How can world knowledge and in-depth evaluation improve sentiment analysis

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March 2, 2018

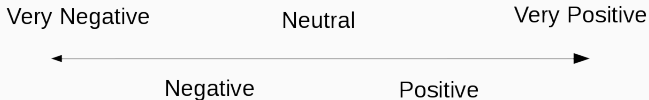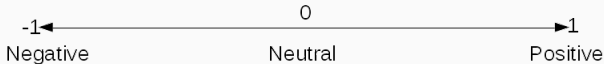School of Computing and Communications, Lancaster University.

What is sentiment analysis

Generally finding the positive and negative opinion within a text.

Text

1. Document e.g. News article
2. Sentence e.g. Headline

Opinion Scales

-1 ←————————— 0 —————————→ 1

Negative — Neutral — Positive

Very Negative — Neutral — Very Positive

←————————————————————→

Negative — Positive

Positive rotten tomato review

tim allen is great in his role but never hogs the scenes from his fellow cast , as there are plenty of laughs and good lines for everyone in this comedy. (Pang et al., 2005)

Finance Example

Falling crude prices, corrections make stocks attractive[1]

[1] http://www.mydigitalfc.com/companies-and-markets/stock-market/falling-crude-prices-corrections-make-stocks-attractive

Finance Example

Falling crude prices, corrections make stocks attractive[2]

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[2]http://www.mydigitalfc.com/companies-and-markets/stock-market/falling-crude-prices-corrections-make-stocks-attractive

Sentiment within finance

Finance Example

Falling crude prices, corrections make stocks attractive[3]

Shell Example

Niger delta oil spill clean-up launched - but could take quarter of a century[4]

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[3] http://www.mydigitalfc.com/companies-and-markets/stock-market/falling-crude-prices-corrections-make-stocks-attractive

[4] https://www.theguardian.com/global-development/2016/jun/02/
niger-delta-oil-spill-clean-up-launched-ogoniland-communities-1bn

Sentiment within finance

Finance Example

Falling crude prices, corrections make stocks attractive[5]
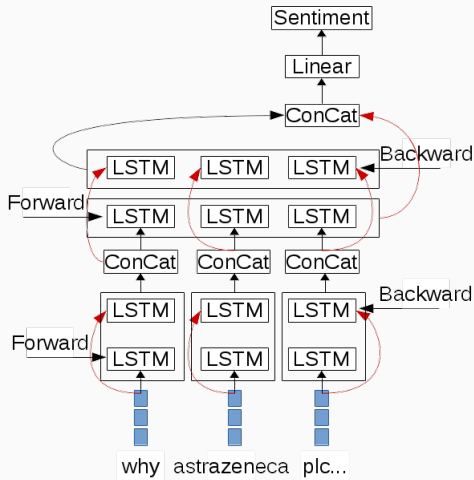
Shell Example

Niger delta oil spill clean-up launched - but could take quarter of a century[6]

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[5] http://www.mydigitalfc.com/companies-and-markets/stock-market/falling-crude-prices-corrections-make-stocks-attractive

[6] https://www.theguardian.com/global-development/2016/jun/02/
niger-delta-oil-spill-clean-up-launched-ogoniland-communities-1bn

What is the state of the art?

Methods	Datasets						
	1	2	3	4	5	6	7
Mitchell et al. (2013)			✓				
Kiritchenko et al. (2014)				✓			
Dong et al. (2014)	✓						
Vo et al. (2015)	✓	✓	✓				
Zhang et al. (2015)			✓				
Zhang et al. (2016)	✓	✓	✓				
Tang et al. (2016b)	✓			✓			
Tang et al. (2016a)				✓			
Wang et al. (2016)				✓			
Chen et al. (2017)	✓			✓	✓		
Liu et al. (2017)	✓	✓	✓				
Wang et al. (2017)	✓					✓	
Marrese-Taylor et al. (2017)				✓			✓
1=Dong et al. (2014), 2=Wilson (2008), 3=Mitchell et al. (2013), 4=Pontiki et al. (2014), 5=Chen et al. (2017), 6=Wang et al. (2017), 7=Marrese-Taylor et al. (2017)							

Table 1: Methods and Datasets

Which implementation is correct?

Authors	Restaurant	Laptop
Tang et al. (2016b)	75.63	68.13
Chen et al. (2017)	78.00	71.83
Tay et al. (2017)	69.73	62.38

■ Original   ■ Re-used the same code   ■ Re-implemented

What we are doing

Methods	Datasets						
	1	2	3	4	5	6	7
Mitchell et al. (2013)			✓				
Kiritchenko et al. (2014)				✓			
Dong et al. (2014)	✓						
Vo et al. (2015)	✓	✓	✓				
Zhang et al. (2015)			✓				
Zhang et al. (2016)	✓	✓	✓				
Tang et al. (2016b)	✓			✓			
Tang et al. (2016a)				✓			
Wang et al. (2016)				✓			
Chen et al. (2017)	✓			✓	✓		
Liu et al. (2017)	✓	✓	✓				
Wang et al. (2017)	✓					✓	
Marrese-Taylor et al. (2017)				✓			✓
1=Dong et al. (2014), 2=Wilson (2008), 3=Mitchell et al. (2013), 4=Pontiki et al. (2014), 5=Chen et al. (2017), 6=Wang et al. (2017), 7=Marrese-Taylor et al. (2017)							

Table 2: Methods and Datasets

The future

1. Transfer learning between related task
2. Transfer learning between languages

Questions?

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Presentation can be found here [7]

📄 Chen, Peng et al. (2017). "Recurrent Attention Network on Memory for Aspect Sentiment Analysis". In: *Proceedings of the 2017 Conference on Empirical Methods in Natural Language Processing*. Copenhagen, Denmark: Association for Computational Linguistics, pp. 463–472. URL: http://aclweb.org/anthology/D17-1048.

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📄 Kiritchenko, Svetlana et al. (2014). "NRC-Canada-2014: Detecting Aspects and Sentiment in Customer Reviews". In: *Proceedings of the 8th International Workshop on Semantic Evaluation (SemEval 2014)*. Dublin, Ireland: Association for Computational Linguistics, pp. 437–442. URL: http://aclanthology.coli.uni-saarland.de/pdf/S/S14/S14-2076.pdf.

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📄 Tang, Duyu et al. (2016b). "Effective LSTMs for Target-Dependent
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International Conference on Computational Linguistics: Technical
Papers*. Osaka, Japan: The COLING 2016 Organizing Committee,
pp. 3298–3307. URL: http://aclanthology.coli.uni-
saarland.de/pdf/C/C16/C16-1311.pdf.

📄 Tay, Yi, Anh Tuan Luu, and Siu Cheung Hui (2017). "Learning to Attend
via Word-Aspect Associative Fusion for Aspect-based Sentiment
Analysis". In: *arXiv preprint arXiv:1712.05403*.

📄 Vo, Duy-Tin and Yue Zhang (2015). "Target-Dependent Twitter
Sentiment Classification with Rich Automatic Features." In: *IJCAI*,
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