Parser Adaptation for Social Media by Integrating Normalization

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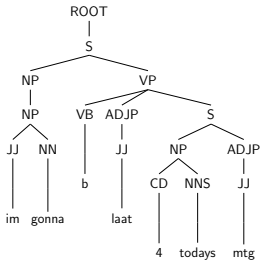
Problem

Problem

Problem



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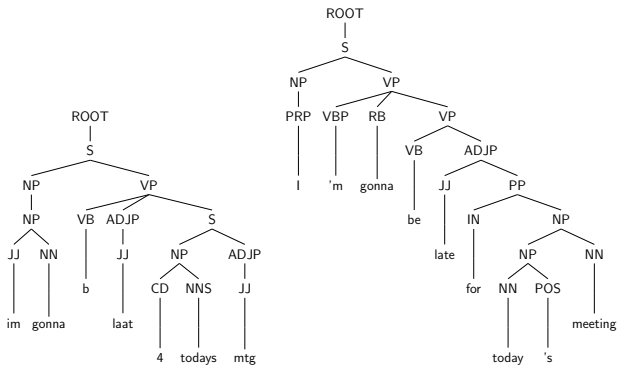
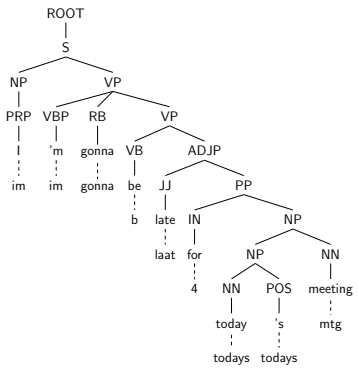


Idea



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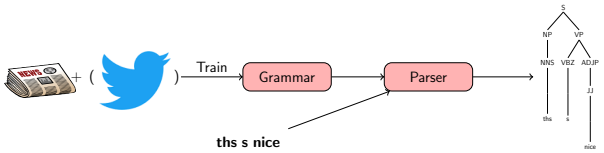

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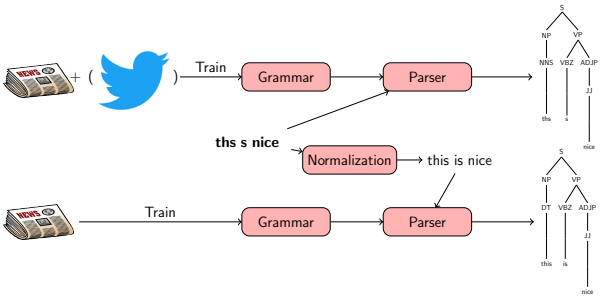

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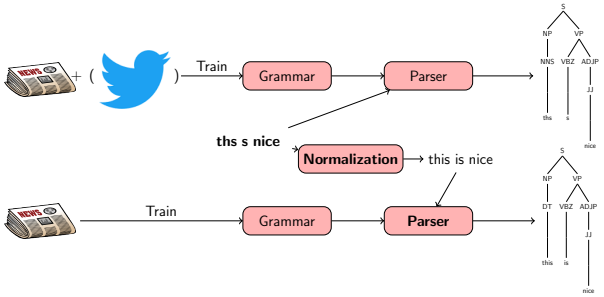
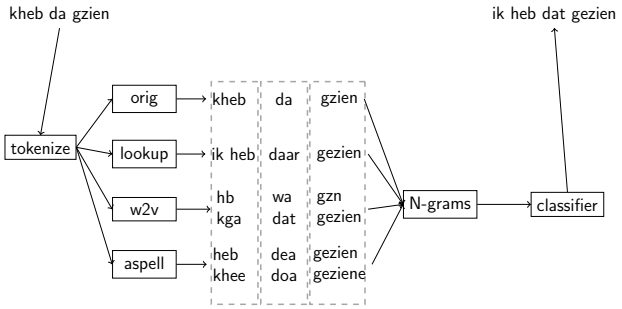
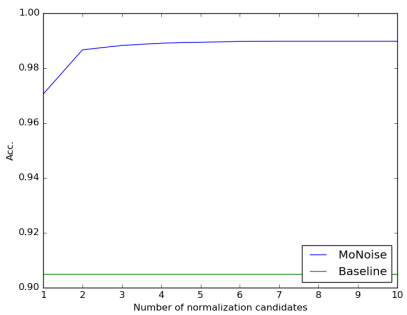


