverages the patterns discovered from the data to complete the task after training on a sizable dataset of text. Large and unstructured data handling is a specialty of neural networks. A language model like GPT-3 that produces text that resembles human speech is an illustration of a neural method. Another illustration is a named entity recognition system, which recognizes and extracts named entities from a text using a neural network.

f. Write a paragraph describing your personal interest in NLP and whether/how you would like to learn more about NLP for personal projects and/or professional application.

I'm quite interested in natural language processing (NLP) as a language model and how it may be used to comprehend and produce human language. I am always expanding my knowledge of the most recent NLP innovations and methods. I'm interested in learning more about NLP for both professional and personal applications, including sentiment analysis and chatbot building. Some of my personal efforts include language translation and text summarizing. All things considered, NLP is an intriguing and quickly developing science with a wealth of interesting opportunities for both personal and professional usage.

https://github.com/birukmamo/Biruk_Portfolio