Natural Language Processing (NLP) is a subfield of computer science, in which we try to understand the intricacies of the human language through computers. NLP can be categorized as a subset of Artificial Intelligence, similar to Machine Learning. Natural Language Understanding is defined as the process of gaining knowledge on how a language works and comprehending it to make certain decisions. Natural language Generation focuses more on the process of generating human language either in response to a human or based on prior data. NLP also has a wide range of modern applications. Some examples include sentiment analysis, smart assistants (Siri, Alexa, etc), and text summarization. Throughout the years, NLP has undergone different approaches. In this document we will briefly examine the 3 main approaches utilized by scientists towards NLP.

The first approach towards NLP which gained a lot of traction in the 1960s was the rules-based approach. As the name suggests, a rule-based approach essentially meant that the computer program would try to classify a language using a given set of rules. A rule in this set could be something as simple as a spell check, context free grammar or a correlation in meaning. One of the primary examples used to explain the rule-based system is the Eliza chatbot. This chatbot was created in 1964, and was designed to be a basic version of a chatbot therapist. Eliza mainly uses pattern matching to achieve a certain level of personalization to give the user the intended effect of understanding their feelings.

The next approach which was popularized in the early 1980s was the statistical and probabilistic approach. This approach concentrated on using traditional machine learning algorithms along with statistical inference techniques in order to comprehend language in a way more similar to humans. Another example of such an approach utilizes word frequencies in order to gauge human language appropriately. NLP systems based on this approach usually require large amounts of data to be trained on before they can accurately predict/understand a particular language.

The most recent approach which has been commonly used since the 2010s is the deep learning based approach. As is in the name, this approach mainly utilizes deep learning models which attempt to simulate how the brain works. This can be especially useful when trying to understand

human languages as it mimics an actual human being. Due to the high accuracy of this approach, there are many use cases such as language translation, understanding and generation which are all improvised by the complexity of the deep learning network. Some potential drawbacks are that along with a large amount of data to be trained on, there seems to be a long time required in training the models in order to accurately tune their hyperparameters.

My personal interest in NLP stemmed from taking multiple machine learning courses. I learned about statistical methods and deep learning techniques through previous courses. I was then intrigued by the use cases of such methods. Upon further exploration, I stumbled upon NLP. I wish to learn more about NLP techniques in python by building projects that expand my knowledge base. I believe that through hands-on experience with NLP I will become a better engineer and be able to work more efficiently in the field of AI.