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Neural Fusion Model for Chinese Semantic Matching

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Introduction

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Deep neural networks are the most popular choices for semantic matching nowadays. In this paper, we propose a novel Chinese semantic matching approach, namely **Neural Fusion Model**, which consists of char-word fusion encoder and encoding-interaction fusion classifier.

Main contributions

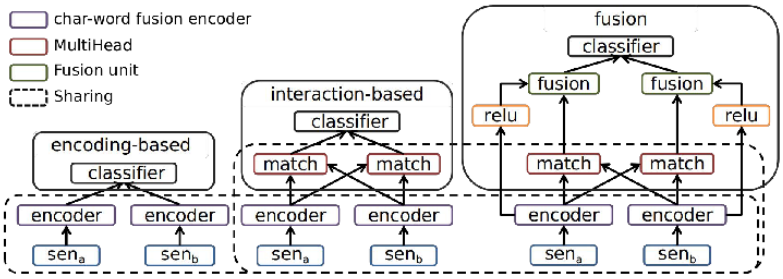
The **char-word fusion encoder** models the char and word sequences separately, and then uses a char-word fusion units to fuse them together.

The **encoding-interaction fusion classifier** jointly learns from three simple classifiers. Among them, the fusion classifier combines encoding-based and interaction-based representation from multiple perspective.

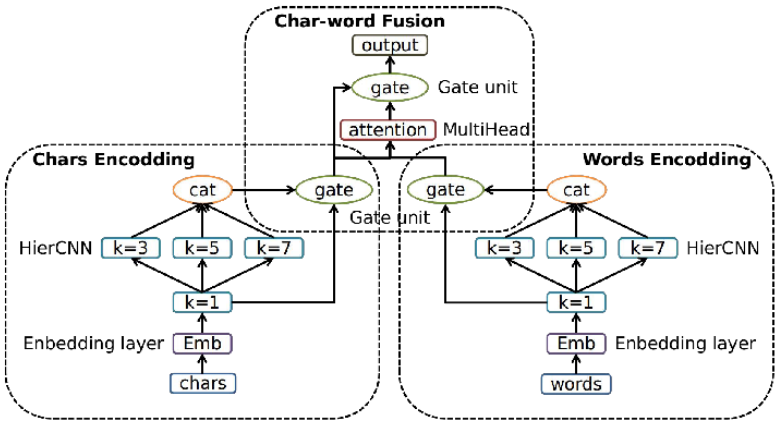
Conclusion

Empirical studies demonstrate the effectiveness of the proposed model, and it achieves the best results among non-BERT models. In addition, our BERT-equipped model obtains new state-of-the-art results on the Chinese semantic matching benchmark corpus: **LCQMC** and **BQ**.

Overview of the Neural Fusion Model



Structure of char-word fusion encoder



Experimental setting

Dataset

Data	LCQMC			BQ		
	Total	Positive	Negative	Total	Positive	Negative
Train	238766	138574	100192	1000000	50000	50000
Vaild	8802	4402	4400	10000	5000	5000
Test	12500	6250	6250	10000	5000	5000

Hyper-parameters setting

- Batch Size: 32
- Vocabulary Size: 50K
- Text Truncated Length: 64
- Networks Hidden Units: 300
- Word Embedding: 300
- Learning Rate: 0.001
- Dropout: 0.2

Experimental results

Experimental results on LCQMC

Methods	Precision	Recall	F1 score	Accuracy
BiMPM	77.7	93.5	84.9	83.3
ESIM	76.5	93.6	84.2	–
SSE	78.2	93.6	85.2	–
MSEM	78.9	93.7	85.7	–
Glyce	80.4	93.4	86.4	85.3
RE2	79.6	95.1	86.6	85.4
Our	**82.8**	91.7	**87.0**	**86.2**
BERT	83.2	94.2	88.2	87.5
Glyce+BERT	86.8	91.2	88.8	88.7
Our+BERT	**88.1**	90.7	**89.4**	**89.2**

Experimental results on BQ

Methods	Precision	Recall	F1 score	Accuracy
BiMPM	82.3	81.2	81.7	81.9
ESIM	81.9	81.8	81.9	–
SSE	80.2	80.3	80.2	–
MSEM	82.9	84.4	83.6	–
Glyce	81.9	85.5	83.7	83.3
RE2	83.8	82.8	83.3	83.4
Our	**82.3**	86.0	**84.1**	**83.8**
BERT	83.5	85.7	84.6	84.8
Glyce+BERT	84.2	86.9	85.5	85.8
Our+BERT	**85.0**	**87.5**	**86.2**	**86.1**