Automatically Creating a Lexicon of Verbal Polarity Shifters: Mono- and Cross-lingual Methods for German

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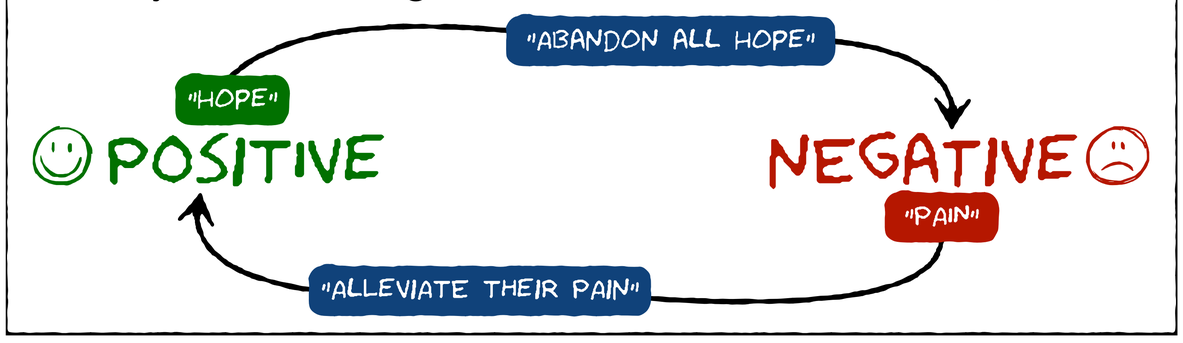
Introduction

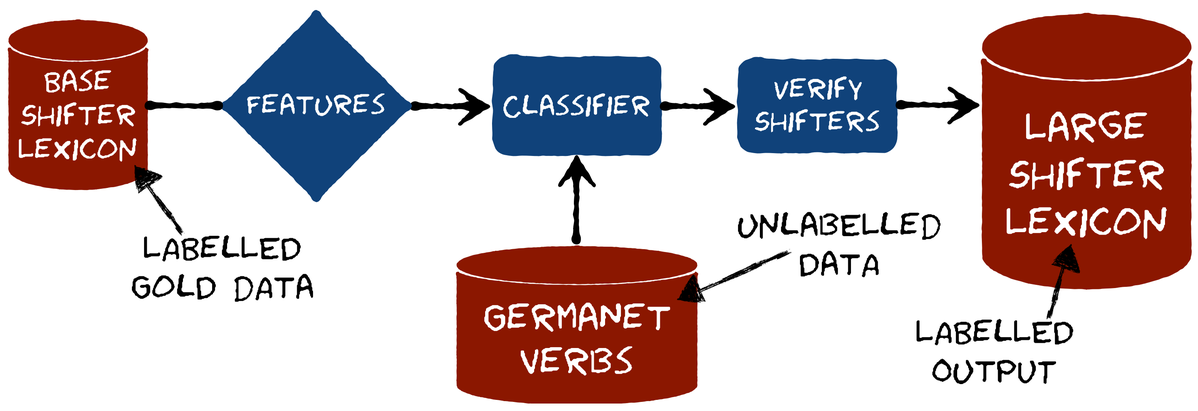
Polarity Shifters

Shifters are content words that affect polarities in ways that are very similar to negation words like *no*, *not*, *neither*, etc.



Goal: A list of German verbs that are polarity shifters.
Uses: NLP tasks affected by negation, e.g. polarity classification.

Bootstrapping Approach



Task: Binary classification: Shifter vs Non-shifter
Gold Data: 2000 German verbs (11% shifters).
Unlabelled Data: 7262 German verbs.

Source	Features
Data	Similarity to Negation, Polarity Clash, Verb Particles, Co-occurrence with *any*, Anti-Shifter
Resource	GermaNet, Salsa FrameNet, EffektGermaNet
Xling	Bilingual Dictionary, Cross-lingual Embedding

Will this work? It does for English (Schulder et al., IJCNLP 2017).
What's new? Applied to German, added cross-lingual features.
Why not deep learning? Not enough data!