Normalization

Mo'Noise



Normalization



Normalization

Not found:

ight	alright
naw	no
acc	actually
shotti	shotgun
ibe	i'm
unliked	disliked
pgh	pittsburgh
1	one

Parsing

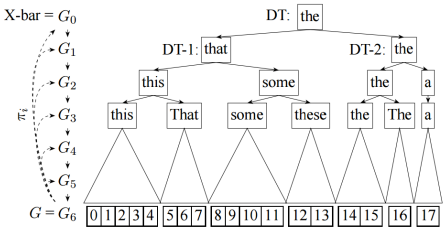
Dataset:

- Jennifer Foster, Ozlem Cetinoglu, Joachim Wagner, Joseph Le Roux, Joakim Nivre, Deirdre Hogan and Josef van Genabith, 2011. From News to Comment: Resources and Benchmarks for Parsing the Language of Web 2.0.
- 519 tweets (250-269)
- Constituency trees (EWT)
- Less noisy compared to normalization corpora

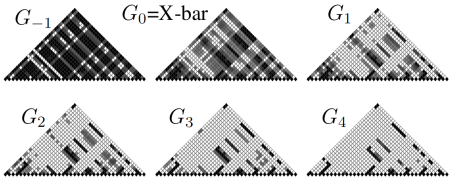
Parsing

- Berkeley parser (CYK, PCFG-LA)
- Trained on EWT and WSJ

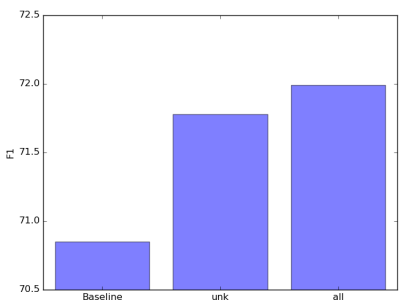
Parsing



Parsing



Parsing



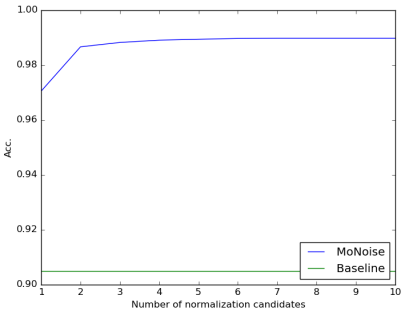
Parsing

- Nice improvement,
- but:

Parsing

- Nice improvement,
- but:
- Normalization is not perfect
- Information is lost

Parsing



Parsing as Intersection

- Bar-hilel (1961)
- "The intersection of a context-free language with a regular language is again a context-free language"

Parsing as Intersection

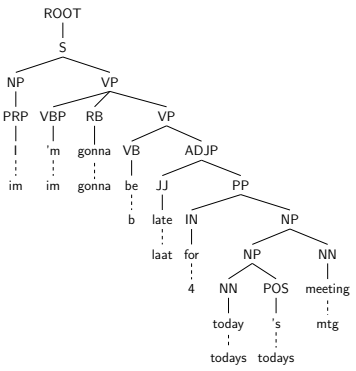
- Bar-hilel (1961)
- "The intersection of a context-free language with a regular language is again a context-free language"
- Ability to find optimal parse tree over a word graph

Parsing as Intersection

In practice:

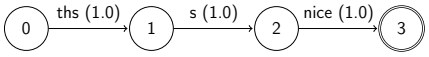
- Treat words as constituents

Parsing as Intersection

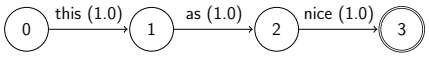


Parsing as Intersection

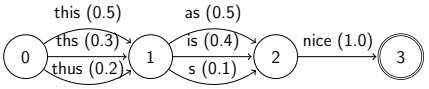
Raw sent:



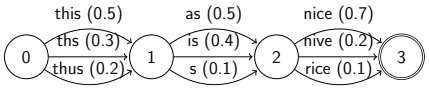
Best norm:



