LQVSumm: A Corpus of **L**inguistic **Q**uality **V**iolations in Multi-Document **Summ**arization

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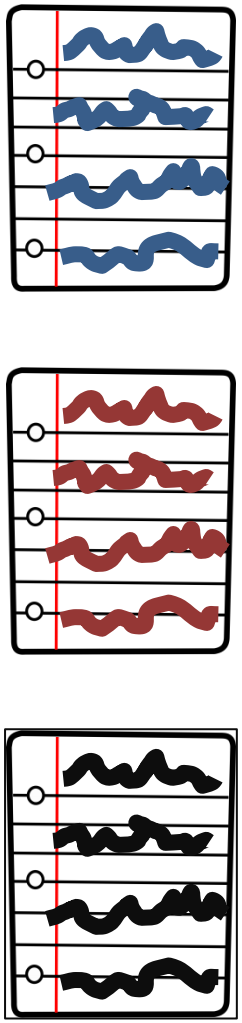
SAARLAND UNIVERSITY, GERMANY

Extractive Multi-Document Summarization



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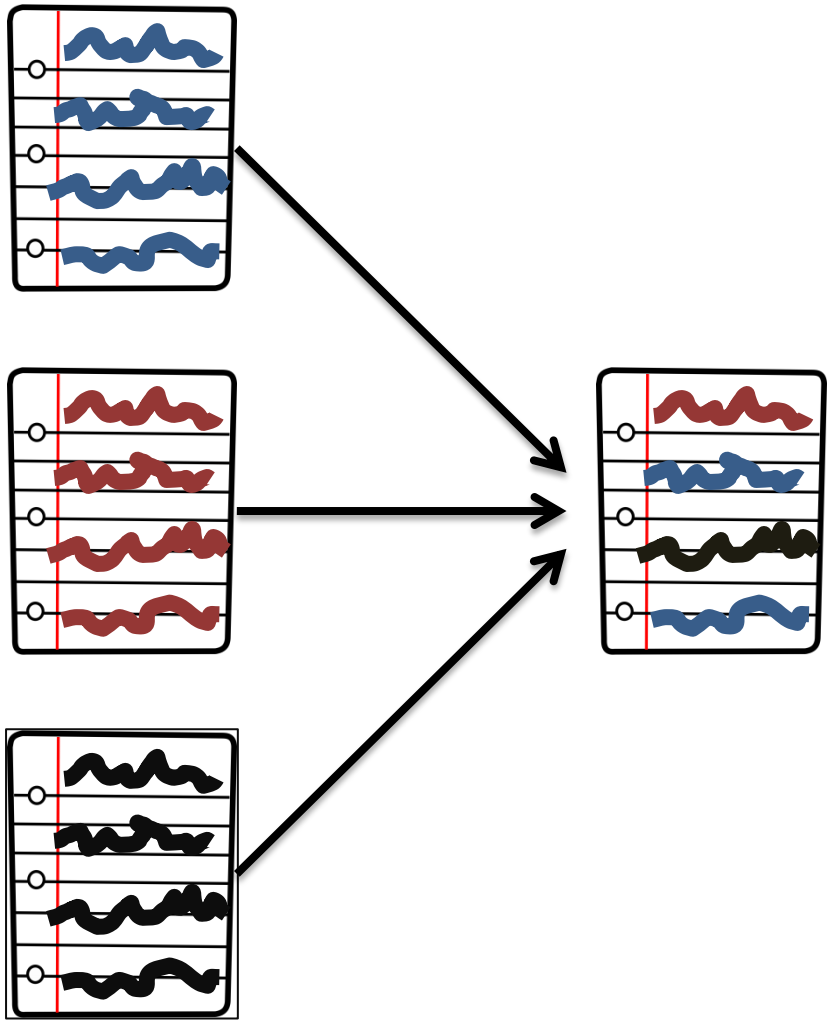
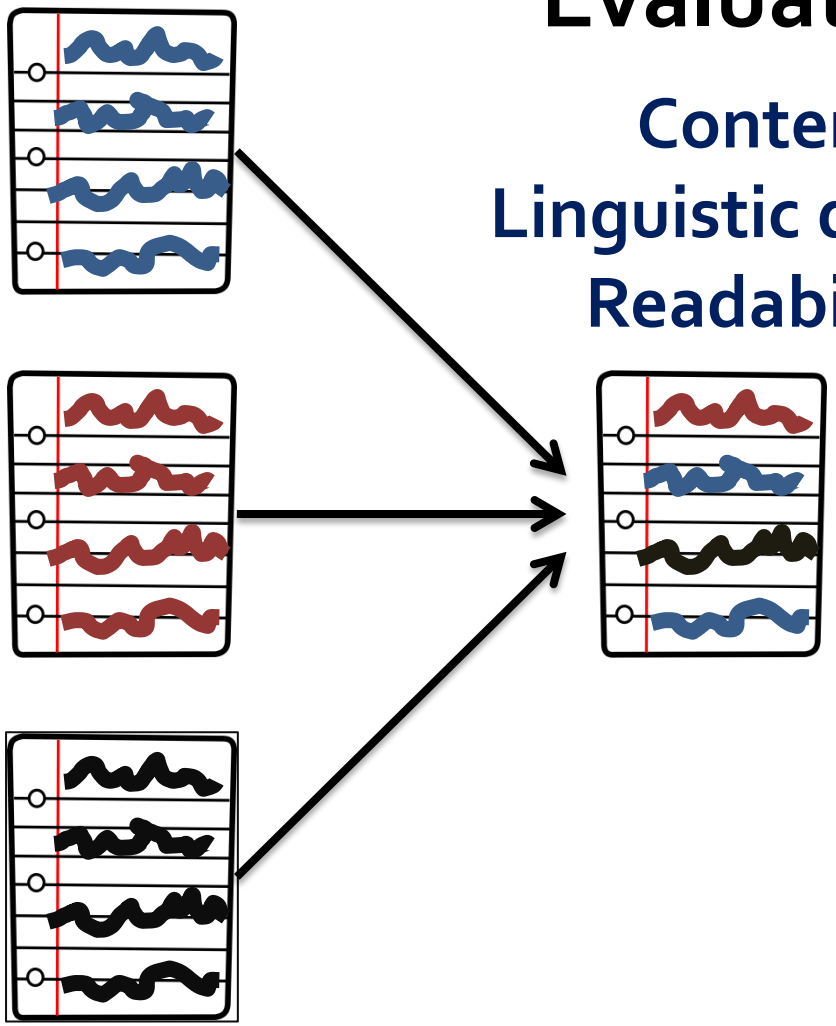


