

Gabriela Saenz

Gvs180000

CS 4395.001

09/04/2022

### Overview of NLP

- a. Natural Language Processing, or NLP, is the process of writing algorithms for machines to be able to recognize, understand, and analyze human language.
- b. Artificial intelligence is a broad term that can be used for more specific applications and NLP is one of those applications. Many aspects of NLP can deal more with linguistics and the technical aspects of understanding language, but the analysis side of NLP can involve AI.
- c. When humans engage in conversation with one another there is an exchange of the two activities of natural language understanding and natural language generation. As one person listen to the others they are understanding the language that is being produced and, in their turn, they generate language when they speak.
- d. Some modern NLP applications include:
  - a. Language recognition from automated assistants such as Amazon Alexa, of Apple's Siri.
  - b. Automated email reply suggestions
  - c. Recommender systems on what to buy next based on your recent purchases
- e. The first approaches to NLP, and the oldest, are known as Rules-based approaches. These approaches were used to solve many text processing problems. Although they are

difficult to scale up because of the complexity of human language, they were quite useful for coming up with quick solutions to simple problems. Rule-based approaches include: context-free grammars, regular expressions to convert plural words to their singular form, and regular expressions to echo talking points back to a user from an automated chat bot.

Next, we can look at Statistical and probabilistic approaches. Developed in the 1980s, these mathematical approaches involved counting words and finding the probabilities of words and sequences of words. This mathematical work led to useful language models. Some examples of this approach include: machine translation systems, classic machine learning algorithms such as Neural Networks, and an improved statistical approach to the pre-1980s chatbots using deep learning algorithms.

Finally, we study a deep learning approach to NLP. Having evolved from Neural Networks, deep learning came at a time of increased power from GPUs and cloud computing, which gave the algorithms access to huge amounts of data. The goal of deep learning in NLP is to create more authentic and real-sounding interactions between humans and machines. Some examples of using a deep learning approach for NLP today include: perfecting helper chatbots, sentiment analysis of products online, machine translation applications.

- f. I have an interest in NLP because I believe it will help lead me down a path of doing better research on analyzing human language and behaviors on social media. I have been interested, prior to enrolling in this course, in doing research to analyze social media behavior and developing a machine learning model to detect violent, triggering, and/or harmful posts. After learning about NLP I know this course would be extremely helpful

in my future academic and professional career and I can use it to make extremely impactful applications.