To Normalize or Not to Normalize: The Impact of Normalization on Part-Of-Speech Tagging

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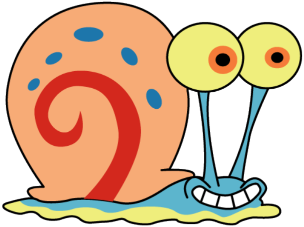
Problems

Gary	did	gd	protectin	SpongeBob	house	!
NNP	VBD	NN	NN	NN	NN	.



Problems

Gary	did	gd	protectin	SpongeBob	house	!
NNP	VBD	NN	NN	NN	NN	.

Gary	did	good	protecting	SpongeBob’s	house	!
NNP	VBD	JJ	VBG	POS	NN	.

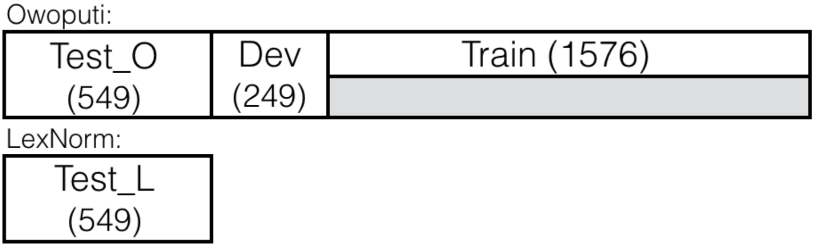
Problems

Experiments

- Normalization for POS tagging
- Semi-supervised adaptation of a POS tagger
- Complementary

Experimental setup

Train data



Owoputi:

Test_O (549)

Dev (249)

Train (1576)

LexNorm:

Test_L (549)

Data from: Chen Li, Yang Liu. Joint POS Tagging and Text Normalization for Informal Text. IJCAI 2015

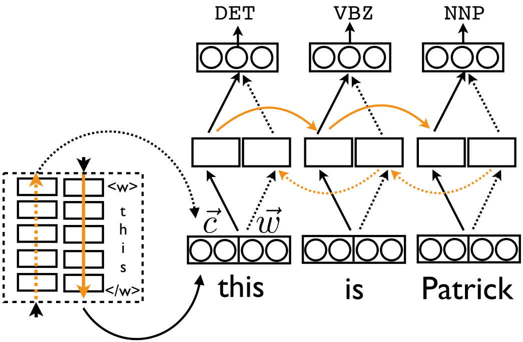
Experimental setup

Raw data

- Wikipedia
- Tweets
- No gazetteers, hard coded rules, etc.!

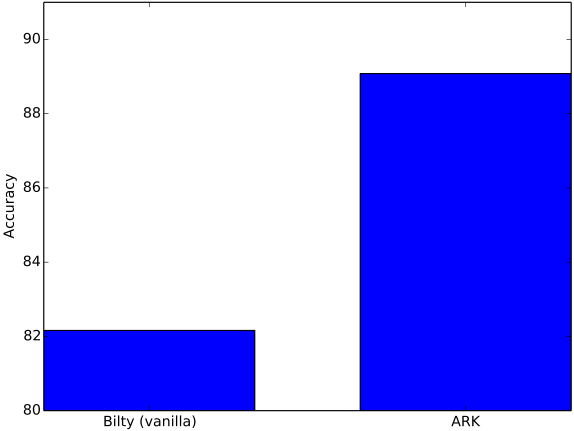
Experimental setup

Bilty



https://github.com/bplank/bilstm-aux

Experimental setup



To Normalize

ur dat dude frm spongebob ?

orig	ur	dat	**dude**	frm	spongebob
w2v	yur your	tht **that**	guy dude	frm fron	Spongebob **SpongeBob**
aspell	Ur Eur	DAT dart	dude dud	**from** Fromm	sponge bob sponge-bob
lookup	**you're** your	that	dude		spongebob

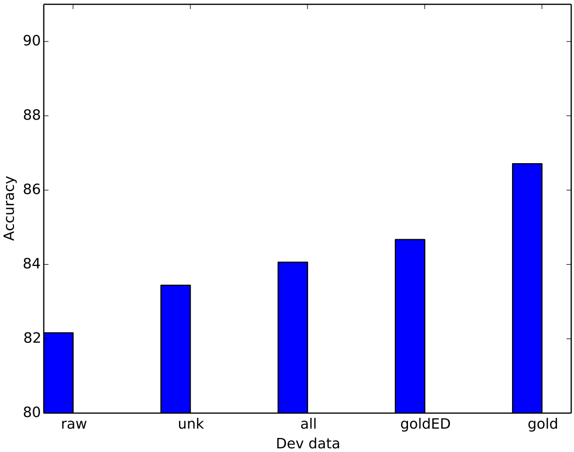
N-grams

Random Forest

you're that dude from SpongeBob ?

