Overview of NLP

a. Define NLP in your own words.

To me, Natural Language Processing is a field where computers and linguistics are combined to make computers better understand the natural human languages. This involves making computers better understand what we mean when asking it questions or tasking it to do something.

b. Describe the relationship between AI and NLP

Natural Language Processing is considered to be a branch of Artificial Intelligence. It helps to make computers better understand human languages and speech. This in turn helps AI since it will be able to collect and understand more accurate data.

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

Natural language understanding concerns a computer's ability to understand a human language. While natural language generation involves making a computer capable of talking back to a human.

d. List some examples of modern NLP applications.

Some simple examples of NLP applications would be Siri, Alexa, and various chatbots such as ChatGPT.

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

Starting with the first approach made for NLP is the rules-based approach. This is self-explanatory in that the program follows simple rules and operates solely off of them. Determining what is a noun or verb and recognizing patterns are some of the rules that get used. Examples include spell checking, context-free grammar, and simple chatbots like Eliza.

A statistical and probabilistic approach is the next approach that came after the rules-based one. It relies more of statistics and probability given from a pool of data. Considered the be a step up from the rules-based approach due to it ability to learn (in a very limited way). Examples of statistical and probabilistic approach are finding the frequency of words being used or the more traditional machine learning algorithms like linear regression and decision trees.

Finally, the third main approach is deep learning. It uses an artificial neural network with multiple layers to try and mimic a natural neural network. Creating nodes and adapting to different inputs from a very large group of data helps to make this much more accurate than the previous approaches. However, typically NLP consists of combining these three approaches to get the most accurate and effective result. Some examples of deep learning are facial recognition, translating, and more nuanced chatbots.

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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 will be honest here with saying that I had never really known much about Natural Language Processing until I saw this class. After some time looking around at what NLP is and what I would be in for, I decided it was something I could find interest in. The idea behind making computers better understand humans is an intriguing one and I felt like it would be good to know how they work. I can't say for sure yet if I want to learn more about NLP for personal projects / professional applications, but I will say so far, the topic is quite interesting.