CS410 – Technology Review

TensorFlow, Pytorch and its applications in NLP

Abstract

TensorFlow & Pytorch provides you with a rich collection of ops and libraries to help you work with input in text form such as raw text strings or documents. These libraries can perform the preprocessing regularly required by text-based models and includes other features useful for sequence modeling.

You can extract powerful syntactic and semantic text features from inside the TensorFlow graph as input to your neural net.

This paper is a review of TensorFlow & Pytorch in NLP. They are used in most of the NLP and why is it preferred over other machine learning libraries.

Introduction

Created by Google Brain Team, TensorFlow is an open-source library for numerical computation and large-scale machine learning. It uses Python to provide front-end API for building applications with the framework, while executing those applications in high performance C++. Google's TensorFlow is known to ease the process of acquiring data, training models, serving predictions, and refining future results.

Why TensorFlow?

Whether you're an expert or a beginner, TensorFlow is an end-to-end platform that makes it easy for you to build and deploy ML models.

TensorFlow offers multiple levels of abstraction so you can choose the right one for your needs. Build and train models by using the high-level Keras API, which makes getting started with TensorFlow and machine learning easy.

If you need more flexibility, eager execution allows for immediate iteration and intuitive debugging. For large ML training tasks, use the Distribution Strategy API for distributed training on different hardware configurations without changing the model definition.

TensorFlow has some very interesting features to offer. Let's review the various features by addressing some pros and cons that will help us in understanding the tool better. While addressing the pros and cons we shall also compare TensorFlow with other DL frameworks like Keras and PyTorch. TensorFlow has lot of inbuilt functionality for this. Since TensorFlow is an open-source library, it is very easy to use. With adequate tutorials one can easily set it up fast and get started quickly. Google created TensorFlow and hence it has a large community which means that if users are stuck with some issue/problem, they can just resolve it.

TensorFlow & Real-World Applications

Text based applications like text messages, reactions, comments, tweets, stock results are all processed using TensorFlow for analysis purpose. Also, Google uses it for translation purposes. It uses its neural networks to translate one language into another language using TF library. Looking for patterns in images by processing them is made possible by using the computer vision algorithm – DeepDream. TensorFlow is used in implementing RankBrain, an AI system part of the core Google algorithm that is used to sort search results.

TensorFlow Time Series algorithms are used for analyzing time series data to extract meaningful statistics. This is extremely important for companies like Amazon, Google, Facebook, Netflix, etc., that analyze customer activity and use that data to compare it to millions of other users to determine what the customer might like to purchase or watch. This kind of contribution in the field of AI has helped many companies to execute such tasks efficiently. This algorithm is also used in other fields like Security, IoT, Finance, Accounting, Predictive Analysis, etc.

Pytorch

Natural language processing (NLP) is continuing to grow in popularity, and necessity, as artificial intelligence and deep learning programs grow and thrive in the coming years. Natural language processing with PyTorch is the best bet to implement these programs.

First and foremost, NLP is an applied science. It is a branch of engineering that blends artificial intelligence, computational linguistics, and computer science in order to "understand" natural language, i.e., spoken and written language.

Second, NLP does not mean Machine Learning or Deep Learning. Instead, these artificial intelligence programs need to be taught how to process natural language and then use other systems to make use of what is being input into the programs.

While it is simpler to refer to some AI programs as NLP programs, that is not strictly the case. Instead, they are able to make sense of language, after being properly trained, but there is an entirely different system and process involved in helping these programs understand natural language.

This is why natural language processing with PyTorch comes in handy. PyTorch is built off of Python and has the benefit of having pre-written codes, called classes, all designed around NLP. This makes the entire process quicker and easier for everyone involved.

Conclusion:

TensorFlow & Pytorch are great options if you are working around machine learning. It is a great library for numerical and graphical computation of data for creating DL networks. It is most widely used library for various applications like Google Search, Google Translate, Google Photos, Twitter , Facebooks & many more. Although it can be difficult for beginners as the learning of the tool takes some time, it has various benefits as mentioned above. This tool has certain compatibility issues with other Python packages. Despite many disadvantages, this library is continuously being used in various fields and applications.

References:

https://www.exxactcorp.com/blog/Deep-Learning/natural-language-processing-with-pytorch?utm_source=google&utm_medium=ppc&utm_campaign=deep-learning-workstations&utm_term=dl-ws-dynamic&gclid=CjwKCAjwtp2bBhAGEiwAOZZTuDjuDRvZbfgen4H5xAoyXF4akjvh-2W73Qvoi1f_jOKsUpuTzFXFPxoC2OsQAvD_BwE

https://www.tensorflow.org/

https://pytorch.org/blog/