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01/26/23

Overview of NLP

Natural language processing (NLP) is a branch of artificial intelligence (AI) that uses allows computers to process and understand text and spoken language similar to the way a human can.

The relationship between AI and NLP, as mentioned above, is one of parent and child. By this I mean that if AI is an umbrella term, NLP is something that falls under that umbrella. Although, in some cases a project can be fully NLP without many elements of general AI included in it [1].

Now the term NLP consists of 2 subcategories: natural language understanding and natural language generation. They are both similar in the sense that they both have to do with “human-to-human dialog” but the differentiating factor is that natural language understanding has to do with making sure “each party understood what the other person said”, while natural language generation has to do with the actual “formation of spoken responses” [1].

One example of modern NLP application is email filters [2]. These are some of the most primitive and simple examples of NLP application out there [2]. Initially, the computer would process certain human words that could signal spam email and filter those emails out [2]. But with newer advances in technology, there is now even a sorting system that some emails (Gmail) have [2]. Another example of modern NLP application, which may be one of the most popular ones, is predictive text [2]. This example has a hint of machine learning in it as well since the computer is learning what text to suggest based on your typing trends.

There are 3 main approaches to natural language processing. The first is a rules-based approach which uses a set of rules to create “syntactically correct sentences” or check whether a sentence is grammatically correct or not [1]. A couple examples of this approach include context-free grammars and regular expressions [1]. It is not very easy to scale up rules-based approaches due to the human language being too complex, but they can solve lower-level text issues [1].

The second approach to natural language processing is a statistical and probabilistic approach. This approach uses counting and “probabilities of words” to enhance the usefulness and accuracy of language models [1]. Some examples of this approach include language translation and predictive text [1]. Many typical machine learning algorithms use this approach to learn as well [1].

The final approach to natural language processing is deep learning. This is the most recent approach out of all three as it “evolved from neural networks” and requires a lot of data and power from GPUs to run [1]. Some examples of this approach include speech recognition, caption generation for images, and document summarization [3].

I personally wasn’t really aware of what NLP was until my internship this past summer. I worked with an NLP model to generate visualizations of documents to make them easier to understand. That entire process was very enjoyable for me, and I would love to look into different types of NLP models in the future. I think that I’m really going to enjoy this class as

it'll help me get a better understanding of natural language processing in an environment where I can ask questions if I want to know more.

References

- [1] K. Mazidi. 2019. Exploring NLP with Python Building Understanding Through Code (1st. ed.). LaTeX.
- [2] Tableau, “8 Natural Language Processing (NLP) Examples,” Tableau.
<https://www.tableau.com/learn/articles/natural-language-processing-examples>
- [3] “6 Interesting Deep Learning Applications for NLP,” Paperspace Blog, Aug. 12, 2019.
<https://blog.paperspace.com/6-interesting-deep-learning-applications-for-nlp/> (accessed Jan. 27, 2023).