Page Rank Algorithm-NLP

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First, you'll need to install the necessary libraries:

```
pip install nltk
pip install numpy

import nltk
import numpy as np
from nltk.tokenize import sent_tokenize, word_tokenize
from nltk.corpus import stopwords
from sklearn.metrics.pairwise import cosine_similarity
from sklearn.feature_extraction.text import CountVectorizer

nltk.download('punkt')
nltk.download('stopwords')

def text_summarization(text, num_sentences=2):
# Tokenize the text into sentences
sentences = sent_tokenize(text)
```

```
# Tokenize the text into words
word_tokens = [word_tokenize(sentence.lower()) for sentence in sentences]

# Remove stop words
stop_words = set(stopwords.words('english'))
filtered_tokens = [[word for word in words if word not in stop_words] for words in word_tokens]

# Create sentence vectors using CountVectorizer
vectorizer = CountVectorizer().fit_transform([' '.join(words) for words in filtered_tokens])
sentence_vectors = vectorizer.toarray()

# Calculate similarity matrix using cosine similarity
similarity_matrix = cosine_similarity(sentence_vectors)

# Convert similarity matrix to graph and apply PageRank algorithm (TextRank)
damping_factor = 0.85
scores = np.ones(len(sentences))
for _ in range(100):
scores = (1 — damping_factor) + damping_factor * np.dot(similarity_matrix, scores)

# Sort the sentences based on scores and get the top num_sentences
ranked_sentences = [sentences[idx] for idx in np.argsort(scores)[-num_sentences:]]

return ' '.join(ranked_sentences)
```

```
# Example text for summarization
text = """
Natural language processing (NLP) is a field of artificial intelligence that focuses on the interaction between humans and computers using natural language. It involves the processing and analysis of large amounts of natural language data to extract meaningful insights and patterns. NLP has various applications, such as machine translation, sentiment analysis, speech recognition, and text summarization.

Text summarization is the process of generating a concise and coherent summary of a longer piece of text. There are different approaches to text summarization, including extractive and abstractive methods. Extractive summarization involves selecting and combining existing sentences from the text, while abstractive summarization involves generating new sentences to form the summary.

In this example, we will use an extractive text summarization technique based on the TextRank algorithm. TextRank is an unsupervised algorithm that applies the PageRank algorithm to sentences in a text document. It calculates the importance of each sentence based on its similarity to other sentences in the document.

Let's implement text summarization using NLP and the TextRank algorithm.
"""

# Perform text summarization
summary = text_summarization(text, num_sentences=2)
print(summary)
```

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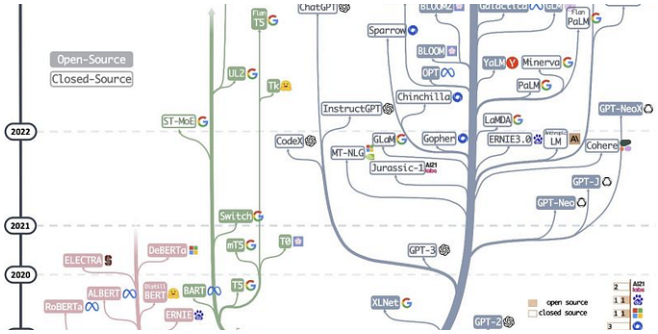

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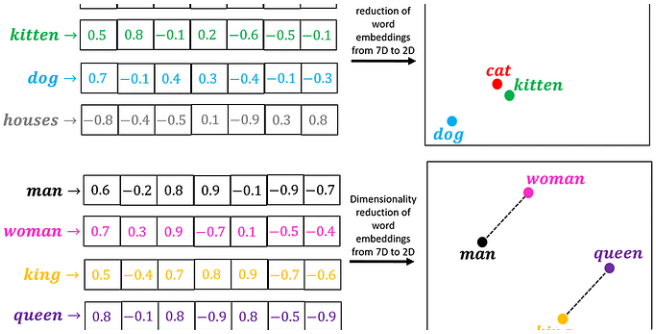

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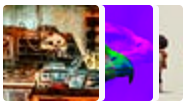

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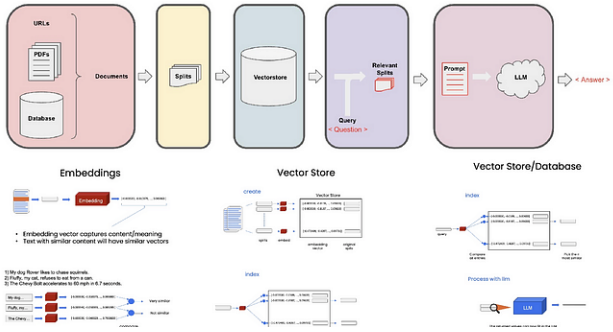

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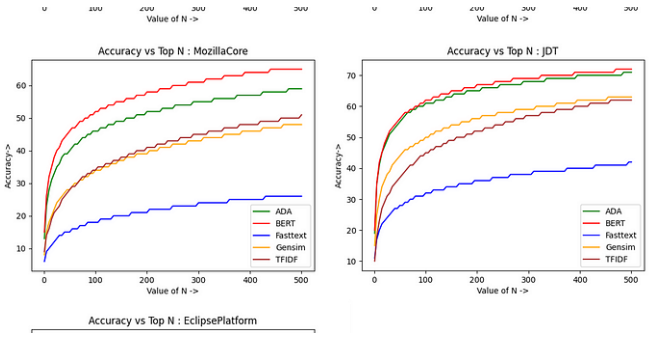

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