Sentence to Sentence semantic similarity

Introduction:

The project's main idea is to predict which of the provided pairs of questions contain two questions with the same meaning or not (duplicated or not).

Methodology:

- **Preprocessing**
  - Change sentences to lowercase
  - Replace abbreviations with their original using regular expression
  - Tokenization
  - Remove stop words
  - lemmatization
  - Replace nulls with an empty string

- **Doc2Vec model**

  Doc2Vec model, as opposite to the Word2Vec model, is used to create a vectorized representation of a group of words taken collectively as a single unit. It doesn't only give the simple average of the words in the sentence.

  It is preferred to use the doc2vec instance of word2vec when you have a set of sentences, not words

- **Models**

  Using classification models to identify question pairs that have the same intent or meaning

  - XGBoost Classifier
    - Train subset accuracy 0.8166909891414579
    - Test subset accuracy 0.8112493507135967

  - AdaBoostst Classifier
    - Train subset accuracy 0.7998311855351357
    - Test subset accuracy 0.7998961141754681

Data Set Summary:

1-What is the data set used?

Quora Question Pairs in Kaggle (The train data set in the Link)

2- What is the summary of the dataset columns?

id → number of instances in data

qid1 → ids for first questions

qid2 → ids for second questions

- each question has one id and there are no two questions that have the same id

question1 → the text of the first questions

question2 → the text of the second questions

is_duplicate → classify the two questions are duplicate or not

- 0 → the two questions aren't duplicate or don't have the same meaning
- 1 → the two questions are duplicate or have the same meaning

cosine_similarity→ Cosine similarity measures document similarity in text analysis

cwc_min→ Get the common Tokens from the Question pair

cwc_max → Get the common Tokens from the Question pair

last_word_eq→ Last word of both questions is the same or not

first_word_eq→ First word of both questions is the same or not

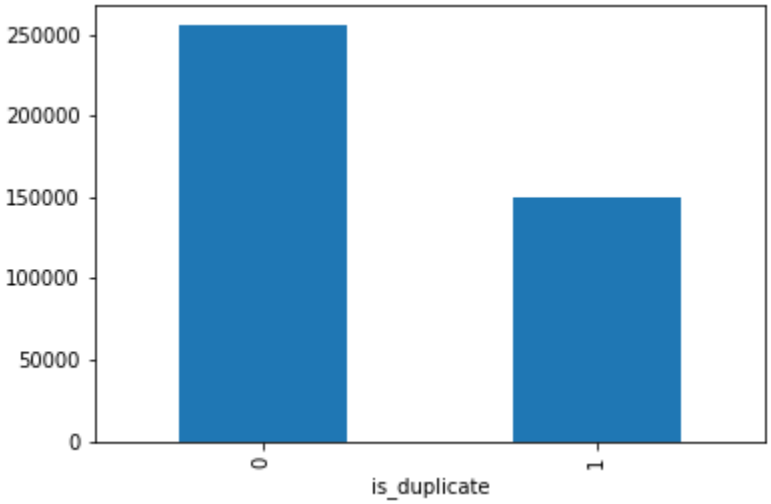
q1_ferq→ frequency of first questions in data

