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Overview of Natural Language Processing

My definition of NLP

- Natural language processing is a branch of Artificial intelligence that can be used by computers to understand and potentially respond to human generated texts or phrases.

Relationship between AI and NLP

- The relationship between AL and NLP can be described as NLP being a branch of AL similar to machine learning. Even though NLP is a branch of AL when creating NLP projects it is possible or often necessary to implement features that are associated with AL or machine learning and not just exclusively NLP. AL, ML, and NLP can work hand and hand to create intricate NLP solutions.

Natural Language Understanding and Natural Language Generation

- With natural language understanding and natural language generation they both work with human natural languages. However, with natural language understanding it purpose to is understand the meaning behind what is being said but natural language generation is used to form human like responses.

Modern NLP Applications

- Chatbots
- Auto Correct
- Virtual Phone Assistance
- Voice Assistance (Google, Siri, Alexa)
- Filtering Emails (SPAM/NOT SPAM)
- Search Engines (Google, Bing)

Three main approaches to NLP and examples

- The first type of approaches to NLP is rules-based approaches. Rules-based approaches are the oldest techniques used for NLP. An example of rules-based approache is using regular expressions with some exceptions to convert from plural words to their singular ones. Another example is using context-free grammar to generate syntactically or grammatically correct sentences. However, since the human language is so complex it is hard for rules-based approaches to keep up. Therefore rules-based approaches are helpful for simple rules-based problems but not so much with very complex ones such as problem using the entire human language.

- The second type of approaches to NLP is statistical and probabilistic approaches. These mathematical approaches such as counting the words or finding the probabilities of words created useful language models used in machine translations systems. These language models can be used in search engines for predictive text where the user receive suggestion from their current sentence or phrase. Machine learning algorithms such as Naïve Bayes, Logistic Regression, SVMs, and Decision Trees also fall into this NLP approach.

- The third type of approaches to NLP is Deep learning. Deep learning is an extension of neural networks where there are multiple layers of neural networks used to learn from large amounts of data and utilize the current processing power capabilities. These neural networks attempt to simulate the human brain. The goal of deep learning is to create a more human like interaction between the users and computer. An example of deep learning in NLP is QA and machine translations.

Personal interest in NLP and whether/how you would like to learn more about NLP for personal projects and/or professional application

- I am very interested in NLP as it is a growing field under the AL umbrella. I have always being intrigued by the current NLP application such as Siri and Alexa voice assistances, search engines, auto correct feature when texting, and chatbots to help with customer services. I hope to learn more about NLP through project throughout the course and even possibly working on my own personal project. Additionally, I wouldn't mind using what I learn throughout this course and applying it to a professional application in the future.