Overview of NLP

CS4395 - Noah Gonzales

Define NLP in your own words

Humans and computers process information very differently. Computers, at base, do not have the capability to understand the intricacies of human language; concepts like meaning, denotation, connotation, ideas, actions, etc. are not easily processed by computers. Natural language processing is the study of allowing computers the ability to understand human language.

Describe the relationship between AI and NLP

NLP is an application of AI. Ai is a field of technology focused on mimicking human thought, and NLP is a branch of human thought.

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

Natural language understanding and natural language generation are two sides of the same coin. Understanding refers to the ability to comprehend written text given while generation refers to the ability to write text.

List some examples of modern NLP applications

- Chatbots for customer interaction and FAQs
- Call operators
- Better autocomplete (more than just completing a word)
- Voice assistants (Alexa, Siri, etc.)

Write 3 paragraphs describing each of the 3 main approaches to NLP, and list example of each approach

Rule based approaches were the first approach in NLP and are still used today. The name is self-explanatory: rules are applied to language to decipher their meaning. For example, nouns can be related to verbs or adjectives to deduce meaning. Rule based approaches can focus on pattern matching with regular expressions and context free grammars to identify parts of rules. However, rule based approaches struggle when given cases that have not been accounted for even though they are good for specific cases.

Statistical and probabilistic approaches are not as strict as rule based approaches as they are based on probability and likelihood. For a statistical and probabilistic approach, a model or similar is trained on data to identify different features and predict words and other elements.

Deep learning approaches include neural networks. Large amounts of raw data are fed into the network and then features and interpretations are discovered. The networks can then be fed other data for language interpretation.

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 have not crossed paths with natural language processing in my natural exploration in technology. I have had passing interest when I saw projects in ACM projects that utilized sentiment analysis and have also had some interest in how Siri or Alexa processed speech. I would like to learn about the ways things work, although I do not have much interest in utilizing natural language processing as of now.