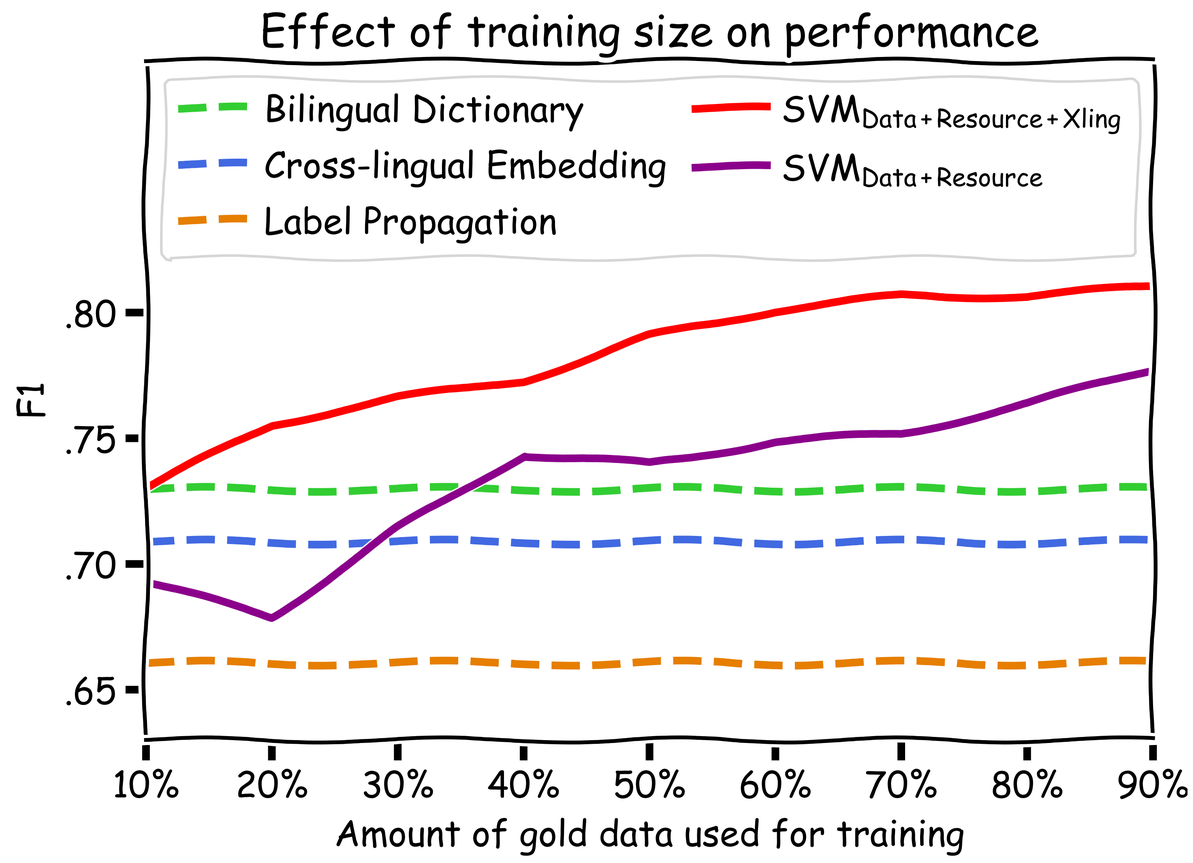
Results

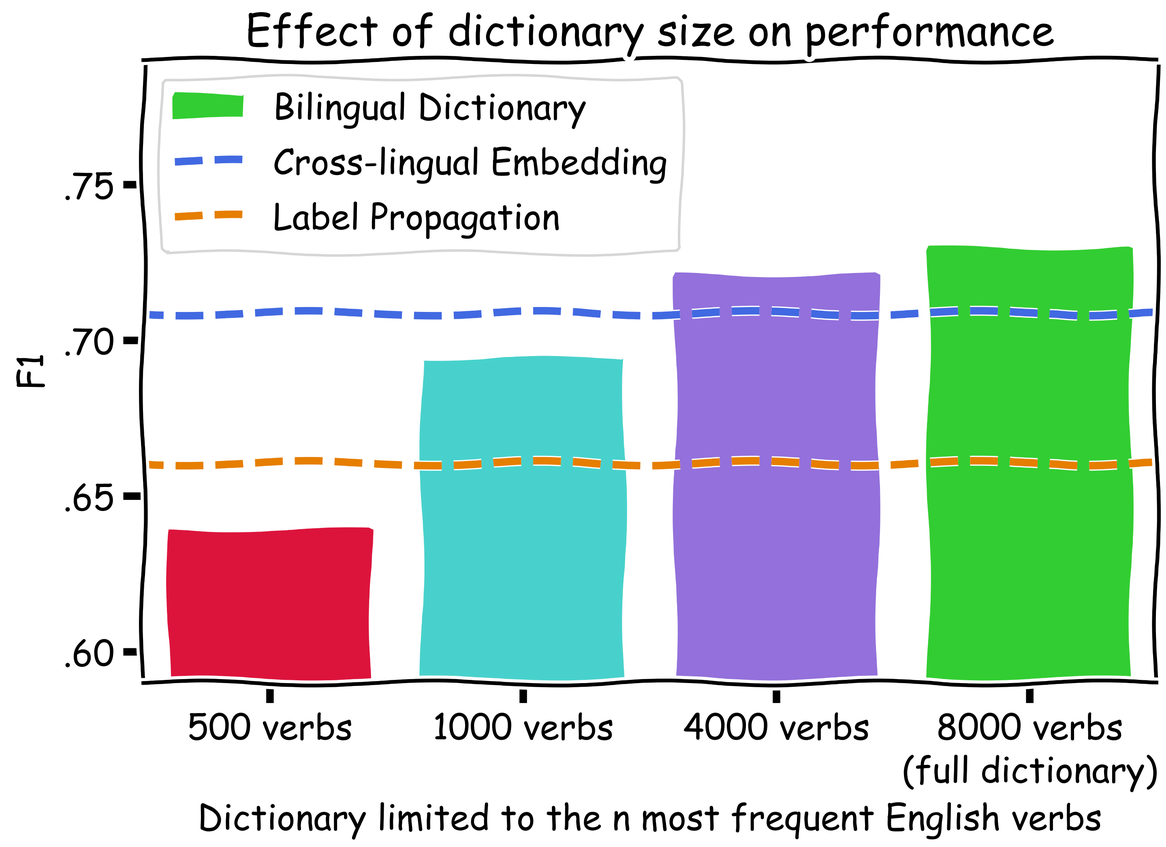
Output: Lexicon of 677 German verbal shifters.
Data: `https://github.com/uds-lsv/coling2018`
Lessons learned:

- Classification of shifters works for German, too.
- Cross-lingual features are strong feature addition.
- Dictionary and embeddings are both useful.

Evaluation

	Classifier	Prec	Rec	F1
Base	Majority Label	44.4	50.0	47.0
	Label Propagation	67.2	65.0	66.1
Xling	Cross-lingual Embedding	67.6	74.6	70.9
	Bilingual Dictionary	69.2	77.3	73.0
SVM	Data	60.8	72.6	66.2
	Resource	79.4	73.9	76.4
	Data+Resource	79.0	76.7	77.7
	Data+Resource+Xling	**80.3**	**82.0**	**81.0**





Future Extension to Other Languages

Sounds great!
What approach should I use for a particular language?