Extractive Multi-Document Summarization

Evaluation

Content?
Linguistic quality / Readability?



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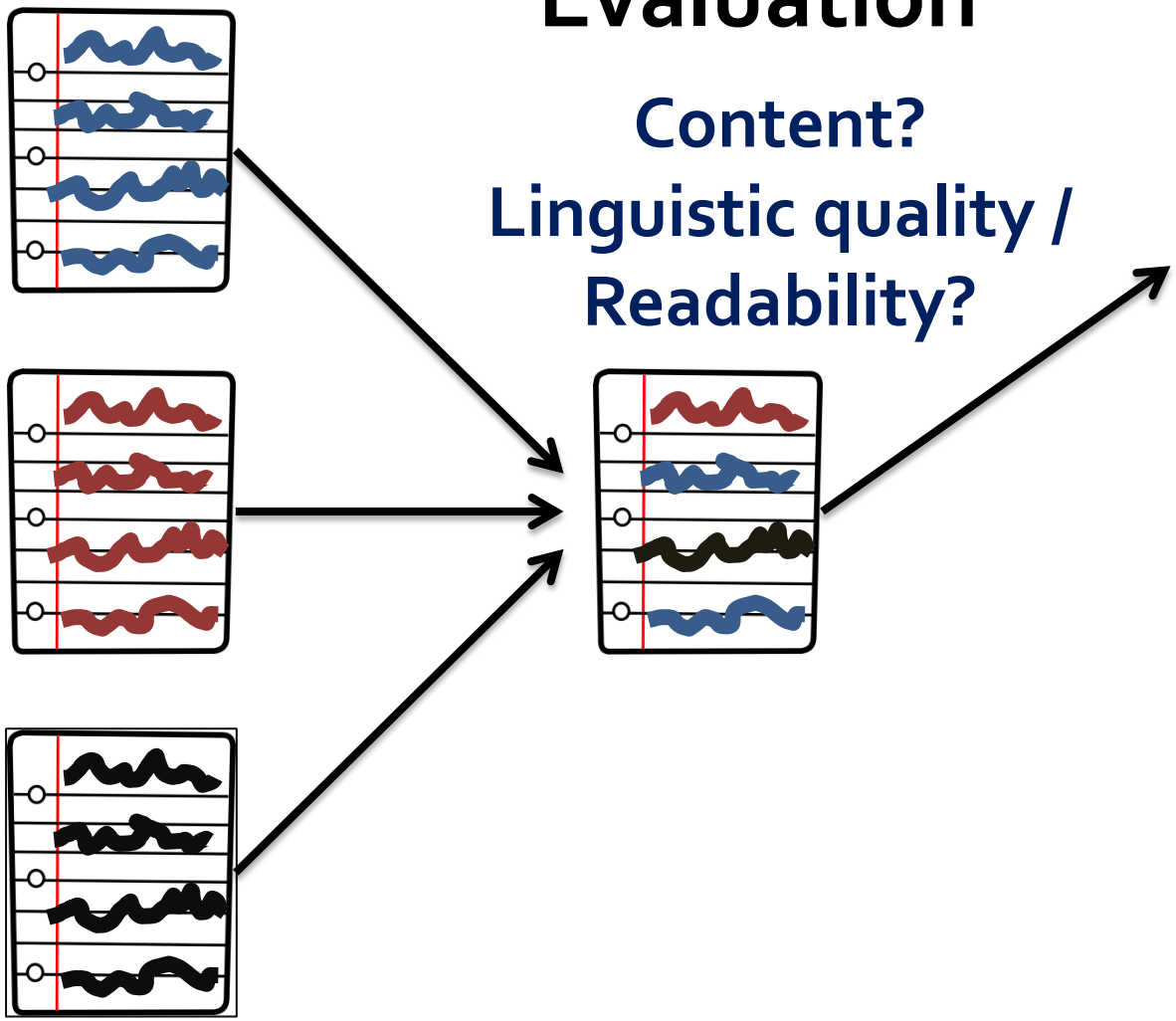

