SentiBERT: A Transferable Transformer-based Architecture for Compositional Sentiment Semantics

Da Yin¹, Tao Meng², Kai-Wei Chang²

¹Peking University
²University of California, Los Angeles
Motivation

- Sentiment composition is challenging.

Frenetic but **not really funny**.
Motivation

● How to encode sentiment composition in a contextual encoder?
● Can semantic composition learned from SST transfer to related tasks?

= Better capture sentiment composition
Model

BERT

Sentiment Semantics Composition

Phrase Node Prediction
Model

- **BERT**
- **Sentiment Semantics Composition**
- **Phrase Node Prediction**

Layer 1:
- Attention to Tokens

Layer 2:
- Attention to Children
Training Objectives

Phrase Annotation

Masked LM

Phrase Node Prediction

SentiBERT
Experiments

- Tasks:
  - SST-phrase
  - SST-5
  - SST-2, SST-3
  - Twitter Sentiment Analysis
  - Contextual Emotion Detection (EmoContext)
  - Emotion Intensity Classification (EmoInt)

Evaluated under supervised learning protocol

Test transferability
Experiments

● Results:

○ For sentiment semantic composition:

More results and discussion are in the paper
Experiments

- Results:
  - For transferability:

  |                | EmoInt (Pearson Correlation) | EmoContext (F1) |
  |----------------|-----------------------------|-----------------|
  |                | BERT                        | BERT            |
  |                | SentiBERT                   | SentiBERT       |
  |                | RoBERTa                     | RoBERTa         |
  |                | SentiBERT w/ RoBERTa       | SentiBERT w/ RoBERTa |

0.64 0.645 0.65 0.655 0.66 0.665 0.67 0.675

More results and discussion are in the paper
Analysis -- Performance v.s. Sentiment Switch

- **Local difficulty**: the number of sentiment switches between a phrase and its children
- **Global difficulty**: the number of sentiment switches in the entire constituency tree
Analysis

- Results:

More results and discussion are in the paper
Case Study

More examples are in the paper
Conclusion

- We present SentiBERT to better capture compositional sentiment semantics

- SentiBERT can transfer the compositional sentiment semantics learned on SST to other related tasks

Thanks!
GitHub: https://github.com/WadeYin9712/SentiBERT