

NLP & TensorFlow – Tech Review

Introduction

Natural Language Processing

Natural Language Processing, usually shortened as NLP, is a branch of artificial intelligence that deals with the interaction between computers and humans using the natural language.

The primary goal of NLP is to read, interpret, comprehend, and beneficially make sense of human language. Human speech, unlike computer language, is not necessarily exact and organized – it contains ambiguity, and complex factors such as slang, regional dialects, and social context may exist in its linguistic structure.

Google Translate uses natural language processing to translate across languages. Personal Assistant Apps like Siri, Alexa, and Bixby also uses NLP to make dialogues and comprehend speech.

Let's talk about TensorFlow. Text-based apps, picture identification, voice search, and many other applications employ TensorFlow. TensorFlow finds its use in image identification in Facebook's image recognition technology. Apple's Siri also uses it for voice recognition. Google also uses TensorFlow in almost every app we use to improve our experience.

TensorFlow Overview

Machine learning is a complex discipline. But thanks to machine learning frameworks like TensorFlow that made the process of acquiring data, training models, serving predictions, and refining future results simpler than before, utilizing machine learning models is much less intimidating and complicated than before.

TensorFlow is an open-source software platform for machine learning. TensorFlow focuses on the training and inference of deep neural networks but has found uses in a wide range of applications. DistBelief, a proprietary machine-learning system based on deep learning neural networks, was built by Google Brain beginning in 2011. The DistBelief codebase was simplified and refactored into TensorFlow, a quicker, more robust application-grade framework. The team, led by Geoffrey Hinton, introduced extended backpropagation and other enhancements in 2009, allowing for the formation of neural networks with significantly improved accuracy, such as a 25% decrease in voice recognition mistakes. Since its inception, its use in both research and corporate applications developed quickly across several Alphabet entities.

Consider a world where there are no traffic accidents or incidences of road rage. Consider a world where every operation is successful with no human life lost to surgical mistakes. Consider a future where no kid is underprivileged and where those with special needs may enjoy the same standard of living like the rest of humankind.

NLP using TensorFlow

A good NLP system can execute a wide range of activities. You can ask Google to give weather updates or even ask how to say "How are you?" in any other language like Spanish. Below are some of the activities that a good NLP can perform using TensorFlow:

➤ **Tokenization**

The process of tokenization is diving strings into tokens. `tensorflow_text` package provides tokenizers that are available for preprocessing text required for text-based models. If you tokenize using the TensorFlow graph, you won't have to worry about training and inference workflows and how to manage preprocessing scripts.

- **Word-sense Disambiguation (WSD)** : Word-sense-disambiguation (WSD) is a problem where we try to make sense of a word in a given phrase. Natural language is too ambiguous, where words can have a different context. This activity becomes extremely important to increase the effectiveness of complex systems like search engines.
- **Part-of-Speech (PoS) tagging: POS tagging** is the process of marking up a word in a text (corpus) as corresponding to a particular part of the speech. This activity is not an easy task, as some words can represent more than one part of the speech at different time. This phenomenon is not rare and make POS tagging complex.

TensorFlow has built-in high-level API named `tf.keras` to define and train machine learning models and to make predictions. `tf.keras` is the TensorFlow variant of the open-source Keras API.

Reference

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