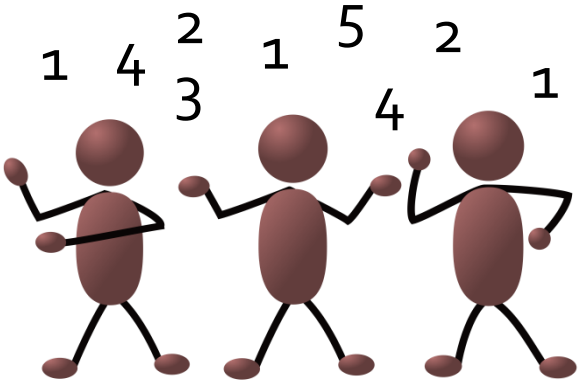

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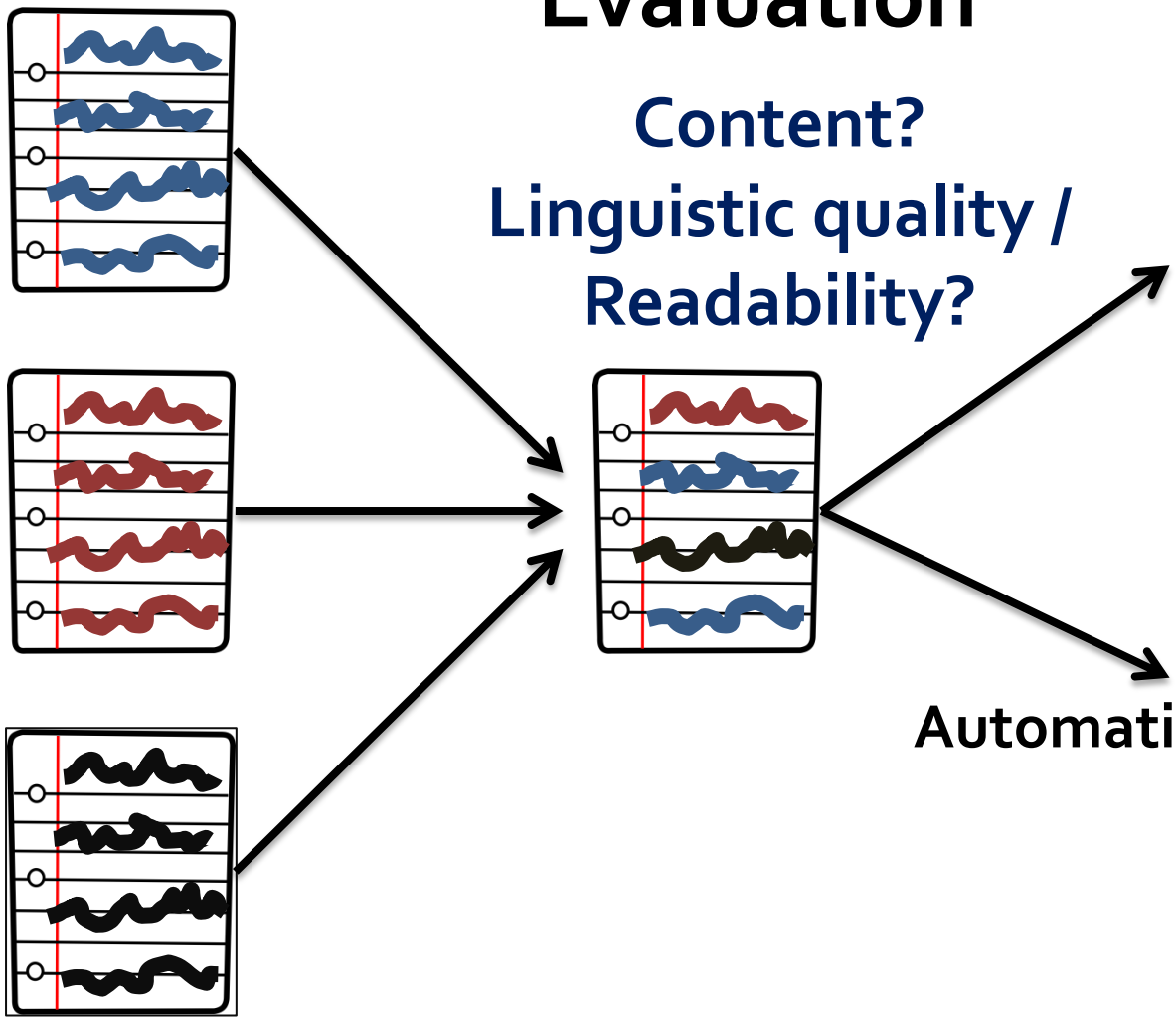

