

## **Google Search Engine: Natural Language Processing (NLP) in search**

After Yahoo since 2000 Google has become the most popular client search engine in the world. They didn't limit their potential within search engines, they are now indubitably one of the most famous multinational technology companies focusing on artificial intelligence, online advertising, search engine technology, cloud computing, computer software, quantum computing, e-commerce, and consumer electronics.

As part of the task I will focus on Google Search engine which is currently the most famous and visited site in the world provided by Google.

Google has been at the forefront of implementing the capabilities of Natural Language Processing (NLP) in search. At a high level, NLP is a combination of Natural Language Understanding (NLU) and Natural Language Generation (NLG) that gets search engines like Google to recognize and comprehend user queries in order to come up with relevant answers. NLU is a subset of NLP, which uses syntactic and semantic analysis of text and speech to determine the meaning of a sentence. On the other hand, NLG is the other subset of NLP through which machines can produce a human-like language text response based on some data input. This text can also be converted into a speech format through text-to-speech services which is used in Google Voice Assistant.

Google first launched BERT (Bidirectional Encoder Representations from Transformers) as the first NLP system and successfully implemented it in the search engine. BERT uses Google's own Transformer NLP model, which is based on Neural Network architecture. Neural networks, also known as artificial neural networks (ANNs) or simulated neural networks (SNNs), are a subset of machine learning and a method in artificial intelligence that teaches computers to process data in a way that is inspired by the human brain. In 2020 Google announced 3 separate releases of their new NLP based models i.e. SMITH (Siamese Multi-depth Transformer-based Hierarchical), GPT-3 and LaMDA (Language Model for Dialogue Applications), these are all more refined and faster than the BERT model. LaMDA is touted as 1000 times faster than BERT, and as the name suggests, it's capable of making natural conversations as this model is trained on dialogues.

Google has gone through a lot of transitions since 2000 and recent advancements in NLP have given them the lead in the industry. In the future, we will see more and more entity-based Google search results replacing classic phrase-based indexing and ranking.

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Natural Language Processing (NLP): What Is It & How Does it Work?

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