q2_ferq→ frequency of second questions in data

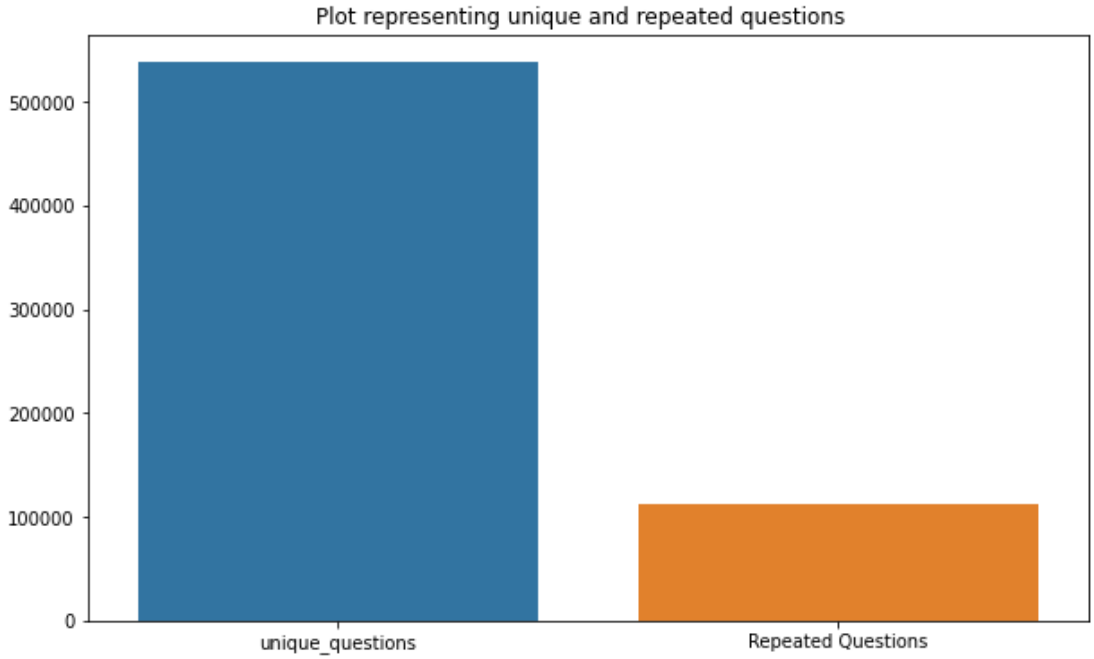
word_share→ word_common (number of common question pair) **/** word_total (length of question 1 + length of question 2)

3- Visualize the dataset statistics*/

- **bar chart for representing is_duplicated column**

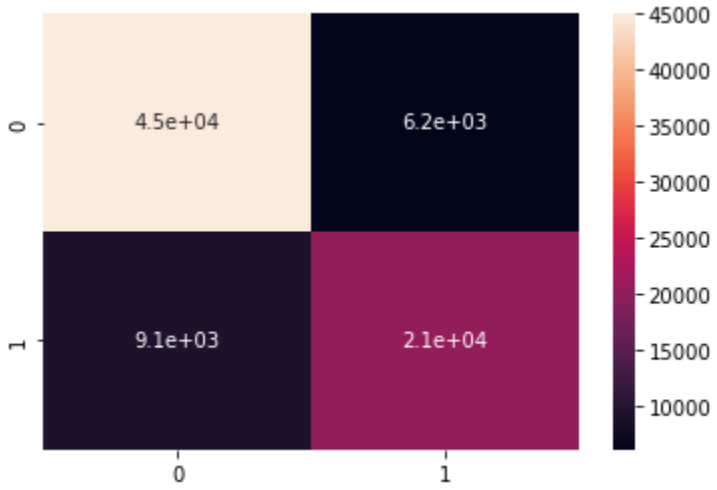


- **bar chart for representing unique and repeated questions**

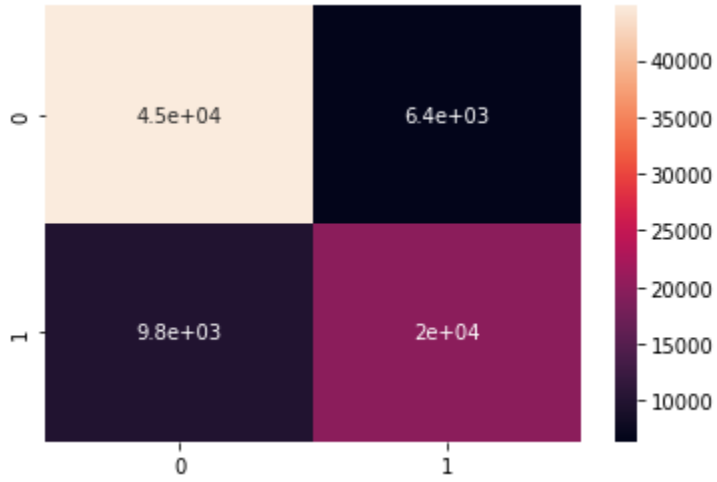


Results:

- **XGBoost Classifier**



- **AdaBooststst Classifier**



  - **XGBoost model** has the highest accuracy where Training accuracy = 0. 8166909891414579 , Testing accuracy = 0. 8112493507135967