



CONTEXT-DEPENDENT OPINION LEXICON TRANSLATION WITH THE USE OF A PARALLEL CORPUS

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Motivation

- Sentiment analysis is an important task
- It highly relies on positive and negative words
- Opinion lexicon is available in English and few other languages
- What if multilingual sentiment analysis?
- Problem: bootstrap opinion lexicon in a target language from a source language



amazon

social network



State of the art

Lexicon creation:

- Manual
- Dictionary based (using word-net...) Hu et al. 2004
- Corpus based
 - Bootstrapping, Hatzivassiloglou et al. 1997
 - Patterns, Turney et al. 2002
 - Classification, Breck et al. 2007

Russian language:

~Classification: Chetviorkin et al. 2010

Multilingual approaches:

- Lexicon translation, simple: Mihalcea 2007; triangulation: Steinberger 2012
- Corpus translation, Mihalcea 2008,2011



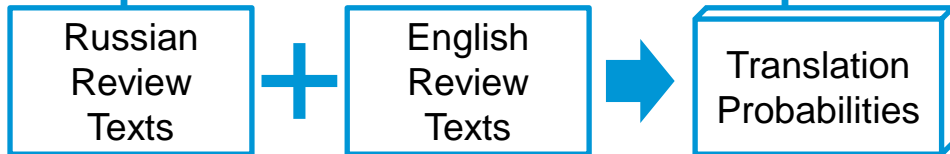
Approach

Get English lexicon (Bing Liu homepage)

Collect a corpus of parallel reviews

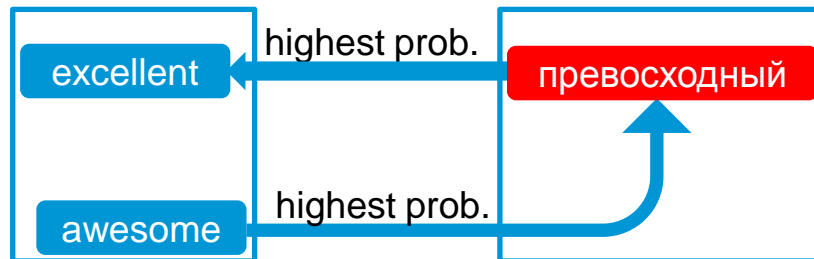
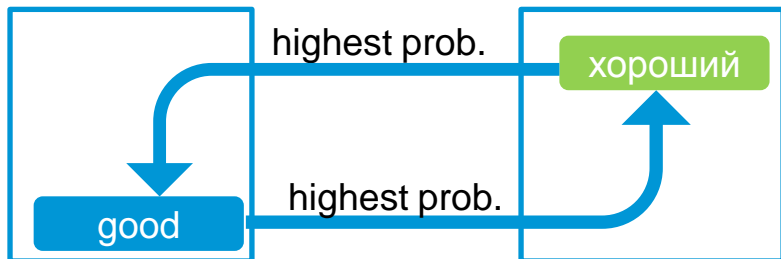
Find parallel texts or use some translations; align them

Compute word lexical translation probabilities



Collect opinion words translations

$$\exists t, s: p_t(s) = \max_i p_i(s) \text{ and } p_s(t) = \max_j p_j(t).$$



	positive	negative
Number of words	2041	4818



Datasets

English lexicon (Bing Liu homepage)

Parallel texts: mobile-review.com

The same reviews on Russian and English

Pseudo-parallel texts: ROMIP 2012 corpus

Part of ROMIP corpus (cameras, films and books reviews) was translated using Google Translate

Google Translate

Using Google Translate for translating English lexicon

	Russian words	English words
Mobile Review	579559	726798
Romip 2012	714533	820241
Bing Liu lexicon	4510	6859



Experiments

- Lexicons built using our approach
 - We got parallel or pseudo-parallel texts
 - Align them using MS aligner
 - Build translation probabilities using GIZA++
 - Create lexicon in a new language
 - Normalize words using myStem
- Lexicon built using Google Translate (GT)
 - Translate English lexicon in GT (Bing Liu-GT)
 - Leave only those words, backward translation of which is equivalent to the target word (Bing Liu-GT filtered)

Lexicon	Positive	Negative	Total
Bing Liu (English)	2041	4818	6859
Bing Liu-GT	1443	3067	4510
Bing Liu-GT filtered	907	2037	2944
Mobile Review	163	182	345
ROMIP-GT	706	1311	2017
ROMIP-GT merged	1057	1812	2869
Union:	1993	4040	6033

		Words		
Intersection		positive	negative	total
Mobile Review	ROMIP-GT merged	118	88	206
Mobile Review	Bing Liu-GT	132	178	310
ROMIP-GT merged	Bing Liu-GT	626	1006	1632
ROMIP-GT merged	Bing Liu-GT filtered	436	786	1222



Lexicon manual assessment


Lexicon	Precision
Bing Liu-GT	0,79
Bing Liu-GT filtered	0,87
Mobile Review	0,76
ROMIP-GT	0,83
ROMIP-GT merged	0,82

Mobile Review vs ROMIP-GT	
рад	унылый
плюс	замыкать
массивный	размыто
пресс	бесстыдный
конструктивный	ненадежный
сноровка	победный
определяющий	подозревать
недорогой	мешок
тихий	нечитать
мгновенный	бессистемный
гармонично	дьявольский
драгоценность	холуй
выдержанный	табу
неповрежденный	лаж
стильный	сложноватый

Random 15 unique words from both lexicons



Sentiment classification with the use of lexicons

Lexicon	Method	MicroP	MicroR (Acc)	MacroR	MacroF1
	Perceptron	0,84	0,84	0,59	0,60
	Perceptron + TfIdf	0,84	0,84	0,62	0,63
Romip - GT	Binary Voc	0,76	0,68	0,59	0,58
	Frequency Voc	0,79	0,72	0,59	0,59
Romip - GT merged	Binary Voc	0,84	0,80	0,59	0,61
	Frequency Voc	0,86	0,82	0,59	0,61
Bing Liu - GT	Binary Voc	0,65	0,60	0,62	0,54
	Frequency Voc	0,73	0,69	0,59	0,56
Bing Liu - GT filtered 	Binary Voc	0,78	0,78	0,59	0,58
	Frequency Voc	0,77	0,72	0,58	0,58
Mobile Review	Binary Voc	0,67	0,52	0,50	0,49
	Frequency Voc	0,66	0,53	0,51	0,50

 -best precision by manual assessment

CONCLUSION

Results

- A novel method for opinion lexicon projection from a source language to a target language
- We need only parallel text
- The quality of created lexicons was evaluated manually and in sentiment classification benchmark

Future work

- Work with opinion phrases
- Investigate other translation options instead of the most probable ones
- Other language pairs
- Other tasks:
 - Subjectivity lexicon projection
 - Projection of document features



Thank you

