Transformer Conversational Chatbot using Tensorflow 2.0

Introduction

The use of Artificial Neural Networks to create chatbots is increasingly popular nowadays, however, teaching a computer to have natural conversations is very difficult part and often requires large and complicated language models.
So in this project we are showing how to build complicated model with ease using Tensorflow 2.0.

Tensorflow 2.0

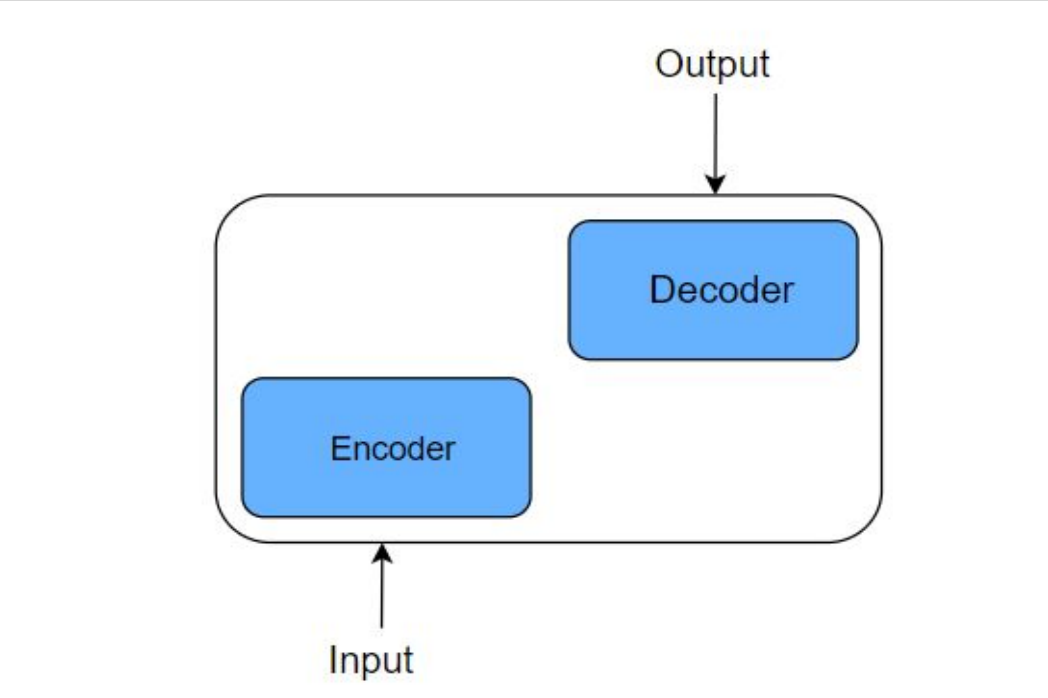
It is machine learning library developed by google.
It is an open source artificial intelligence library, using data flow graphs to build models. It allows developers to create large-scale neural networks with many layers. **TensorFlow** is mainly **used** for: Classification, Perception, Understanding, Discovering, Prediction and Creation.

