Portfolio Assignment 0

A. NLP is a branch of AI that focuses on enabling computers to process human language in both written form and audio.
B. The relationship between AI and NLP is that NLP is a branch of AI, or more specifically NLP is the application of AI techniques to the problem of human language.
C. Both natural language understanding and natural language generation are considered to be subsets of natural language processing, however, they differ in that natural language understanding refers to the computer's comprehension of language, and natural language generation refers to the computer creating a natural language from other data-types.
D. Virtual assistants(Siri, Cortana, etc), predictive autocomplete, and automated answering systems.
E. The first approach to NLP is Rule-based, which started in the 1960s. Rule-based NLP uses a bank of predetermined rules to recognize the language. Examples of rule-based NLP are spell check, context-free grammar, and the eliza chatbot. The limitations of rule-based NLP are evident, as the complexity of actual human languages quickly far outstrips the capability of predefined rules.

   The second approach to NLP is Statistical and probabilistic, which is a method introduced in the 1980's. This model refers to quantitative NLP efforts, so this category of AI includes methods to process numerical data such as linear algebra, information theory, and probabilistic modeling. Some examples of Statistical NLP techniques include word frequencies and traditional ML algos. The primary drawback of this method is the high requirements for both data and processing power.

   The last type of NLP is deep learning, which is the most recent iteration of NLP introduced in the 2010s. This method uses neural networks, which mimic the biological structures of the brain, to gain insight into the data. The networks consist of multiple layers of computation to learn in the same ways as the human mind. Some uses of Deep learning are better results in language translation, understanding, and generation. The primary issue plaguing deep learning is that its overhyped and needs tremendous amounts of data and processing power.
F. My personal interest in NLP stems from my experiences in my Artificial Intelligence class with Dr. Vincent Ng. By far the most in-depth any of my classes have gone into their lecture material, and the projects in that class were tremendously engaging and fun. This class seemed like the natural next step from AI, and I hope to continue my learning in this field. As a senior, a career in AI seems very rewarding, so I also hope to gain some practical knowledge and experience throughout this course.