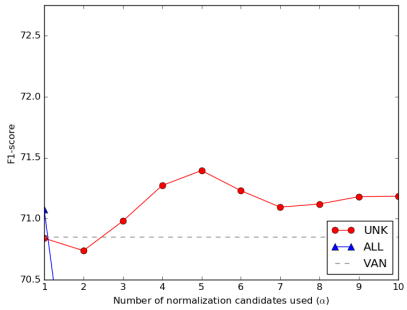
UNK:



ALL:



Parsing as Intersection



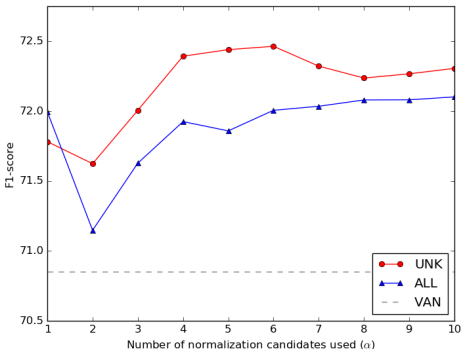
Parsing as Intersection

Adjust normalization weight:

$$P_{chart} = (1 + \beta^2) * \frac{P_{norm} * P_{pos}}{(\beta^2 * P_{norm}) + P_{pos}} \quad (1)$$

Evaluation

Development data:



Evaluation

Test data:

Parser	dev	test
Stanford parser	66.05	61.95
Berkeley parser	70.85	66.52
Best norm. seq.	72.04	66.94
Integrated norm.	72.77	**67.36***
Gold POS tags	74.98	71.80

Evaluation

But: normalization does not improve!

- Why?

Evaluation

But: normalization does not improve!

- Why?
- Is this still domain adaptation?

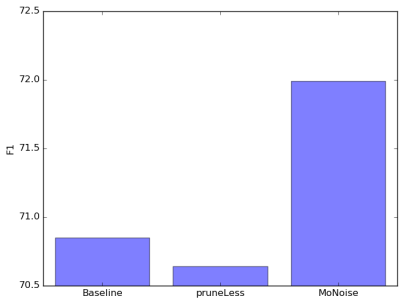
Evaluation

But: normalization does not improve!

- Why?
- Is this still domain adaptation?
- Or do we just prune less?

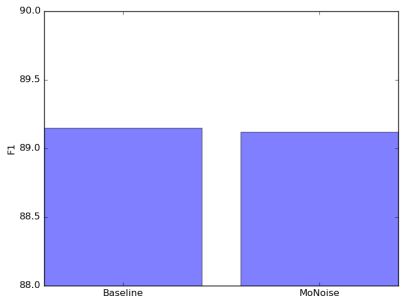
Evaluation

Does pruning help on this domain?



Evaluation

Does our model improve parsing of other domains?



Evaluation

- Why?

Evaluation

- Why?
- Sometimes, we use wrong normalizations that share syntactic properties with the original word

Evaluation

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Evaluation

- Why?
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- ...

Evaluation

- Why?
- Sometimes, we use wrong normalizations that share syntactic properties with the original word
- Is this still domain adaptation?
- ...
- Do we just prune less?

Evaluation

- Why?
- Sometimes, we use wrong normalizations that share syntactic properties with the original word
- Is this still domain adaptation?
- ...
- Do we just prune less?
- Probably not

Evaluation

- Why?
- Sometimes, we use wrong normalizations that share syntactic properties with the original word
- Is this still domain adaptation?
- ...
- Do we just prune less?
- Probably not
- Don't forget: the normalization is already quite good!

Evaluation

`https://bitbucket.org/robvanderg/monoise`

Conclusion

- Word embeddings and aspell complement each other well for the normalization task
- A random forest classifier works very well for ranking normalization candidates
- Normalization most useful when integrated into the parser
- However, the improvement is not always a result of the correct normalization
- If integration is not an option; do not filter the words before normalization

Conclusion

Future work:

- Improve normalization by parsing
- Unsupervised normalization
- Reranking (lexicalized parsing?)
- How can we adapt RNN-parsers

Conclusion