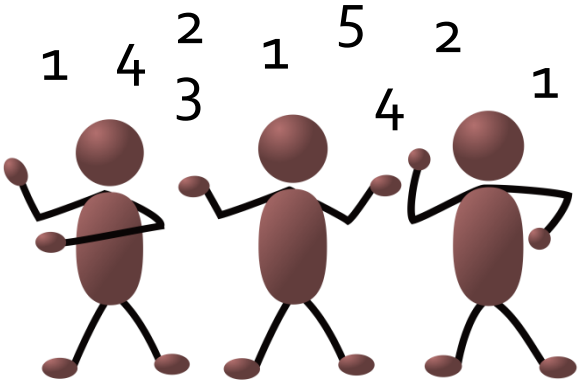

Automatic Evaluation Methods

Extractive Multi-Document Summarization

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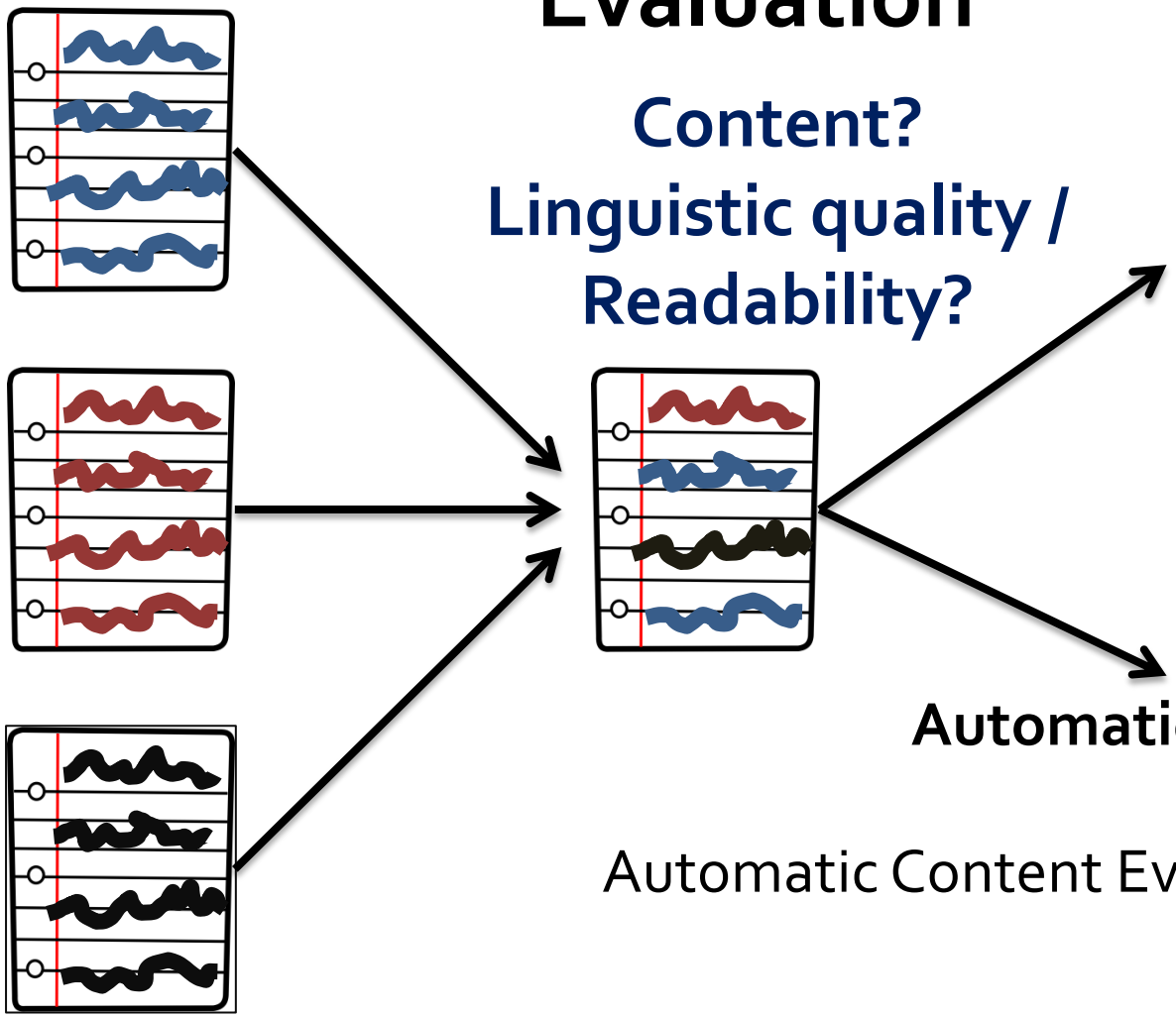

