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Overview of NLP

a. Natural Language Processing (NLP) is the capability of a program to understand written and spoken human language.

b. The relationship between Artificial Intelligence (AI) and Natural Language Processing (NLP) is that NLP is a branch of AI, where the natural language processing enables computers to interpret, understand, and manipulate the human language.

c. Natural Language Understanding (NLU) is the processes of determining decisions and actions taken by the program while Natural Language Generation (NLG) is the process of a program when it generates the human language text from a language dataset.

d. Some examples of modern NLP applications are machine translation such as Google Translate, automated email reply suggestions, and smart assistants.

e. There are three main approaches to NLP: rule-based, statistical and probabilistic, and deep learning.
    i. Rule-based approaches involve using manual categories in language used in analysis. Implementations can include using context-free grammar, Regex, and human language libraries. They are difficult to scale up because there are too many variations in the human language, along with the context that revolves around them. An example of a rule-based approach is converting plural versions of words to singular ones, which requires the use of regular expressions and exceptions.

    ii. Statistical and probabilistic approaches involve using statistical inferences and probabilities to determine the most statistically sound answer to a certain task. Using word frequencies and machine learning algorithms to create models may require using large amounts of data and processing power. An example of this would be predictive text, where a person would query into a search bar and receive suggestions for likely phrases that they may be typing.

    iii. Deep learning approaches may involve using neural networks for NLP, and require large amounts of data and processing power. Deep learning is comparatively superior to the other approaches because of improved performance in NLP language translation, generation, and understanding. An example of this would be smart assistants.

f. My personal interest in NLP has grown as of recent due to recent creations such as ChatGPT and I believe that it would be fun and interesting to learn more about NLP for personal and professional usage.