

Natural Language Processing Techniques

Natural Language Processing (NLP) is a field of artificial intelligence that gives computers the ability to understand text and spoken words in much the same way human beings can. NLP combines computational linguistics—rule-based modeling of human language—with statistical, machine learning, and deep learning models. These technologies enable computers to process human language in the form of text or voice data and to 'understand' its full meaning, complete with the speaker or writer's intent and sentiment. NLP drives computer programs that translate text from one language to another, respond to spoken commands, and summarize large volumes of text rapidly—even in real time. There's a tremendous amount of information stored in free text files, such as patients' medical records. Before deep learning-based NLP models, this information was inaccessible to computer-assisted analysis and could not be analyzed in any systematic way. With NLP, we can analyze this text and extract information such as whether a patient has a certain disease or what medications they are taking. Modern NLP applications include sentiment analysis, text summarization, named entity recognition, relationship extraction, speech recognition, and machine translation. Transformer models like BERT, GPT, and T5 have revolutionized NLP by enabling more accurate language understanding and generation.