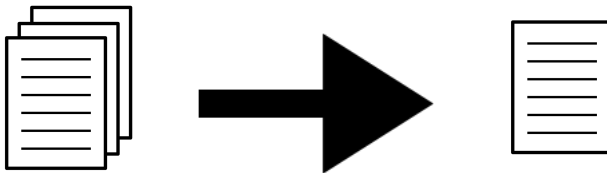


Automatic Detection of Linguistic Quality Violations

Jonathan Oberländer

Bachelor Thesis Defense
Universität des Saarlandes
21.08.2014

Automatic Summarization



Automatic Summarization

- ▶ **Single-Document:** One document
- ▶ **Multi-Document:** Multiple documents on the same topic

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	Single-document	Multi-document
Abstractive		
Extractive		

Summarization systems should produce coherent and grammatical output.

Summarization systems **don't produce coherent and grammatical output.**

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⇒ LQVCorpus (Friedrich et al., 2014)

Annotated results of TAC 2011 Guided Summarization task
(Owczarzak and Dang, 2011)

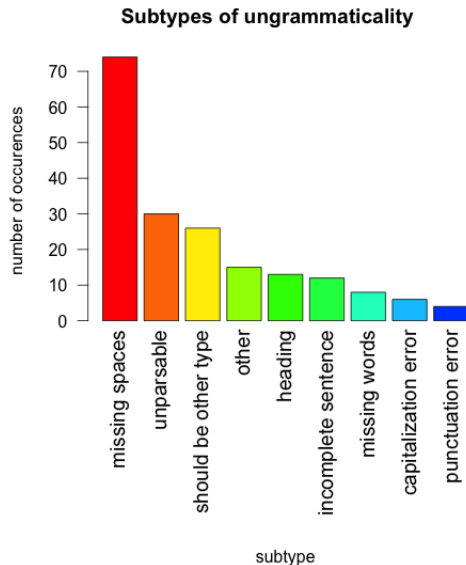
Annotated results of TAC 2011 Guided Summarization task
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- ▶ Entity level:
 - ▶ FM-EXPL, SM+EXPL
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 - ▶ PRN-ANT, PRN+MISLA
 - ▶ ACR-EXPL

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- ▶ Entity level:
 - ▶ FM-EXPL, SM+EXPL
 - ▶ DNP-REF, INP+REF
 - ▶ PRN-ANT, PRN+MISLA
 - ▶ ACR-EXPL
- ▶ Clause level:
 - ▶ **incomplete sentence (INCOMPLSN)**
 - ▶ **inclusion of datelines (INCLDATE)**
 - ▶ **other ungrammatical form (OTHRUNGR)**
 - ▶ no semantic relatedness (NOSEMREL)
 - ▶ **redundant information (REDUNINF)**
 - ▶ no discourse relation (NODISREL)

Ungrammaticality (OTHRUNGR+INCOMPLSN)



Detecting missing spaces

*“A strong earthquake measuring 7.8 magnitude struck **Wenchuancounty** of Sichuan Province on Monday, leaving at least **12,000people** died and thousands more injured.”*

*“Virginia Tech reported a campus shooting Monday and told **studentsto** stay inside their residences and away from windows.”*

*“A gunman opened fire on classrooms at Virginia Tech University **onMonday** morning, killing at least 30 people before turning his **gunon** himself in the bloodiest school shooting in US history.”*

Unknown Tokens

Idea:

Sentence contains violation iff any word \notin known tokens

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known tokens?

- ▶ Source documents available? \rightarrow all tokens in source documents = **UnknownTokens**_{source}
- ▶ Otherwise \rightarrow **UnknownTokens**_{general}

- ▶ Tokens from (parts of) Gigaword = **UnknownTokens_{gw}**

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- ▶ + Wikipedia = **UnknownTokens_{gw+heur+ner+wiki}**

UnknownTokens: Evaluation

	Missing spaces			No missing spaces		
	P	R	F	P	R	F
Baseline	0.0	0.0	0.0	94.8	100	97.3
UT_{gw}	15.0	98.7	26.0	99.9	69.1	81.7
UT_{gw+heur}	30.5	97.3	46.5	99.8	87.8	93.4
UT_{gw+heur+ner}	35.5	97.3	52.0	99.8	90.3	94.8
UT_{gw+heur+ner+wiki}	70.3	96.0	81.2	99.8	97.8	98.8
UT_{source}	95.9	94.6	95.2	99.7	99.7	99.7

RandomForest (Breiman, 2001) to train decision trees

Features:

- ▶ classification from **UnknownTokens**

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Features:

- ▶ classification from **UnknownTokens**
- ▶ perplexity scores from language model trained on Gigaword
- ▶ number of words

RandomForest: Evaluation

	Precision	Recall	F-Score
Ungrammatical	59.6	29.3	39.3
Not ungrammatical	90.1	97.0	93.4
Weighted Average	86.1	88.1	86.3

BLACKSBURG, Virginia 2007-04-16 18:34: 44 UTC A gunman opened fire in a dorm and classroom at Virginia Tech on Monday, killing at least 30 people in the deadliest shooting rampage in U.S. history.

BERLIN, May 13(Xinhua) The German government announced on Tuesday that it is to provide 500, 000 euros(around 770, 000 U.S. dollars) in aid for earthquake victims in Sichuan Province of China.

00 a.m. People are panicking.

Detecting Datelines

```
UTC |  
^\d{4}-\d{2}-\d{2} |  
^[A-Z]{3,} |  
^(Jan|Feb|Mar|Apr|May|Jun|Jul|Aug|Sep|Oct|Nov|Dec)
```

foo bar

foo bar

foo bar

foo bar

- Breiman, L. (2001). Random forests. *Machine learning*, 45(1):5–32.
- Finkel, J. R., Grenager, T., and Manning, C. (2005). Incorporating non-local information into information extraction systems by gibbs sampling. In *Proceedings of the 43rd Annual Meeting on Association for Computational Linguistics*, pages 363–370. Association for Computational Linguistics.
- Friedrich, A., Valeeva, M., and Palmer, A. (2014). Lqvsumm: A corpus of linguistic quality violations in multi-document summarization.
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