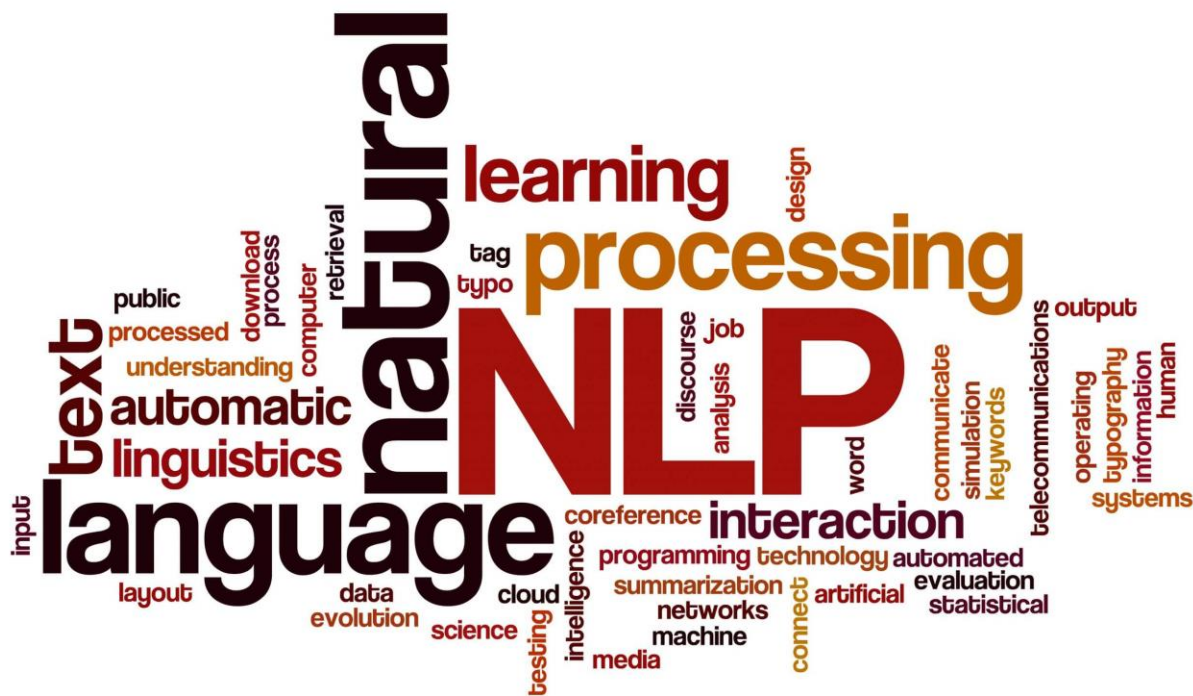


Overview of NLP

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NLP – Natural Language Processing

NLP is the process of a machine attaining, analyzing, understanding, responding to, and generating raw human language to perform tasks, assist humans, or serve a useful purpose.

AI & NLP

Artificial intelligence (AI) is a large umbrella for programs which mimic human behavior. This can range from making logical predictions, apps, chat bots, self-driving cars, robot factories, and even enemies in a video game. It covers a huge range of different types of programs and technology with diverse purposes. NLP fits right under the umbrella as processes human language to understand and generate a response in human language; to give feedback, predict, and perform actions based on the given human language from the user. In other words, Artificial Intelligence is a vast tree with many branches, while Natural Language Processing is a branch of that tree.

Natural Language Understanding vs. Natural Language Generation

Natural Language Understanding is the application attempting to understand human language such as what you said to it through auditory or text means. It extracts your input and processes it to perform a task or response of some kind. Natural Language Generation is the application attempting to form human language to respond or relay information either through auditory means, visual means, or text. In other words, Natural Language Understanding is the application processing your input whereas Natural Language Generation is the application creating/processing output.



Examples of NLP Applications

There are thousands of natural language processing applications today. Three of the most popular applications are Alexa, Google, and Siri. With a simple 'Alexa', 'Hey Google', or 'Hey Siri' you can ask the applications to search something, play music, start another application, tell you about the weather, tell you a joke, or even control synced items in your house with a single voice line. These applications are by no means perfect and do have occasional problems, however it is quite amazing how much you can really do with just a sentence or two. Google even has capabilities to translate between most languages within a few seconds.

Another example of natural language processing applications today is the customer service chats that are popping up on nearly every corporation website. Some of them are better than others, they are overall helpful giving users an immediate response and often a direct line to help. Much better than having to send an email or wait a few hours on the phone for basic questions, for more complex problems they usually connect a customer service agent to the chat and leaves you free to do as you please until they arrive. They also collect data from you that the customer service agent will need once they arrive. Overall, I find it to be an improvement to be able to settle a small issue through a quick chatroom rather than having to call and wait on the phone. That also brings us to the automated phone lines for nearly every customer service line nowadays. I understand most of these serve an important purpose, however some of them are greatly lacking in the feature department and sometimes don't work at all. Thus, they can make it impossible to get help over the phone, making them a deficit to customers. However, for the most part they have greatly improved in the past few years.



The 3 Main Approaches to NLP

1. *Rules-Based Approaches*

The oldest approach, it is based on creating context-free grammar rules. It is very limited and difficult to scale up, was used to create a chatbot therapist Eliza, whom was a free but not fantastic therapist. If you talk to it, you can clearly tell it is responding to keywords and phrases rather than any form of deep analyzing.

2. *Statistical and Probabilistic Approaches*

A mathematical approach to language, used for translation systems. It used strategies such as counting words and finding probabilities in words/sequence. They also implement ML algorithms but tend to depend on large amounts of data to be accurate. However, they are used to solve many NLP problems when given the adequate amount of data and paired with machine learning algorithms.

3. *Deep Learning*

An approach that evolved from neural networks and relies heavily on large amounts of data and processing power. It is the most recent of the approaches and is very widely used to solve modern NLP problems. These approaches use neural networks and have been used to create our modern personal assistants, translations, autonomous vehicles, chat bots, facial recognition, personalized ads, and much more.

My Interest in NLP

NLP is very fascinating to me, and I have always been very curious about how it works under the hood and how to implement it to create useful applications. I also have a few projects in mind such as creating my own secure version of Google Home/Alexa that doesn't constantly send data, creating a simple chatbot app, and even eventually make my own R2D2. I also understand natural language processing is booming in the tech industry as well.

