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Overview of NLP

1. NLP, also known as Natural Language Processing, refers to the process through which computers understand natural human languages for multiple purposes.
2. NLP is a branch of AI. This means that artificial intelligence projects may often require use of natural language processing techniques to achieve the outcome. Also, NLP projects will often include aspects of AI as well as NLP.
3. Natural language understanding and natural language generation are both aspects of NLP which require the machine tasked with conducting NLP to understand the language. The difference is that natural language understanding requires processing and decoding text or speech in that language while natural language generation involves using understanding of how the language works to produce speech or text in that language.
4. Some modern examples of NLP includes Amazon's Alexa, predictive responses to emails provided by Gmail, and the formation of automatic transcripts in Microsoft Teams recordings.
5. The first main approach in natural language processing is the rules-based approach. The rules-based approach is comparatively faster and simpler in general than the other approaches to NLP. The rules-based approach involves following certain rules, often with a list of exceptions, to categorize a natural language and helps to determine how to treat/process/generate the various categories in the language. A downside of the rules-based approach, however, is that natural languages are extremely complex and rules cannot be generated for every aspect of a language. Some examples of rules-based approaches to NLP are spelling check, context-free grammar, and a computer program from the 1960s called Eliza that used regular expressions to mimic a therapist.
The second main approach to natural language processing is the statistical and probabilistic approach. This approach is more complex than the rules-based approach, therefore it can cover more scope of a language than the rules-based approach can. Machine learning solutions for natural language processing often fall under this approach because of their probability/statistic based algorithms. Since natural languages have numerous exceptions and nuances, the statistical and probabilistic approach often achieves more accurate results than the rules-based approach. Examples of the statistical and probabilistic approach include

predictive text programs that give suggestions based on the most probable option. Classic machine learning algorithms, such as logistic regression and naïve Bayes, are also examples of this approach.

The third main approach to natural language processing is the deep learning approach. The deep learning approach involves algorithms that are a step higher than neural networks, such as RNNs, CNNs, and LSTMs. This approach covers more scope and garners much more accurate results than the other two approaches. However, the deep learning approach requires vast amounts of data and faster processing due to the complex nature of the algorithms used for this approach. An example of a deep learning approach to NLP is ChatGPT, a recently released AI text generator.

6. I first became interested in natural language processing when I observed Amazon's Alexa product. I was amazed by the idea that it became possible to speak to a machine and that it could understand human speech. Over the recent years, more and more programs are being developed using natural language processing to make the daily lives of humans easier. I would like to learn more about this field to learn how these fascinating solutions are implemented and about what else can be expected from NLP in the future.