https://bitbucket.org/robvanderg/monoise

To Normalize



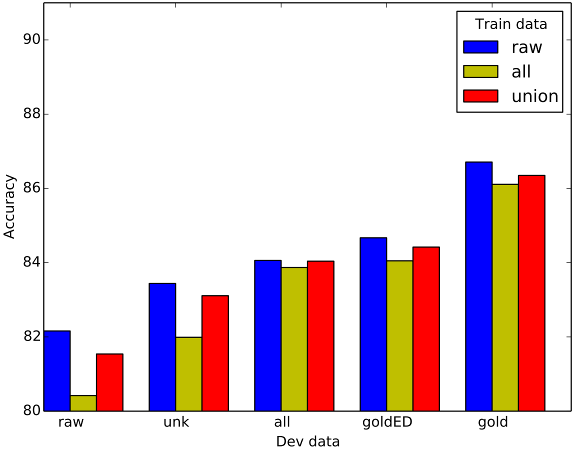
To Normalize

non-canonical		canonical
Train		
Test		
Train		
Test	↦	

To Normalize

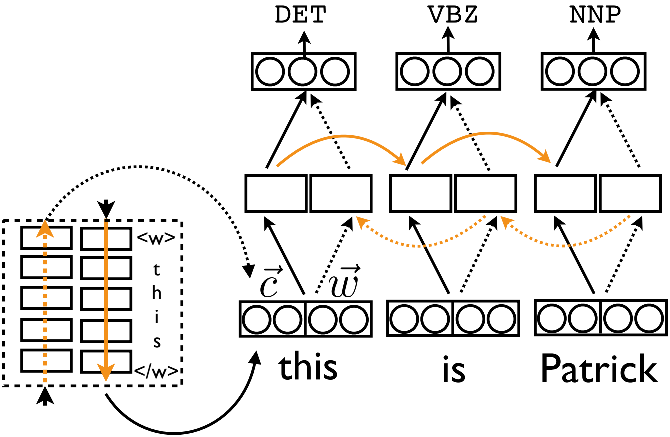
non-canonical		canonical
Train		
Test		
Train		
Test	↦	
Train	↦	
Test	↦	

To Normalize

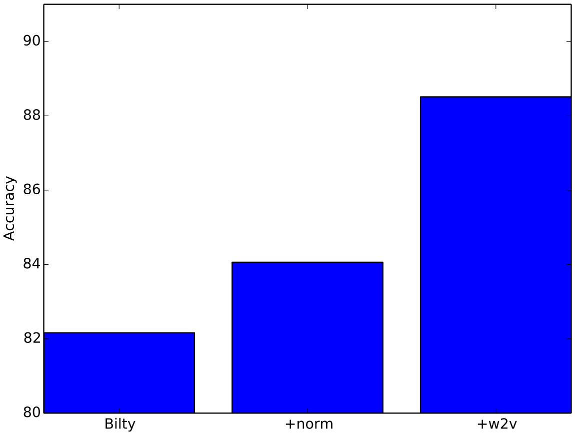


Or Not to Normalize

Word Embeddings



Or Not to Normalize



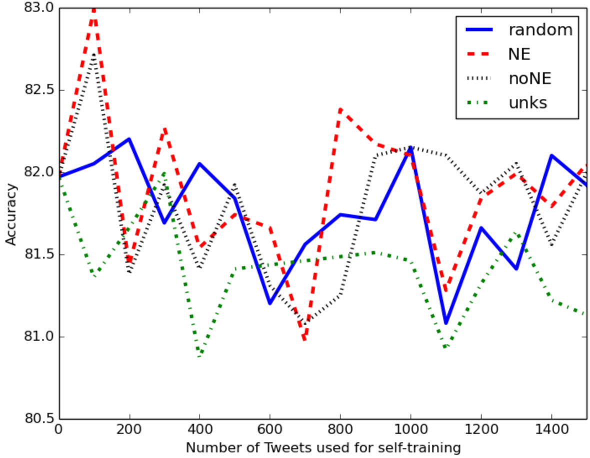
Or Not to Normalize

Self training (Tweets)

- Random Tweets
- Tweets with NE
- Tweets without NE
- Tweets containing unknown words

Or Not to Normalize

Self training (Tweets)



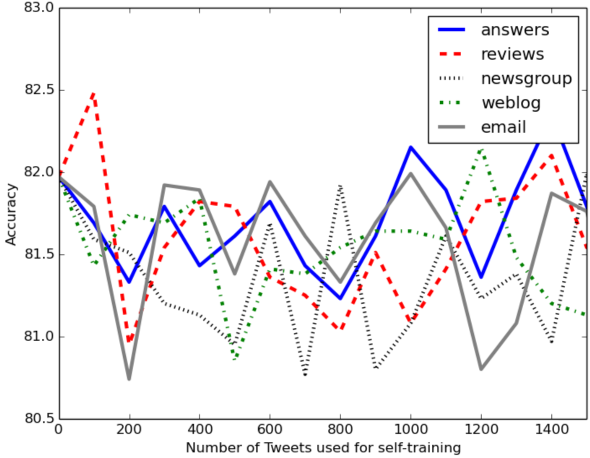
Or Not to Normalize

Self training (EWT)

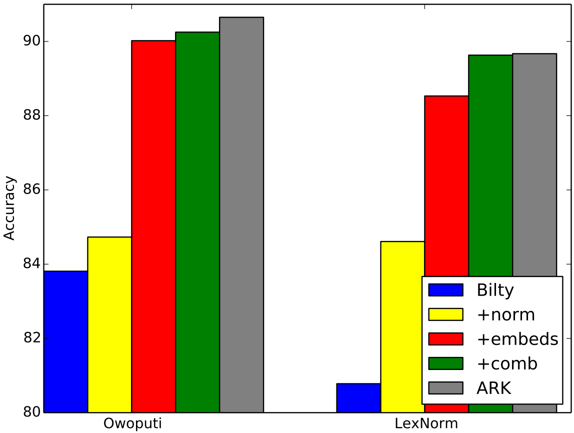
- Answers
- Reviews
- Newsgroups
- Weblog
- E-mail

Or Not to Normalize

Self training (EWT)



Combine


Accuracy
90
88
86
84
82
80
Owoputi
LexNorm
Bilty
+norm
+embeds
+comb
ARK

Conclusions

- Normalization improves the baseline tagger
- Semi-supervised learning works even better
- Combining improves performance slightly
- Performance is close to ARK tagger

Conclusions

Negative results

- Do not normalize training data
- Self-training with pre-selection is not effective

Conclusions

Future work

- Self-training with post-selection
- Domain adaptation setup (train on canonical data)
- Joint/integrated approach

Conclusions

Thx 4 ur attention