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Human Language Technologies

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Overview of NLP

- A. NLP (natural language processing) is where a computer can understand human language whether it is through speech, text, image, or any other format. Along with this the computer can generate human language in either the format of speech or text.
- B. The relationship between AI and NLP is that NLP is a form of AI. It is a category of AI as NLP requires the use of machine learning and artificial intelligence to generate new text and speech or to recognize text and speech.
- C. Natural Language Understanding is where the computer uses context and past data to try and understand what exactly the statement is saying and the potential sentiment surrounding it. Natural Language Generation is where the computer uses context and past data to try and create text that may come from how the sentence was built and how past data examples were. Both are subsets of NLP and both use context from the sentence and past datasets to learn and understand sentences.
- D. Some examples of modern NLP applications would be autofill on internet search and text messages, Email Filtering, Siri and Alexa are examples as well.
- E. Three Main Approaches to NLP
 - a. Rules Based Approaches are some of the first examples of NLP where it uses context free grammar as well as sentence structure rules to create responses to certain questions and situations. An example of Rules Based Approach would

be the program Eliza which uses grammar structure and if statements to give out responses. Sometimes if it is too difficult to make a response it gives out a safety response saying it may not understand the question.

- b. Statistical and Probabilistic approaches appeared around the 1980s after rules-based approaches. These approaches now use more mathematical and statistical tools to find the probability of what the next words may show up after. These methods of using statistics and probabilities to predict future outputs are now being used in machine learning models as well such as SVM, Naïve Bayes, and Decision trees as well. An example of Statistical and Probabilistic approaches is autocomplete in the Google search bar.
- c. Deep Learning approach is the newest approach, and it uses large amounts of data along with neural networks to create NLP solutions. Different forms of neural networks are combined and used with large amounts of data to create more powerful, faster, and smarter solutions. Examples of this would include Alexa, Siri, and other large-scale projects use large amounts of data and neural networks to make smarter choices and decisions.

F. NLP is a growing field that is now being used in almost all aspects of our day-to-day life. One reason why I have an interest in the field is because of the aspect it affects our day to day lives. Tools such as an Alexa, Siri, autocomplete, and even mail filtering use NLP. I would love to learn more about how these tools work as well as if I can integrate these tools into my daily life. Along with this, I would love to learn how NLP is being used in the professional field for new cutting-edge technology as well as how the field of AI is changing and evolving.