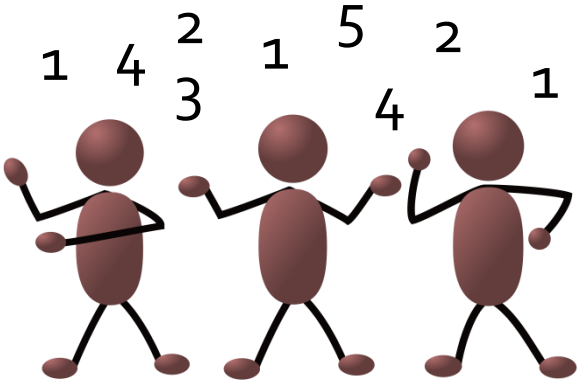

Automatic Evaluation Methods

Automatic Content Evaluation ✓

Extractive Multi-Document Summarization

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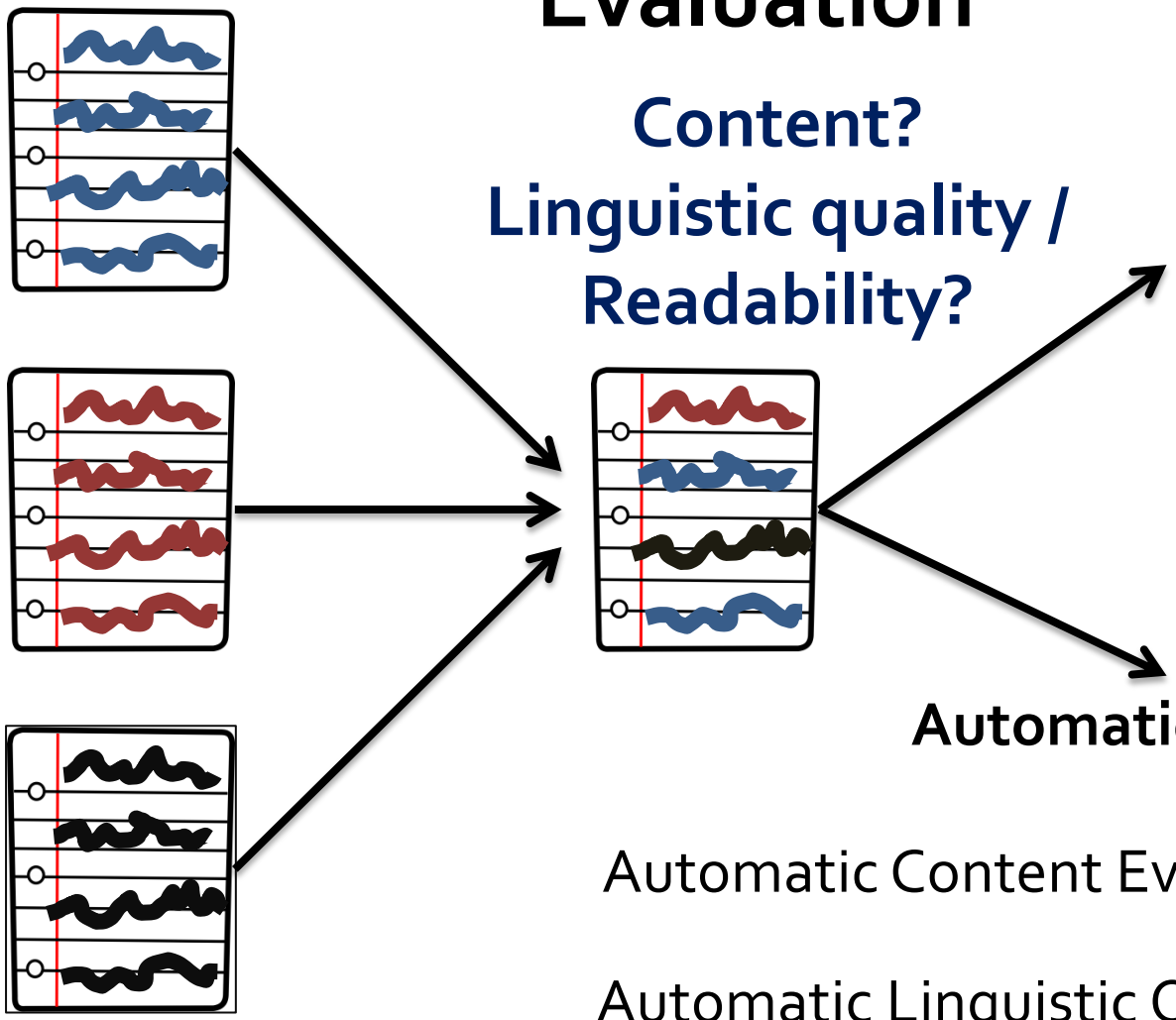

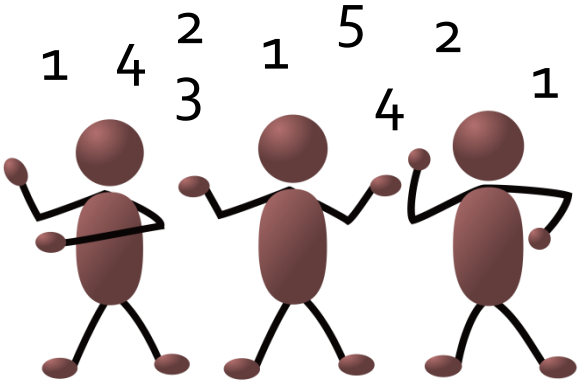

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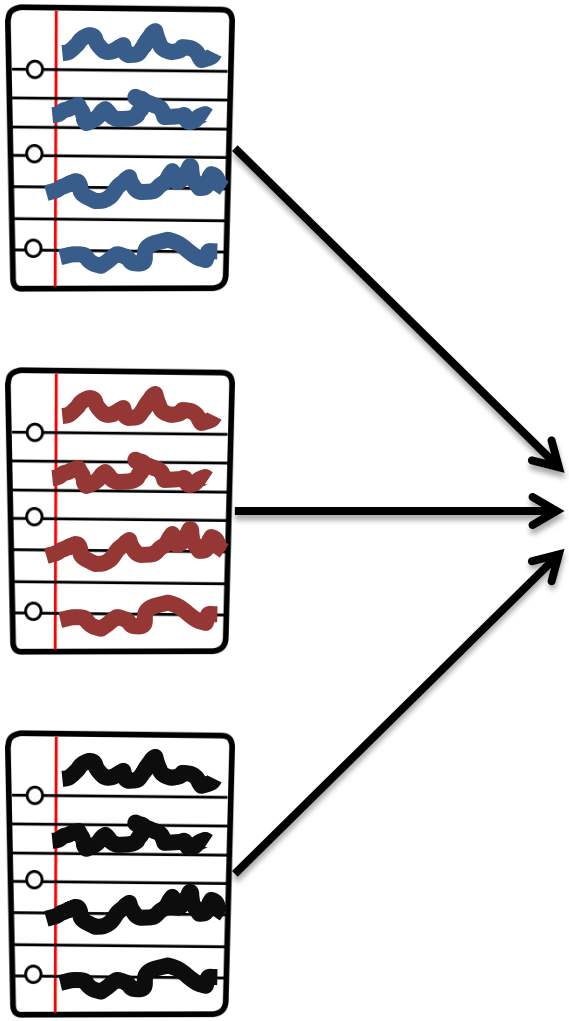
Automatic Linguistic Quality Evaluation ?

