Overview of NLP

Define NLP in your own words: NLP (Natural Language Processing) is a field of computer science that deals with formatting the organic way humans communicate into a more rigid and structured manner so that computers can do something useful with human language.

Natural language understanding deals with processing and extracting something useful from a corpus that already exists. Natural language generation deals with teaching computers to synthesize their own unique output.

Some modern NLP Applications are:

- Text to Speech apps
- Automatic captioning of video audio (Youtube)
- Text Generation (Chat GPT)
- Phone Assistants (Siri, Google Assistant)
- Email filtering (GMail)
- Sentiment Analysis
- Language Translation

Write 3 paragraphs describing each of the 3 main approaches to NLP, and list examples of each approach:
The first approach to Natural Language Processing is the Rules Based approach. This approach was popular in the 1960's. The way that the approach worked was to have hundreds or thousands of sorting rules that would be applied to each word in the corpus. These systems were very brittle. An example of an application of this approach is spell check.

The second approach to Natural Language Processing is the Statistical and probabilistic approach. This approach was popular in the 1980's. This approach would take a corpus of data and use it to predict the likelihood that a given word would come next or be a certain part of speech. These approaches were less brittle than the rules based approach but needed more data. An example of an application that used this approach was use of word frequencies.

The third approach to Natural Language Processing is the Deep learning approach. This approach recently became popular in the 2010's.This approach learns from large amounts of data and is able to evaluate or generate new text/speech with high accuracy. The trade off for the high accuracy is that the models have to train on huge amounts of data. An example of an application that uses this approach is ChatGPT and language generation.

My personal interest in NLP is to understand how the applications work. It is amazing to me that we can talk to our phones and they can understand what we are saying and do something useful based on our speech. I think NLP will play a huge role in automating tasks as well. At Cisco, we have a product called Contact Center, which is a bot that handles the initial processing of calls made to a business. This bot can answer FAQ's, understand why you are

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calling, and pass you along to a human who is best fit to answer your question. The ability for computers to understand, evaluate, and generate human language is an awesome thing. I would certainly love to incorporate NLP in my personal projects or learn enough from this class to be able to use NLP at my job.