Practical 6

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Roll no: A-58
Subject: NLP

Aim: To write a python program to detect similar sentence from given paragraph.

Theory:

Sentence Similarity:

Sentence similarity or semantic lecture similarly is a measure of how similar of two pieces of text are as to what degree they express the same meaning. Release task include paragraph or duplicate identication search and matching application. Sentence similarity is normally calculated by the following two steps:

1. Calculating the embedding of the sentence
2. Taking the cosine similarity between them.

* Cosine Similarity:

Cosine similarity calculate similarity by measuring the cosine of angle between two vectors.

$$\text{Similarity} = \cos(\theta) = \frac{AB}{(|A| \times |B|)}$$

Mathematically cosine similarity is measure of similarity between two non-zero vector of an inner product space that measure the cosine angle between them. It is advantageous because even if the two similar documents are far apart by eucledian distance, they may still oriented closer together, smaller the angle, higher the cosine simailarity.

Conclusion: Hence, successfully created and implemented a python program to detect similar sentence from a given paragraph.

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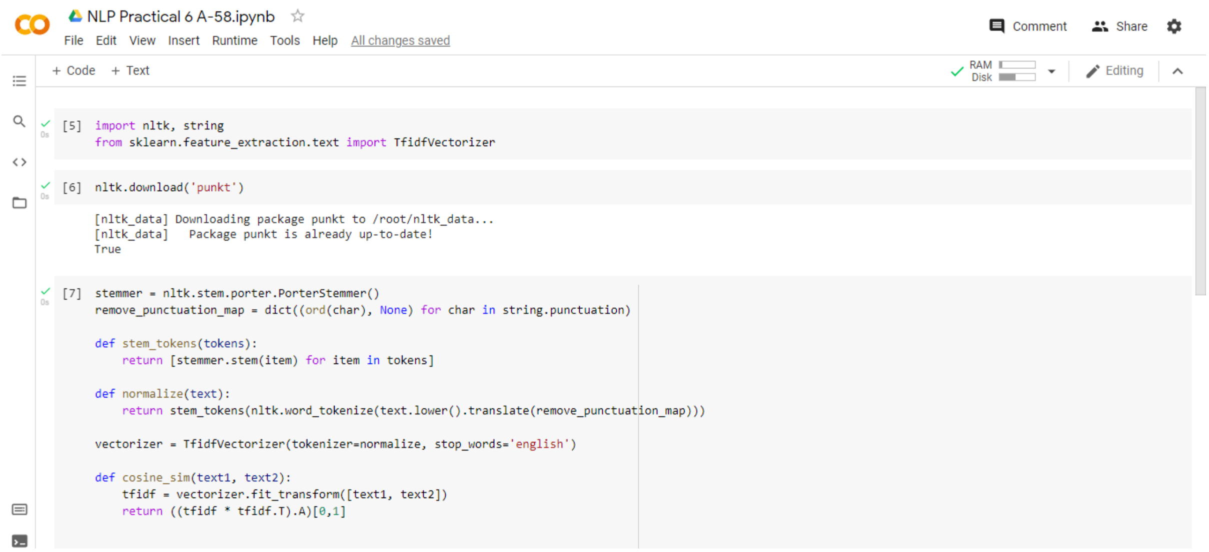
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```
[5] import nltk, string
    from sklearn.feature_extraction.text import TfidfVectorizer
```

```
[6] nltk.download('punkt')
```

```
[nltk_data] Downloading package punkt to /root/nltk_data...
[nltk_data]   Package punkt is already up-to-date!
True
```

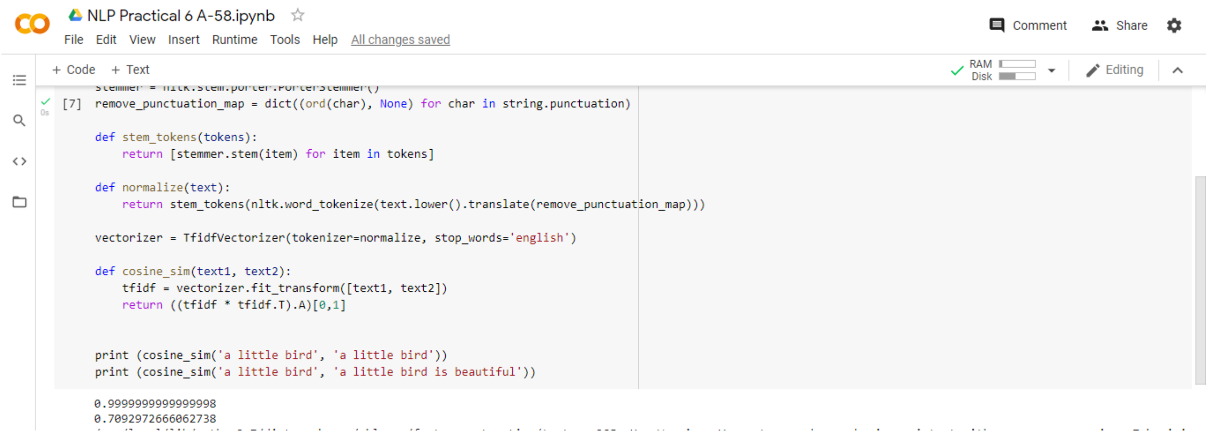
```
[7] stemmer = nltk.stem.porter.PorterStemmer()
    remove_punctuation_map = dict((ord(char), None) for char in string.punctuation)

    def stem_tokens(tokens):
        return [stemmer.stem(item) for item in tokens]

    def normalize(text):
        return stem_tokens(nltk.word_tokenize(text.lower().translate(remove_punctuation_map)))

    vectorizer = TfidfVectorizer(tokenizer=normalize, stop_words='english')

    def cosine_sim(text1, text2):
        tfidf = vectorizer.fit_transform([text1, text2])
        return ((tfidf * tfidf.T).A)[0,1]
```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    print (cosine_sim('a little bird', 'a little bird'))
    print (cosine_sim('a little bird', 'a little bird is beautiful'))
```

```
0.9999999999999998
0.7092972666062738
```