Violations of Linguistic Quality



entity mentions: reference unclear

The suspect apparently called **her** from a cell phone shortly before the shooting began, saying he was "**acting out in revenge for something that happened 20 years ago**, Miller said. **The gunman, a local truck driver Charles Roberts**, was apparently **acting in "revenge" for an incident that happened to him 20 years ago**. Charles Carl Roberts IV may have planned to

Violations of Linguistic Quality

subsequent mention of entity too specific

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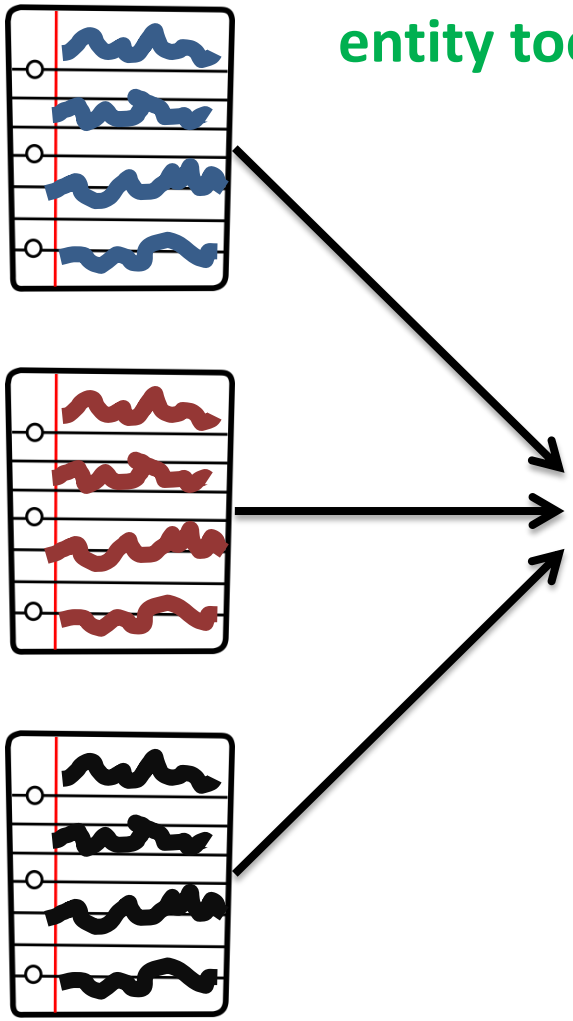

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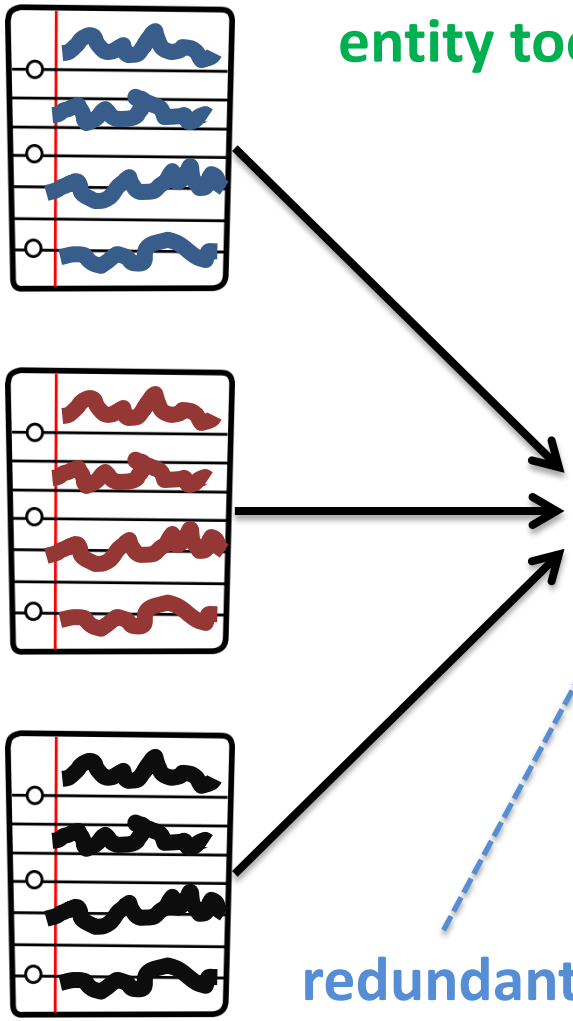

