POSHAN: Cardinal POS Pattern Guided Attention for News Headline Incongruence

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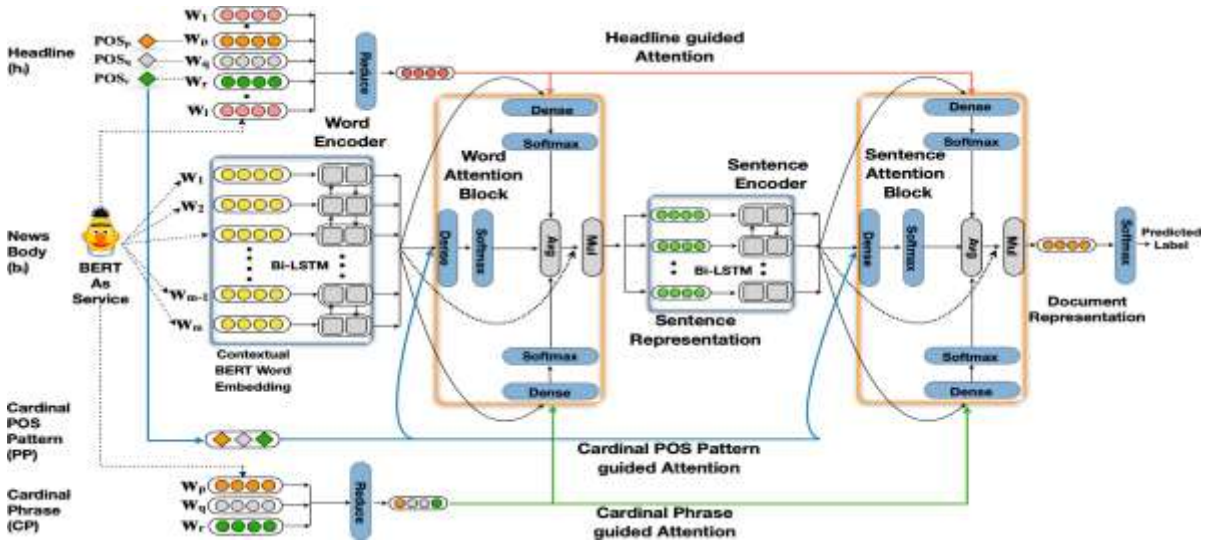
Problem Statement

The objective of this model is to devise an incongruence detection method which performs well on the classification of incongruent news items containing cardinal values. For this, model is leveraging the Cardinal Part-of-Speech tag patterns to drive the hierarchical attention.

Model Architecture



Main Components

- Model has six main components:
    - Preprocessing of data
    - Embedding of the words(BERT embedding and POS embedding)
    - Word and Sentence encoder(Bi-LSTM)
    - Cardinal POS triplet pattern guided hierarchical attention
    - Cardinal Phrase guided hierarchical attention
    - Headline guided hierarchical attention

Preprocessing

- We have used POS tagger to get the corresponding POS tag for every word in the headline.
- Using these POS tags, we are extracting POS triplets containing cardinal phrase in the middle and with that we are also maintaining the type of POS pattern formed using an index.
- If a headline contains multiple cardinal phrases then each of the POS triplets will be considered individually as a data point.
- So we will have multiple headline-body pairs in out preprocessed dataset based on number of cardinal phrases in the headline.

Embedding

- Two types of embeddings are used in POSHAN:
    - BERT embedding
    - POS embedding
- Model using pre-trained contextual BERT embedding of size 768 dimensions for each word(headline and body).
- It is using 100 dimensional vector embedding for each cardinal pos-tag pattern and the weights are learned during training.

- Weights for these cardinal pos-tag pattern embedding will be learnt during training of the model.

Fusion of Attention Weights

- To guide the hierarchical attention, we are using fusion of three types attention weights:
    - Headline Guided Hierarchical attention weights
    - Cardinal phrase guided hierarchical attention weights
    - Cardinal POS triplet guided hierarchical attention weights.

Results of POSAt

Dataset	Accuracy	Macro F1
NELA 17 Test	0.613	0.611
NELA 17 Derived Train	0.633	0.628
NELA 17 Derived Test	0.637	0.631
FNC Test	0.860	0.797
FNC Derived Train	0.859	0.785
FNC Derived Test	0.824	0.739

Results of POSHAN

Dataset	Accuracy	Macro F1	AUC
FNC Derived Test	0.814	0.767	0.778
NELA Derived Test	0.746	0.730	0.74