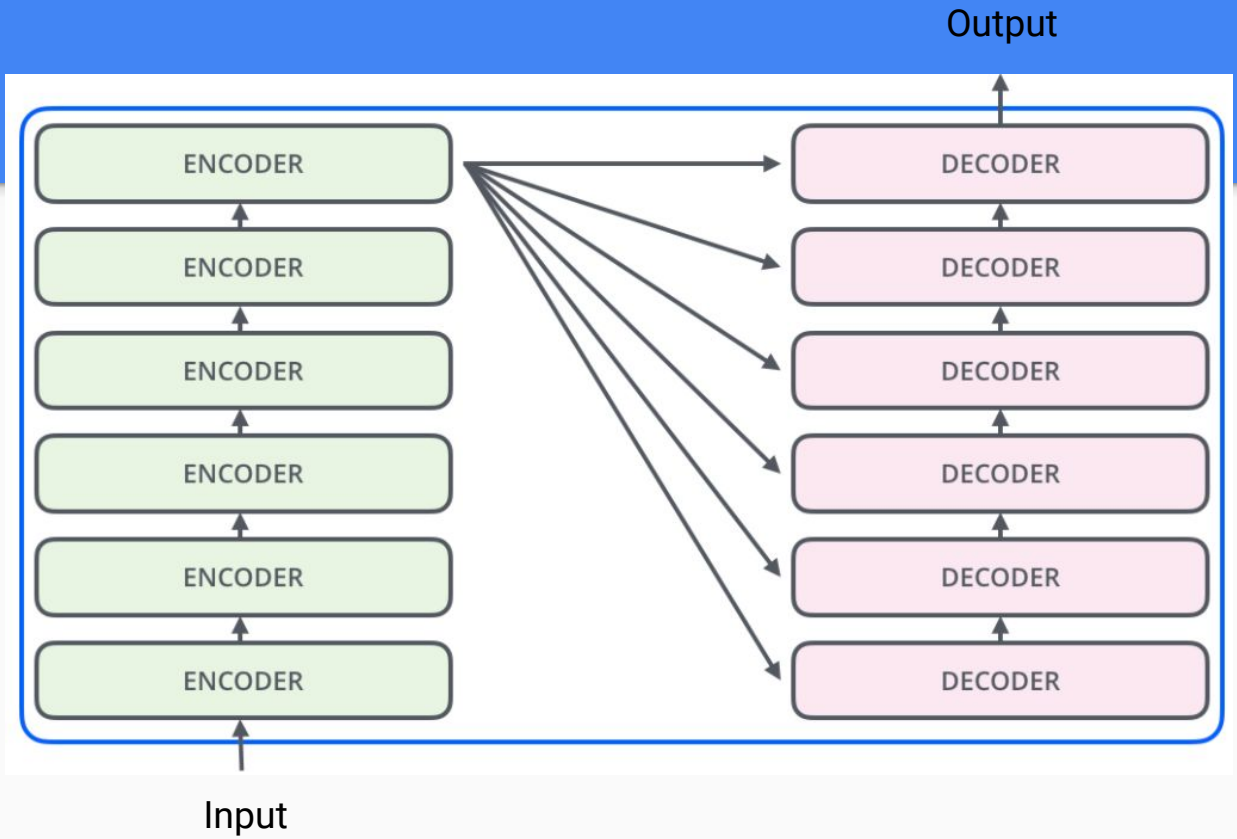
Transformer

It provides thousands of pretrained models to perform tasks on texts such as classification, information extraction, question answering, summarization, translation, text generation, etc in 100+ languages. Its aim is to make cutting-edge NLP easier to use for everyone.

Transformers provides APIs to quickly download and use those pretrained models on a given text, fine-tune them on your own datasets.

Transformer Working




Output
ENCODER
ENCODER
ENCODER
ENCODER
ENCODER
ENCODER
DECODER
DECODER
DECODER
DECODER
DECODER
DECODER
Input

DataSet

We will use the conversations in movies and TV shows provided by **Cornell Movie Dialogs Corpus,** which contains more than 220 thousands conversationals exchanges, between more than 10,000 pairs of movie characters, as our dataset.

Advantages of Transformer

The main advantages of transformer is that it is not a sequential that means it handles variable-sized input using stacks of self-attention layers instead of RNNs and CNNs.

Layer outputs can be calculated in parallel, instead of a series like an RNN.

It can learn long-range dependencies.

Disadvantage of Transformer

For a time-series, the output for a time-step is calculated from the entire history instead of only the inputs and current hidden-state.

This may be less efficient.

If the input does have a temporal/spatial relationship, like text, some positional encoding must be added or the model will effectively see a bag of words.

Advantages of Transformer Chatbot

- Able to achieve long range Conversations and maintain relevance in dialogue generation
- emulate real human conversation & maintain flexibility in functioning
- It makes no assumptions about the temporal/spatial relationships across the data

Literature Review

Authors	Problem discussed and solved	Method/ Algorithm/ Tools Used	Results
Mohammed Javed	To implement word segmentation (tokenization)	Calculating all character spaces	It involves mathematical cal culations hence proves to be slower than the others.

Naeun Lee	To implement word segmentation (tokenization)	Using NLTK package which involves inbuilt tokenizer	Easy to implement, as does not require any coding. Faster and more accurate
Tao Jiang	To implement word segmentation (tokenization)	Using Conditional Random Fields	This algorithm proves to be more accurate and less complex than the first but less efficient as compared to NLTK.
Jerome R. Bellagarda	To implement POS Tagging	Using the latent analogy algorithm	Requires training of large amount of data. Hence involves complexity.

Liner Yang	To implement POS Tagging	Using neural network algorithm	As the algorithm works in layers, it provides high accuracy, but is not time efficient.
None	To implement POS Tagging	Using NLTK	Provides above average accuracy at minimum complexity.
Bo Chen	To create a dependency parser	Using a dependency tree to understand the dependen cies.	Traditional method. Accuracy depends on the training of the data.

Zhenghua Li	To create a dependency parser	Using a graph data structure for the implementation of the parser	Improvised version of the above mentioned algorithm. Provides higher visibility, understandability and improves accuracy.
LinHua Gao	Synonym detection and extraction	Dictionary method	Traditional method. Requires to maintain a dictionary of synonyms wordwise. Provides less accuracy then self training mod els.
Sijun Qin	Synonym detection and extraction	Feature selection method.by calculating feature polarity	Provides high accuracy and less complexity as compared to dictionary method

DrawBacks of existing Systems

Although there are many chatbots in the market, majority of them often failed in

- Long Conversations and reduced relevancy in dialogue generation
- Majority of them use simple rules based techniques
- Most of these chatbots are developed for restricted domain
- Fail to emulate real human conversation & lacks flexibility in functioning

Project Plan

Our Goal is - Create chatbot which is more emulate like real human conversation, and do not fail in long conversation.

We Are Creating a Conversational Chatbot using Tensorflow 2.0 as a machine learning framework.

We Use Transformer NLP model to to get the desired output.

We are Deploy on the messenger to reply message

Nowadays People are using chatbot for the messaging people on the personal chat on social media instead of personal assistant , but after some conversation chatbot fail to maintain relevance in conversation.

We are building a chatbot using transformer natural language processing model which is used for replying messages on the social media without fail longer conversation, by maintaining the natural conversation rather than looks like artificial conversation.

We use tensorflow on which we develop our chatbot using transformer. Which we deploy on any social media to reply the user messages.

Even though there is irrelevant words it will find out the importance of that word with the another words in the sentence and the model will update it self to do further conversation.

Thank You

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