

MIG at the NTCIR-15 FinNum-2 Task: Use the Transfer Learning and Feature Engineering for Numeral Attachment Task

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GOAL

The goal is to judge whether the specified numeral is related to the given stock symbol in a financial tweet. Given a target numeral and a cashtag, and we formulate the problem as a binary classification to tell if the given numeral is related to the given cashtag. Macro-averaged F1 score is adopted for evaluating the experimental results.

Method

In our research, we fine-tuned the BERT and applied linguistic domain knowledge into new feature.

Fine-tune BERT

We set the weight of loss function correspond to the data distribution.

Also, we try to add a Bi-directional Long Short-Term Memory(BiLSTM) after the layer of BERT.

And we tuned the number of epoch to reach a better performance.

Feature Engineering

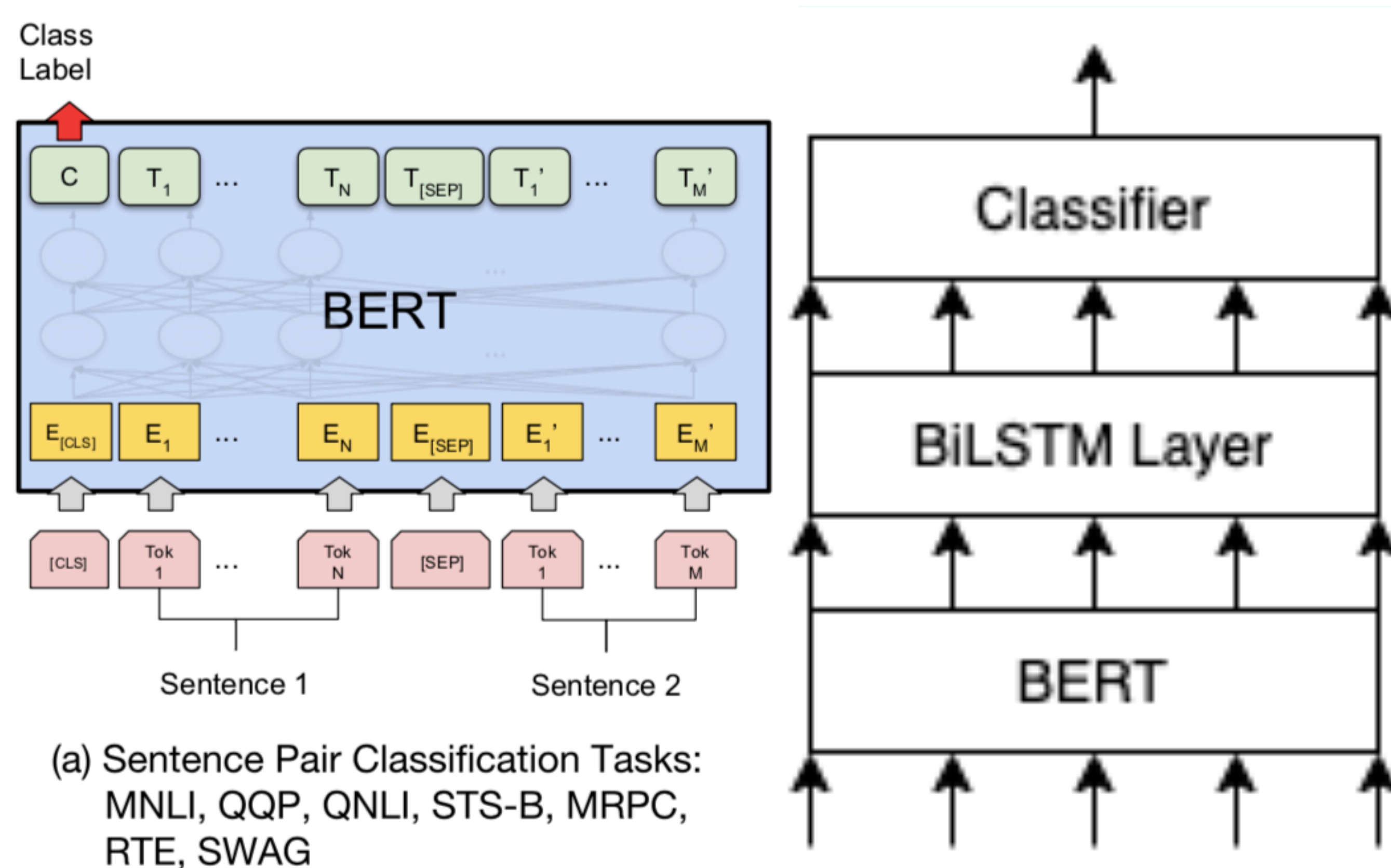
We did the word segmentation and numbered the word in order of the position in a tweet.

And the numbers we generated are the **position features**.

We treat the distance between the cashtag and the number as the **distance feature**.

Then we need to average them with the length of entire tweet.

Totally we create six new features.



“\$NE, last time oil was over \$65 you were close to \$8.”

0 1 2 3 4 5 6 7 8 9 10 11

The cashtag is \$NE, so we generate a position feature of 0.

The number is \$65, so we generate a position feature of 6.

Results and Conclusion

Table 1: Formal Run Results

| | Val Set | Dev Set | Test Set |
|--------------|---------|---------|----------|
| Run 1 | 0.8021 | 0.8446 | 0.6827 |
| Run 2 | 0.8473 | 0.8577 | 0.6872 |
| Run 3 | 0.7252 | 0.9069 | 0.6837 |

Table 2: Evaluation of the Experiments

| | Macro-F1 |
|------------------------|----------|
| Single sentence | 0.8488 |
| Words features | 0.8457 |
| 3 new features | 0.8571 |
| 6 new features | 0.8636 |
| 7 new features | 0.8618 |

In the research, we find that linguistic concepts can help computers to recognize the relationship between entities.

The result represents that the knowledge of linguistics is important to the relation recognition task.