Overview of NLP

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a) Define NLP in your own words

Natural Language Processing helps computers process natural human languages. Non-verbal cues like tone, gestures, body language are not easily translatable to a computer, but NLP is trying to behave and improve to better imitate human language.

b) Describe the relationship between AI and NLP

NLP is a branch of Artificial Intelligence, so there is lot of overlap with other categories of AI and NLP. AI refers to the computer's ability to emulate human thought and task while NLP specifically focuses on text, language and spoken word.

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

Natural language understanding (NLU) and natural language generation (NLG) are two subsets of NLP. NLU takes text/speech and converts it into structured data based on grammar. NLG predicts and generates texts based on structured data.

d) List some examples of modern NLP applications

Some examples of modern NLP applications are seen in our everyday lives like search engines that predict our next words, spell/grammar check tools, and chatbots and virtual assistants that will help answer questions based on pre-determined responses.

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

There are 3 main approaches to NLP: rules-based, statistical and probabilistic, and deep learning. The rules-based approach is the oldest NLP technique and uses hand-written rules. Examples of the rules-based approach include regular expressions and context free grammar (CFG).

Statistical and probabilistic approach is more mathematical and uses language models based on probabilities of words and their sequences. Examples of this approach include machine learning algorithms like Naïve bayes, SVMs, decision trees, logistic regression, and even small neural networks.

Deep learning is the most recent approach and is like the statistical and probabilistic approach but the improvements in processing power have allowed us to process huge amounts of data. Examples of the deep learning approach include algorithms like recurrent neural networks, convolutional neural networks, and LSTMs.

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

Overall, I'm very interested in artificial intelligence and where AI and its branches will go in the future. Right now, I only have a surface level understanding of NLP, so this class is my first dip into the topic. I'm also interested in the way chatbots like ChatGPT work and would love to try my hand at creating my own chatbot based on my knowledge from this class.