Assignment 0: Getting Started

Define NLP in your own words

- 'NLP' or Natural Language Processing, is providing a computer with the ability to communicate how we do. To be able to "hear" "words," understand cultural slang, or translate for people. All of which either in speech or text. The main example I always think of is speech-to-text. Me speaking into a device and seeing it typed out for my verification of correctness.

Describe the relationship between AI and NLP

- NLP is a subset of AI. They both aim to copy a human's ability to receive a stimulus, translate in our heads what were receiving, and react to the stimulus. NLP does this through the speech/text and natural language. You could also use machine learning models, which is another subset of AI, to analyze data.

Write a sentence or two comparing and contrasting natural language understanding and natural language generation

- Understanding is the receiving stimulus and translation parts of communication.
- Generation is the reaction part of communication, sending a message back.

List some examples of modern NLP applications

- The main application I think of is spam filters for emails. Using NLP and (ML) models, you could scan text and depending on the frequency of key words there are, an email could be classified as spam, and you can have that email automatically sent to a spam folder.
- Chatbots
- Text classification
- Speech-to-text for texting
- Speech recognition for automated calls or translating languages

Write 3 paragraphs describing each of the 3 main approaches to NLP, and list examples of each approach

- Rules-based approach: The developers add rules and facts to the knowledge base. The model will blindly follow rules to reach an outcome. If the rule doesn't exist, then the model won't follow it, which may lead to misclassifications.
  Examples: Spell-check, context-free grammar, forward/backward chaining

- Statistical and probabilistic approach: Use of heuristics. Rules-based might not be able to give a solution, or a correct solution. The use of heuristics helps come up with a solution when the answer may not be known by explicit rules. Because statistics are used, this approach requires an enormous amount of data.
  Examples: word frequencies, naïve bayes classifier, svm's.

- Deep learning approach: Uses machine learning models such as neural networks. Uses those models to use context when analyzing data so there are less misclassifications. The model learns based on the data its being given. More data equals more accurate answers.
  Examples: neural networks, language understanding, spam classification

Write a paragraph describing your personal interest in NLP and whether/how you would like to learn more about NLP for personal projects and/or professional application

- I am interested in NLP because the field of AI challenges me. It is the new way to implement things. As a society I believe we are wanting "things" to be in our grasp faster, and AI can help us make that idea tangible. NLP opens the door to making better speech/text filters, helping people communicate across a variety of languages, or simply making life simpler when managing data. This semester for my senior project, I am getting to work on a project could support an NLP implementation. It would be amazing to be able to showcase newfound skills in that project by the end of this course.