Contradictory, My Dear Watson

Detecting contradiction and entailment in multilingual text

Young Zeng, Yoli Wu

Goal: Classifying pairs of sentences (consisting of a premise and a hypothesis) into three categories - entailment, contradiction, or neutral.

Dataset:

- **the train and test set include text in 15 different languages:**
  Arabic, Bulgarian, Chinese, German, Greek, English, Spanish, French, Hindi, Russian, Swahili, Thai, Turkish, Urdu, and Vietnamese.
- **Train: 12120(2.77 MB) (include premise, hypothesis, language, label)**
- **Test: 5195(1.18 MB)**

Link: https://www.kaggle.com/competitions/contradictory-my-dear-watson/data

Tip

NLI (Natural language inference) model is a **model that attempts to infer the correct label based on the two sentences.**

Premise:
He came, he opened the door and I remember looking back and seeing the expression on his face, and I could tell that he was disappointed.

Hypothesis 1

Just by the look on his face when he came through the door I just knew that he was let down.

entailment

Hypothesis 2

neutral

He was trying not to make us feel guilty but we knew we had caused him trouble.

Hypothesis 3

He was so excited and bursting with joy that he practically knocked the door off it's frame.

contradiction

Models and Transformers

Choose one approach to assigns labels of 0, 1, or 2 (corresponding to entailment, neutral, and contradiction) to pairs of premises and hypotheses.

➔ **BERT & RoBERTa**

BERT uses **three** kind of input data - **input word IDs**, **input masks**, and **input type IDs**.

