UNIVERSITAS SCIENTIARUM SZEGEDIENSIS

Research Group on Artificial Intelligence

Wikipedia-based methods to identify noun compounds in running texts

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Multiword Expressions

- proper treatment of multiword expressions (MWEs) is essential
  - MWEs are lexical items that contain space
- subtype: Noun compounds (NCs)
  - A compound is a lexical unit that consists of two or more elements that exist on their own
- frequent in language
  - 67.3% of the sentences contain NC

Corpora used for evaluation

Corpus	Sentence	Token	NC	2	3	4≤
Wiki50	4,350	114,570	2929	2442	386	101
BNC dataset	1,000	21,631	485	436	40	9

WP based method for detecting NCs

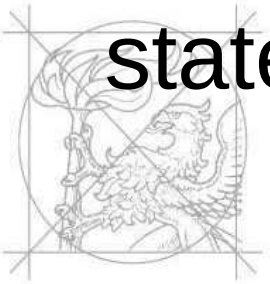
- lowercase n-grams from English Wikipedia links were collected
- three methods:
  - marked as a noun compound if it occurred in the list.
  - merge of two possible noun compounds:
    - if A B and B C both occurred in the list, A B C was also accepted as a noun compound
  - it occurred in the list and its Part of Speech (POS)-tag sequence matched one of the previously defined patterns (e.g. JJ

Results on Wiki50

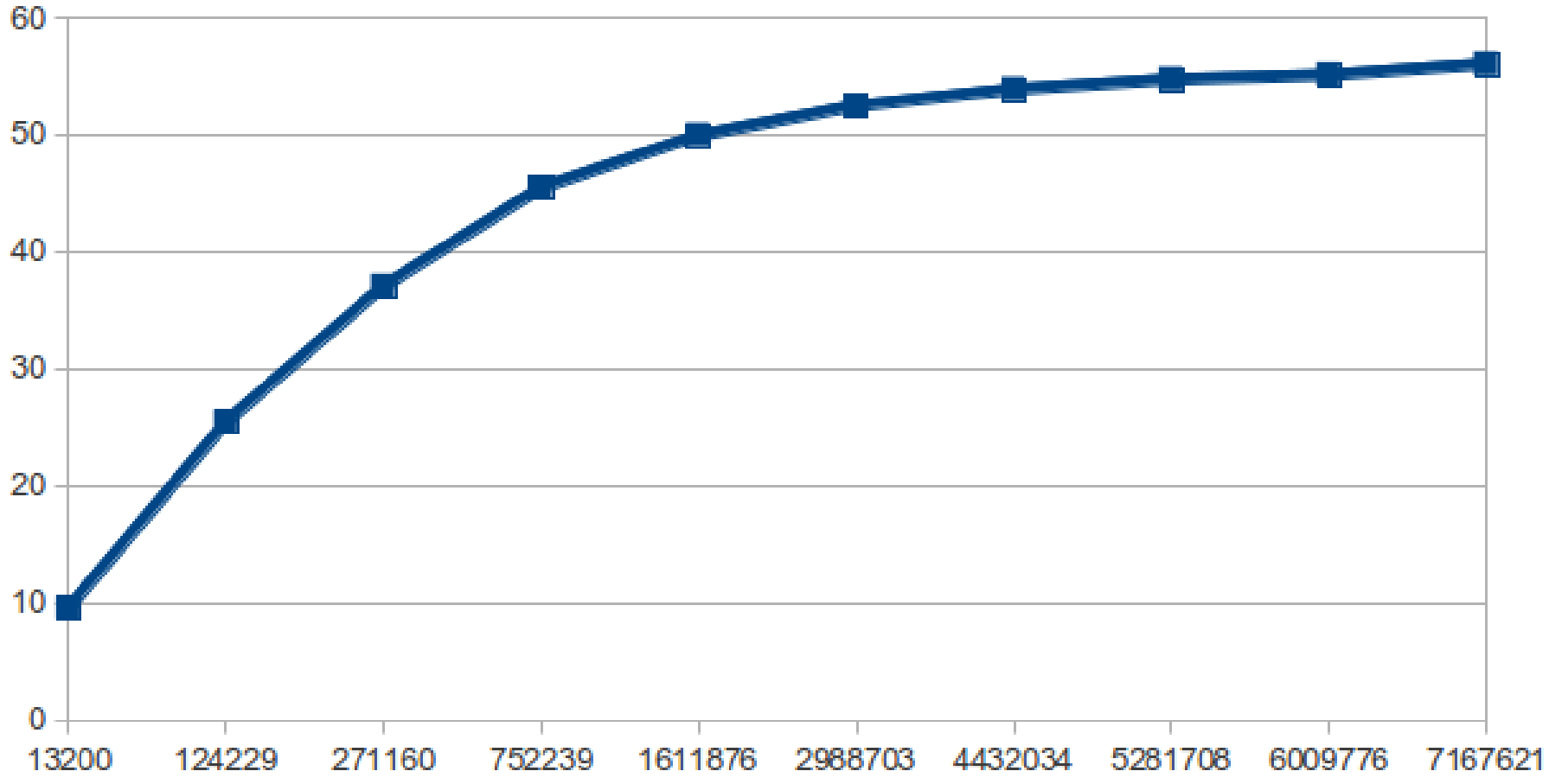
Method	Precision	Recall	F-Score
Match	37,7	54,73	44,65
Merge	40,06	57,63	47,26
POS-rules	55,56	49,98	52,62
Combined	62,66	50,69	56,04

Dictionary based method

- we investigated how the size of Wikipedia influences the results
- NC list from the actual Wikipedia status of the beginning of each year was collected
- The English Wikipedia was launched in 2001 → the first list was collected from the state of 1 January 2002.



Results of the expansion of the number of Wikipedia pages.



Machine Learning approaches

- first-order linear chain Conditional Random Fields (CRF) classifier
- basic feature set was extended with noun compound specific features.
  - Noun compound lists were added to the dictionaries.
  - The shallow linguistic features were extended with the POS-rules
  - the other entities were also specified in the sentence

Machine Learning results

- leave-one-document-out scheme on Wiki50 with 68,16 F-score
- automatically generated training database was also used
  - the training set consisted of randomly selected Wikipedia pages
  - documents were not manually annotated
  - dictionary based NC labeling was considered as the gold standard

Machine Learning results

	Recall	Precision	F-Score
LOO Wiki50	64,39	72,40	68,16
WikiTrain Wiki50	56,57	55,57	56,06
Dict. Wiki50	50,70	62,66	56,05
WikiTrain BNC	38,02	41,53	39,70
Dict BNC.	31,40	40,75	35,47

Conclusions

- dictionary vs machine learning based methods
  - heavily relied on Wikipedia
- examined the results depending on the expansion of WP over the years
  - the growth of Wikipedia can improve the results
  - the rate of improvement is reduced with time

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NEW SZÉCHENYI PLAN

HUNGARY'S RENEWAL

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Thank you for your attention!