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redundant information

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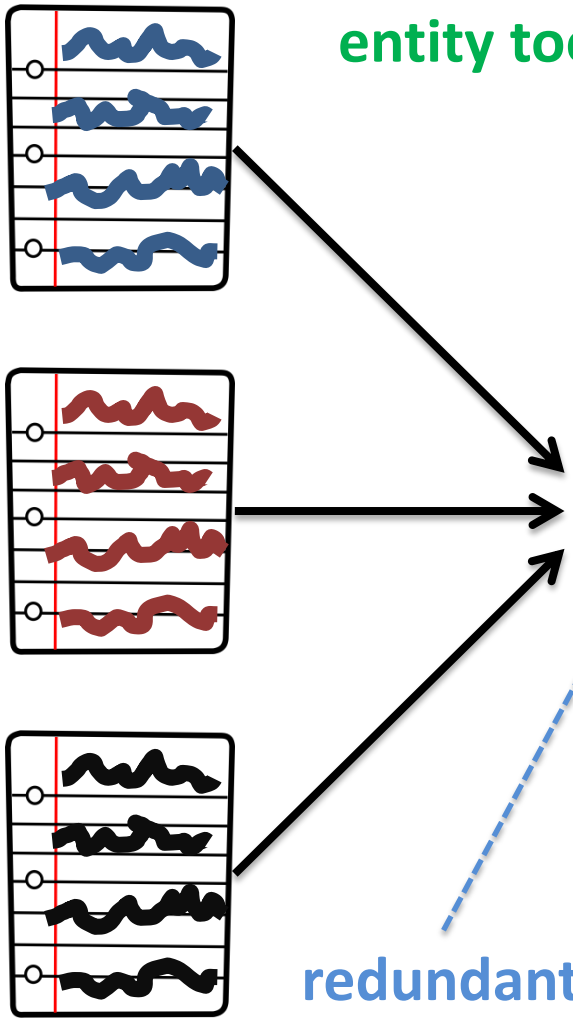

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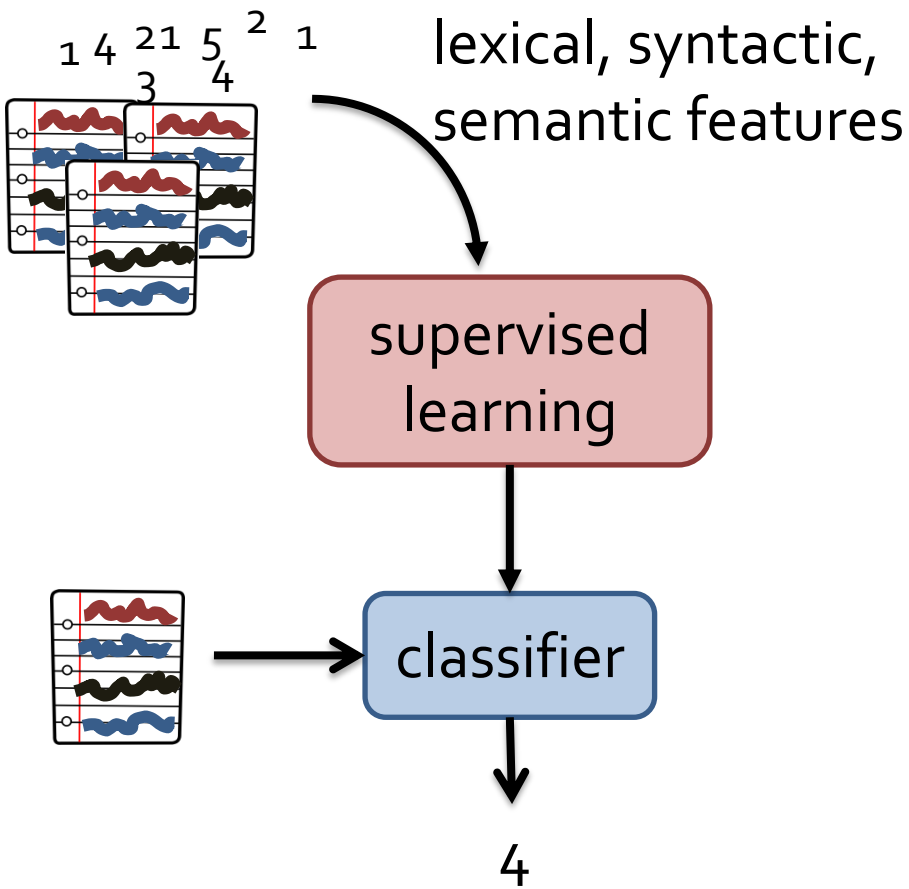
redundant information

incomplete sentence

Automatic Evaluation of Linguistic Quality for Automatic Summarization



[Pitler et al., 2010; Conroy et al., 2011; Giannakopoulos and Karkaletsis, 2011; de Oliveira, 2011; Lin et al., 2012]

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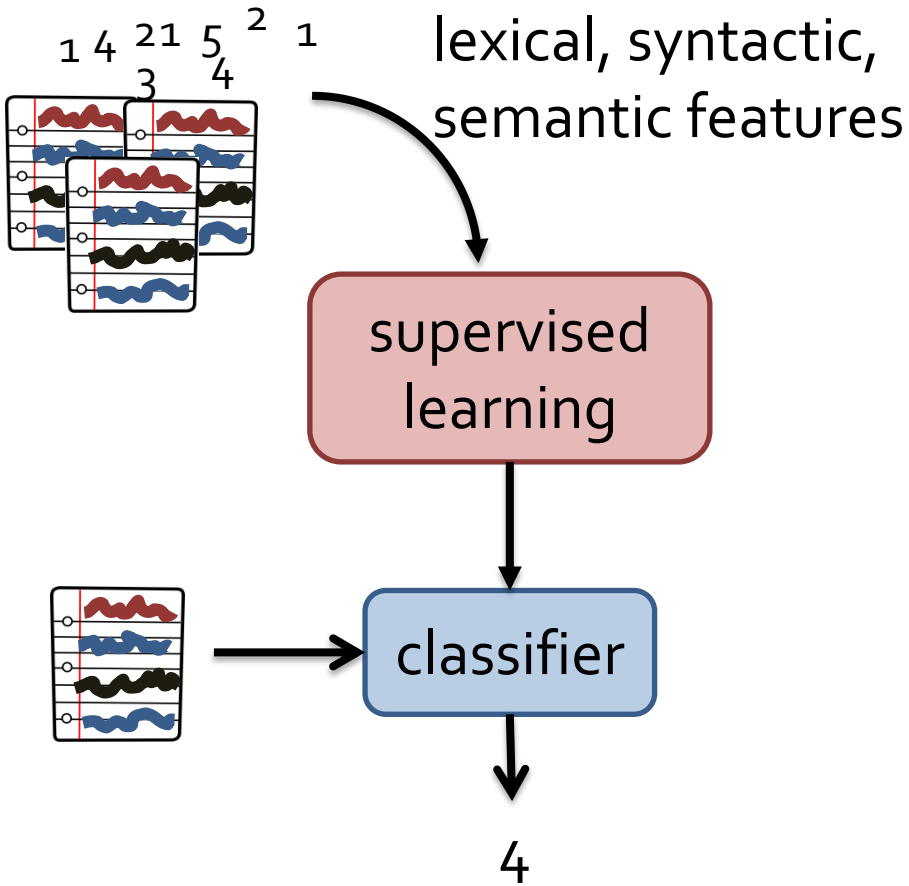