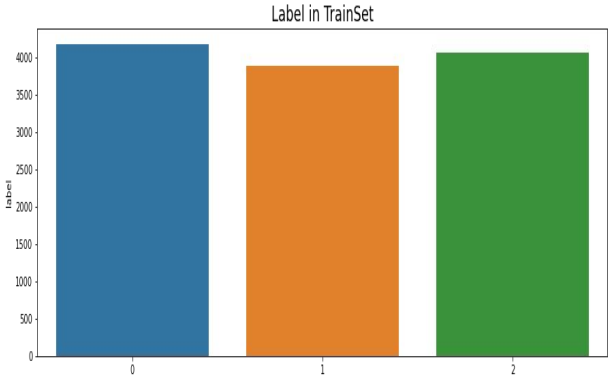
`'bert-base-multilingual-cased'`

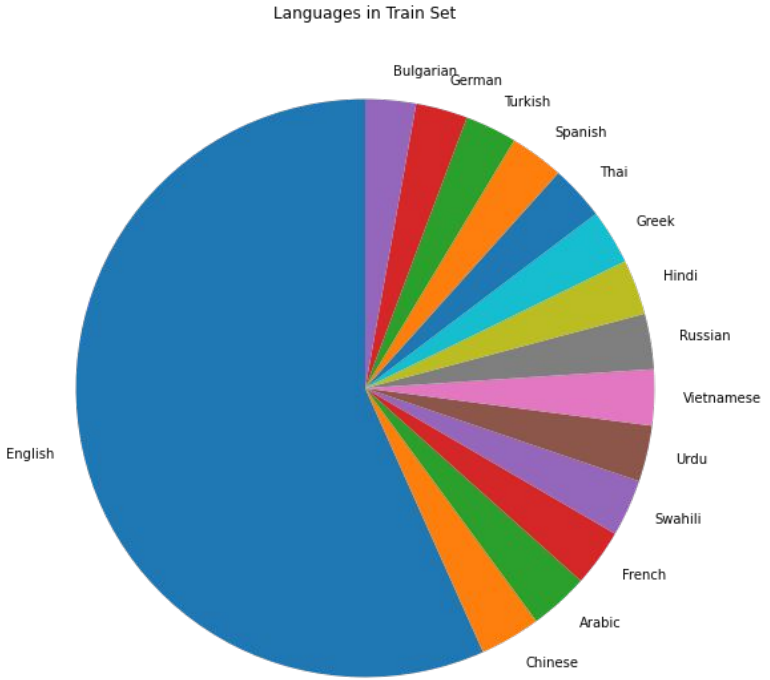
➔ **LSTM**

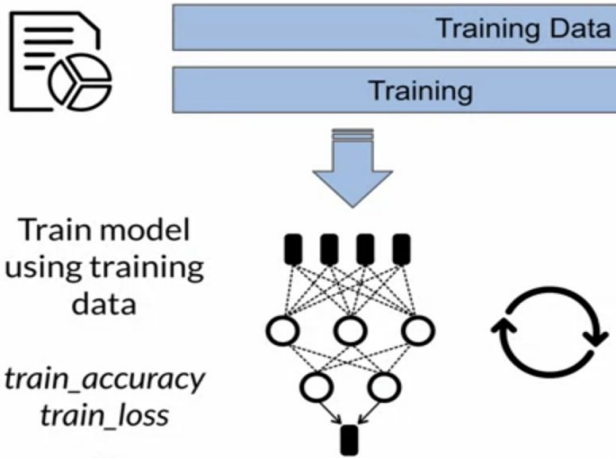
Create a generative model for text, character-by-character using LSTM recurrent neural networks in Python with Keras.

EDA - Training Set

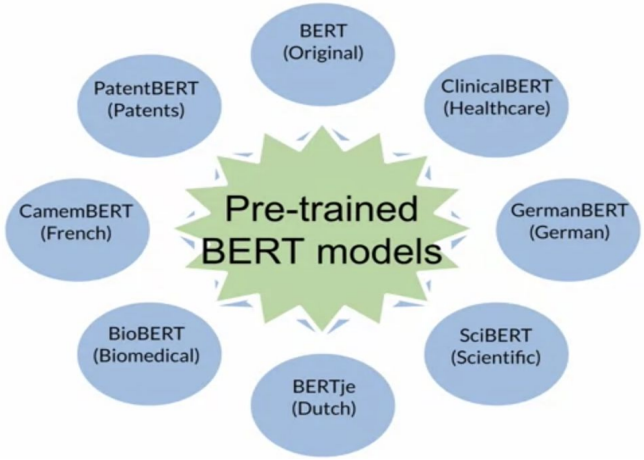
df_train: (12120, 6)
df_test: (5195, 5)



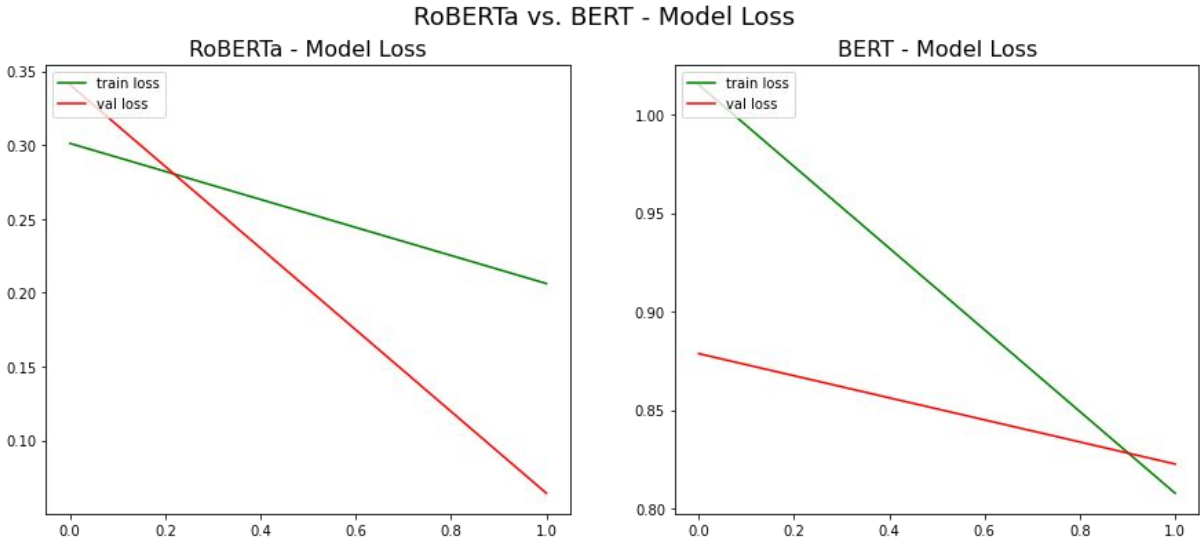



Training Data
Test Data
Training
Validation
Train model using training data
train_accuracy
train_loss
Calculate model metrics after each epoch
Calculate final model metrics

Models


BERT (Original)
PatentBERT (Patents)
ClinicalBERT (Healthcare)
CamemBERT (French)
Pre-trained BERT models
GermanBERT (German)
BioBERT (Biomedical)
SciBERT (Scientific)
BERTje (Dutch)

Models Evaluation



Accuracy:

BERT: 0.63738

RoBERTa: 0.89604

LSTM: 0.024

Thank you!