TELUGU PARAPHRASE DETECTION USING SIAMESE NETWORK

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Abstract

- Paraphrasing methods will generate, identify or extract the phrases or sentences that convey the same meaning.
- The ability to detect similar sentences is crucial for several applications, such as text summarization, and plagiarism detection.
- In our project, we will identify a given pair of Telugu sentences if they are Paraphrased or Non-paraphrase.
- We have used a Siamese architecture for calculating the amount of similarity between pairs of sentences.

Introduction

- Paraphrases are phrases which convey a similar meaning are but used with different wording.
- Paraphrase detection is an NLP Classification Problem. In our model, we are identifying paraphrases for the Telugu language.
- we have created our dataset which contains 1032 pairs of sentences, out of which 516 are paraphrase pairs and 516 are non-paraphrase pairs
- The sentences are selectively chosen from the available Telugu corpus and some Telugu articles.
- To create a paraphrase pair the corresponding paraphrase is generated by using the paraphrasing tool and crosschecked by us.
- And for non-paraphrase pairs, the second sentence is selected randomly such that it is not in a similar meaning and labelled accordingly.

Here are a few examples of Paraphrase and Non-Paraphrase

నేను అబద్ధం చెబుతున్నాను.
I am Lying
నేను నిజం చెప్పడం లేదు.
I am not saying the Truth
This is a paraphrased pair

మీ ఆరోగ్యం త్వరలో కుదుట పడాలని కోరుకుంటున్నాను
I want you to recover soon
మీ ఆరోగ్యం వెంటనే క్షీణించాలని కోరుకుంటున్నాను
I want your health to get deteriorated
This is a Non-paraphrase pair

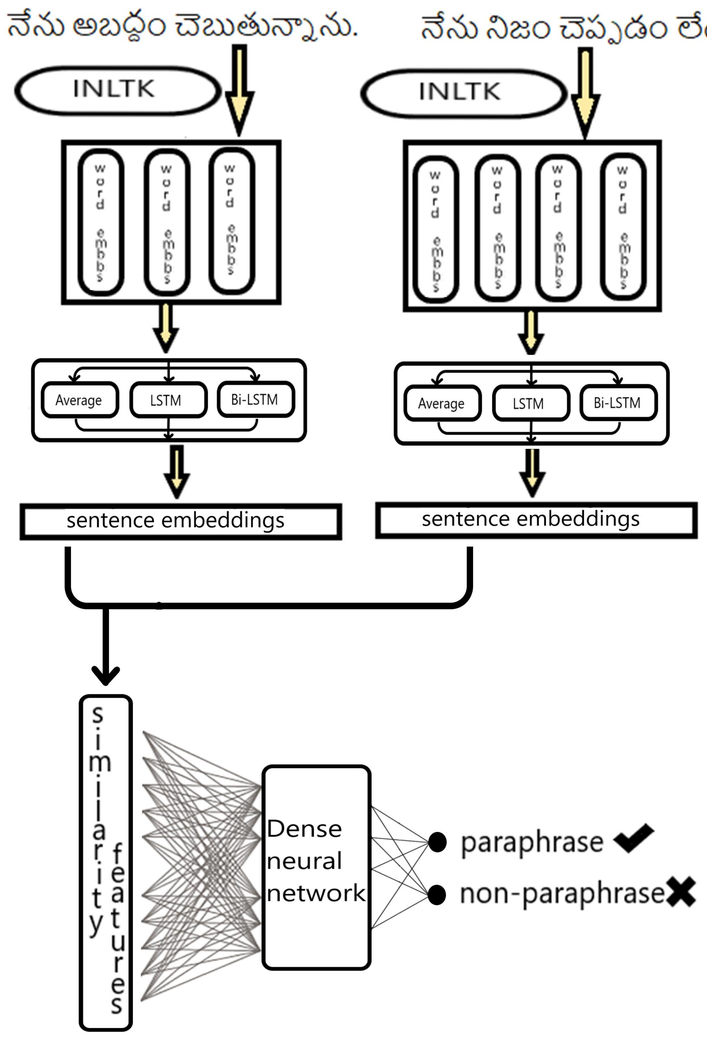
	Training data	Avg no of words	Test dataset	Avg no of words
Paraphrase	417	4.86	113	5.53
Non-paraphrase	407	5.87	94	5.02
Total	824	5.36	207	5.3

Table 1: Information about the dataset which we created

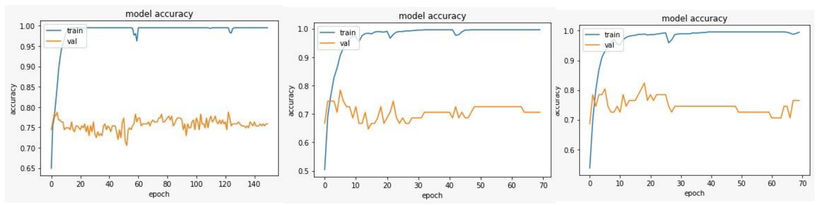
Methods and Materials

- Siamese architecture is used for our project, in which both the sentences go through the same processing and extraction before comparison.
- In the model an embedding layer is created to extract embeddings of a given word, the layer requires an embeddings file to fetch the embeddings.
- We used INLTK embeddings for Telugu to get to create the embeddings file for our dataset.
- Then we are calculating sentence embedding from word embeddings using LSTM, and Bi-LSTM and averaging the word embeddings.
- Then the sentence embeddings are sent as input for similarity feature extraction.
- The similarity features are extracted from the sentence embeddings and passed to a fully connected network to obtain the similarity score.

Proposed Model Architecture



Results



Average Model Performance | LSTM Model Performance | BI- LSTM Model Performance

Chart 1. Performance Measure for our Models.

Discussion

- The model is limited to a small dataset and can be extended further. With large and more cleaned data the models will definitely tune better than the current results.
- we have created three models and compared their performance for our dataset The Bi-LSTM model performs better compared to others.

Conclusions

- In the proposed work, the main aim is to identify the paraphrases from the dataset. We used the INLTK sentence embedding tool to calculate the sentence embedding for our dataset.
- We use the Siamese Network, LSTM and Bi-LSTM for calculating the similarity score between both the sentences and predict whether it is Paraphrase or Non-Paraphrase.
- For Indian Languages paraphrase detection is very less explored so we can explore more and try with another Indian language for the paraphrase Detection.

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