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Overview of NLP

a. define NLP in your own words

Natural Language Processing (NLP) is the ability of a computer to understand and respond to human speech in a way that is similar to humans.

b. describe the relationship between AI and NLP

Natural Language Processing is a subset of Artificial Intelligence. Since AI has to do with machines mimicking the processes of the human brain, NLP is necessary for the machine to interpret and understand human language. To facilitate AI, you also need Machine Learning to deliver more accurate responses and learn from past interactions.

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

Both Natural Language Understanding (NLU) and Natural Language Generation (NLG) are components of NLP. NLU enables a machine to understand the intended meaning of a sentence through context and grammar, while NLG is the construction of text in human language based on a dataset.

d. list some examples of modern NLP applications

Some modern applications of NLP include predictive text tools such as autocorrect and autocomplete, language translation with grammatically correct results, and email filters for email classification.

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

There are three main approaches to NLP: rules-based, statistical and probabilistic, and deep learning approaches.

The rules-based approach is among the oldest techniques in NLP. This involves the use of regular expressions and context-free grammars without the need for training a large neural network. Since human language is so complex and constantly evolving, these approaches are difficult to scale up.

Statistical and probabilistic approaches involved finding the probabilities of sequences of words and counting words to create useful language models. These approaches also include the use of classic machine learning algorithms and can even outperform deep learning algorithms on smaller datasets.

Deep learning came from neural networks and became more prominent when huge datasets and processing power became available. Evolving from the basic neural network, deep learning has been yielding amazing results in creating more human-sounding interactions. Since not everyone has access to the large datasets and hardware required for their processing, many projects use smaller scale deep learning as well as a combination of rules-based and statistical and probabilistic approaches.

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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 am personally interested in NLP because one of my great interests is learning languages. I think that NLP is a great overlap of Computer Science and Linguistics, which is what pushed me to learn more about the topic. For now, I am learning more as a personal interest, but I would love to apply my knowledge professionally once I become more proficient about the fundamentals.

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