

Overview of NLP

What is NLP?

Natural language processing (NLP) is a subfield of artificial intelligence (AI) that involves computational linguistics, where computers are trained to process natural human language instead of formal languages like programming languages. Machines are able to process natural human language through the development of algorithms that simulate human intelligence. Human language technologies allow for the processing of natural language in different ways, such as processing a text file in a specific format.

Relationship between AI and NLP

Like machine learning (ML), natural language processing (NLP) is a branch of artificial intelligence (AI). NLP utilizes foundations and techniques of AI to mimic humans in processing natural language, such as in detecting spelling errors in a text file which could have been manually detected by a human.

Natural Language Understanding vs. Natural Language Generation

Natural language understanding is comprehending the spoken or written text of a natural human language, while natural language generation is the creation of spoken or written responses in the natural human language.

Modern NLP Applications

Some modern NLP applications include email filters to filter spam emails or spam words, virtual assistants like Amazon Alexa listening for and recognizing phrases and commands, autocorrect suggestions on smartphones, classification of product reviews as positive or negative, and automated language translators like Google Translate.

Main Approaches to NLP

One of the main approaches to NLP is the rules-based approach, where text in the form of words, sentences, and documents may use regular expressions and a list of exceptions or rules to perform a function in text processing. In this approach, however, rules are not able to completely scale up to the complexity and changing nature of natural human language. Examples of the rules-based approach include the Eliza chatbot, spell checkers, and context-free grammars.

Another approach to NLP is the statistical and probabilistic approach that involves mathematics when processing data. Tracking probabilities and counts of words and sequences of words can be used to model natural languages. This approach, however, can require a good amount of data and processing

power. Examples of this approach include the use of word frequencies, traditional machine learning algorithms, machine translation systems, and predictive text.

Deep learning is another main approach to NLP, which can utilize neural networks similar to the human brain. This approach, however, can also require large amount of data and processing power, such as through cloud computing and GPUs, to work effectively. Examples of deep learning include improved language translation, generation, and understanding.

Personal Interest in NLP

I am interested in learning more about NLP to explore areas and technologies in the subfield of AI. Gaining more familiarity with simple and advanced applications of NLP would allow for updates or contributions to potential future technologies that process natural human languages more efficiently and accurately than present day technologies can. I hope to learn about different applications of NLP by applying concepts learned in class through assignments and projects, which can also guide me in developing personal NLP projects in the future.