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Overview of NLP

Define NLP

Natural language processing (NLP) is the study of teaching machines to understand, interpret, and manipulate text in human languages, combining computer science, linguistics, and artificial intelligence (AI).

The Relationship Between AI and NLP

The relationship between AI and NLP can be viewed as a set and one of its subsets; AI is a broad field with many subfields, one of which is NLP, which focuses on human linguistics.

Natural Language Understanding vs. Natural Language Generation

Natural language understanding (NLU) is the perceptual process of recognizing the presence or absence of indecent words in text messages, determining whether a text is pleasant or depressing, etc., while natural language generation (NLG) is the process of how chatting robots respond smoothly and reasonably to user input.

Modern Applications of NLP

Modern NLP applications include, but are not limited to, voice assistants such as Siri, email filtering, and grammar checking tools.

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Three Main Approaches to NLP

Rules-based, statistical and probabilistic, and deep learning are the three main approaches to NLP.

In the 1960s, rule-based approaches were used. It is created by programming all possible textual information in an if-then logic to allow the machine to respond using grammatical rules and language patterns. This method was used to create the first chatbot, Eliza. However, these rules do not scale well; because there are so many ways to deal with real-world human language text messages, the more conditional judgment rules that must be written, and the more complex the system becomes.

Statistical and probabilistic approaches were adopted in the 1980s. Traditional machine learning algorithms help computers find the grammatical rules of a language in a large corpus of text and predict the outcome in the form of probability, resulting in statistical inference of inferring the characteristics of the real-world contexts from the sample. For example, the N-gram model, which is based on the Markov model in probability theory to calculate the frequency of N consecutive words in a text, is used to construct a translator.

Finally, since the 2010s, deep learning approaches have become mainstream. The neural-like networks can retrieve data features automatically, overcoming the limits of conventional AI, which depends on manual element designing. When processing text messages in sequential order, the ability of a recurrent neural network (RNN) to remember historical information is a significant advantage. Deep learning applications include voice assistants such as Siri and Alexa.

My Personal Interest in NLP

AI has always fascinated me, and we use it frequently in our daily lives. I'm hoping that by learning NLP, I'll be able to better understand how interactive AI like Alexa works, and that one day I'll be able to create an Alexa-like chatbot.