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TensorFlow NLP Features and Real-world Applications

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Introduction

Natural language processing (NLP) refers to the branch of computer science—and more specifically, the branch of artificial intelligence or AI—concerned with giving computers the ability to understand text and spoken words in much the same way human beings can. TensorFlow is an open-source library created by the Google Brain team for numerical computation and large-scale machine learning.

Nowadays, TensorFlow is among the most popular open-source machine learning framework. It has been used for tackling NLP tasks and has multiple unique features that makes it distinct from other libraries in Python. This paper will discuss how TensorFlow works as well as its applications in the real-world scenarios.

How does TensorFlow NLP work

- For the initial setup, we can feed TensorFlow with some external libraries to gather data.
- Afterwards, we need to extract the crucial part of the dataset and use other framework to construct objects that TensorFlow can make use of.
- Where TensorFlow really started to shine is when we need to build the models. Designers will make models with multiple layers by using the methods that are already included in TensorFlow and using those methods will require minimum human effort since most part are integrated in a beautiful manner up front. We can easily write highly readable code by utilizing functions in the models.
- With the models in hand, we feed them with pre-processed datasets to train them. TensorFlow would use three distinct parameters to help the training process.
- We had to choose a number of hyperparameters for defining and training the model. Our first choice of hyperparameter values, however, may not yield the best results. It only gives us a good starting point for training. Tuning these hyperparameters will help refine our model to better represent the particularities of the problem at hand.
- We can simply deploy our trained model by using them in productivity tests. Remember that TensorFlow is maintained by Google, which makes it easily combined with the use of Google Cloud.

Features that TensorFlow offers

- Open-source Library: It is an open-source library that allows rapid and easier calculations in machine learning.

- Fast Debugging: It allows you to reflect each node, i.e., operation individually concerning its evaluation. Tensor Board works with the graph to visualize its working using its dashboard.
- Easy Experimentation and Trainability: TensorFlow transforms the raw data to the estimators-a form of data neural networks understand. TensorFlow feature columns allow the bridge between raw data and estimators to train the model. This adds the agility to the model for fast developmental insights. It is easily trainable on CPU as well as GPU for distributed computing.
- Abstraction: TensorFlow provides a defined level of abstraction by reducing the code length and cutting the development time. The user needs to focus on logic disregarding the proper way of providing input to functions.
- High Flexibility: TensorFlow eases the mechanism of machine learning with the assistance of such characteristics. It allows the user to create and manipulate the system to create different types of real-time models.
- Large Community: Needless to say, if it has been developed by Google, there already is a large team of software engineers who work on stability improvements continuously.

Real-world applications of NLP in TensorFlow

- Customer support bot: For example, Reply.ai has built a custom ML-powered bot to provide customer support. According to the company, an average organization can take care of almost 40 % of its inbound support requests with their tool.
- Language identifier: One can construct a language identifier with the fastText model by Facebook. The model is an extension of the word2vec tool and uses word embeddings to understand a language.
- ML-powered autocomplete feature: The RoBERTa language model was introduced at Facebook by improving Google's BERT technique. It can detect the incomplete terms entered by the user are compared to a dictionary to suggest possible options of words.
- Predictive text generator: AI Dungeon 2 is a classic example of a text adventure game built using the GPT-2 prediction model. The game is trained on an archive of interactive fiction and demonstrates the wonders of auto-generated text by coming up with open-ended storylines.
- Media monitor: The analytics platform Keyhole can filter all the posts in your social media stream and provide you with a sentiment timeline that displays the positive, neutral, or negative opinion.

Conclusions

In recent years, TensorFlow has become the most well-known deep learning library. People prefer to use it for NLP because of its simple syntaxes and high model training efficacy. While supporting other machine learning toolkits to make it much easier to use, it will offer great scalability and flexibility so that many company as well as personal developers choose TensorFlow as their machine learning library.

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