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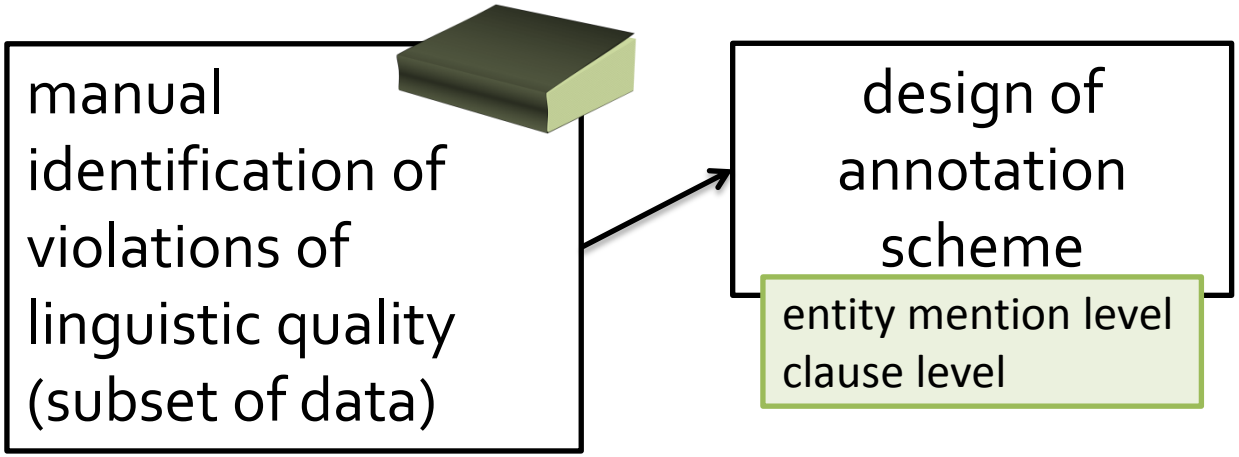
Revision-based approach

[Mani et al. 1999, Jing & McKeown 2000, Otterbacher et al. 2002]

LQVSumm corpus

manual identification of violations of linguistic quality (subset of data)

LQVSumm corpus



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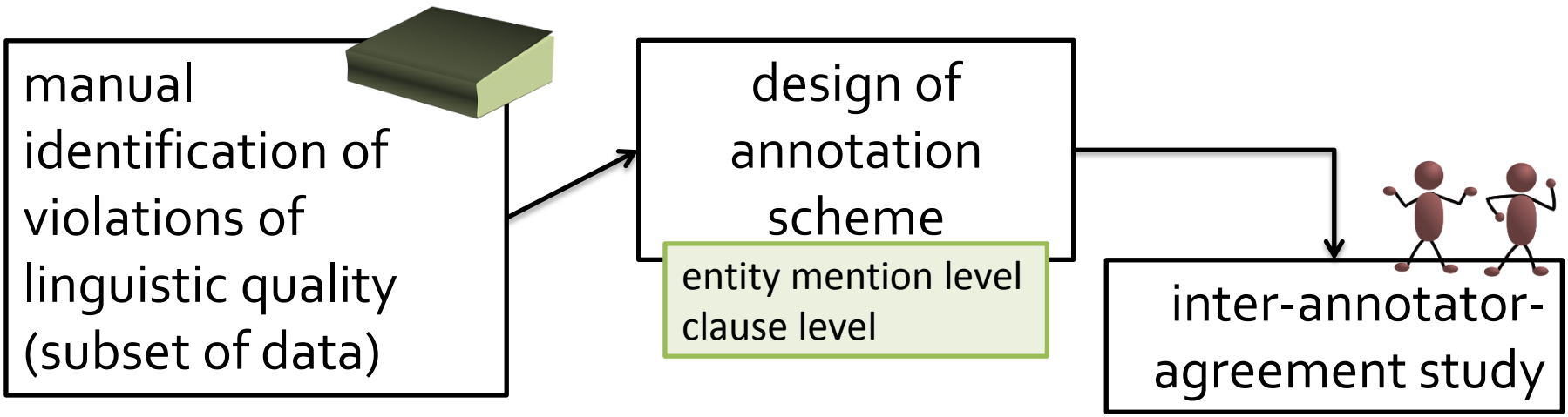

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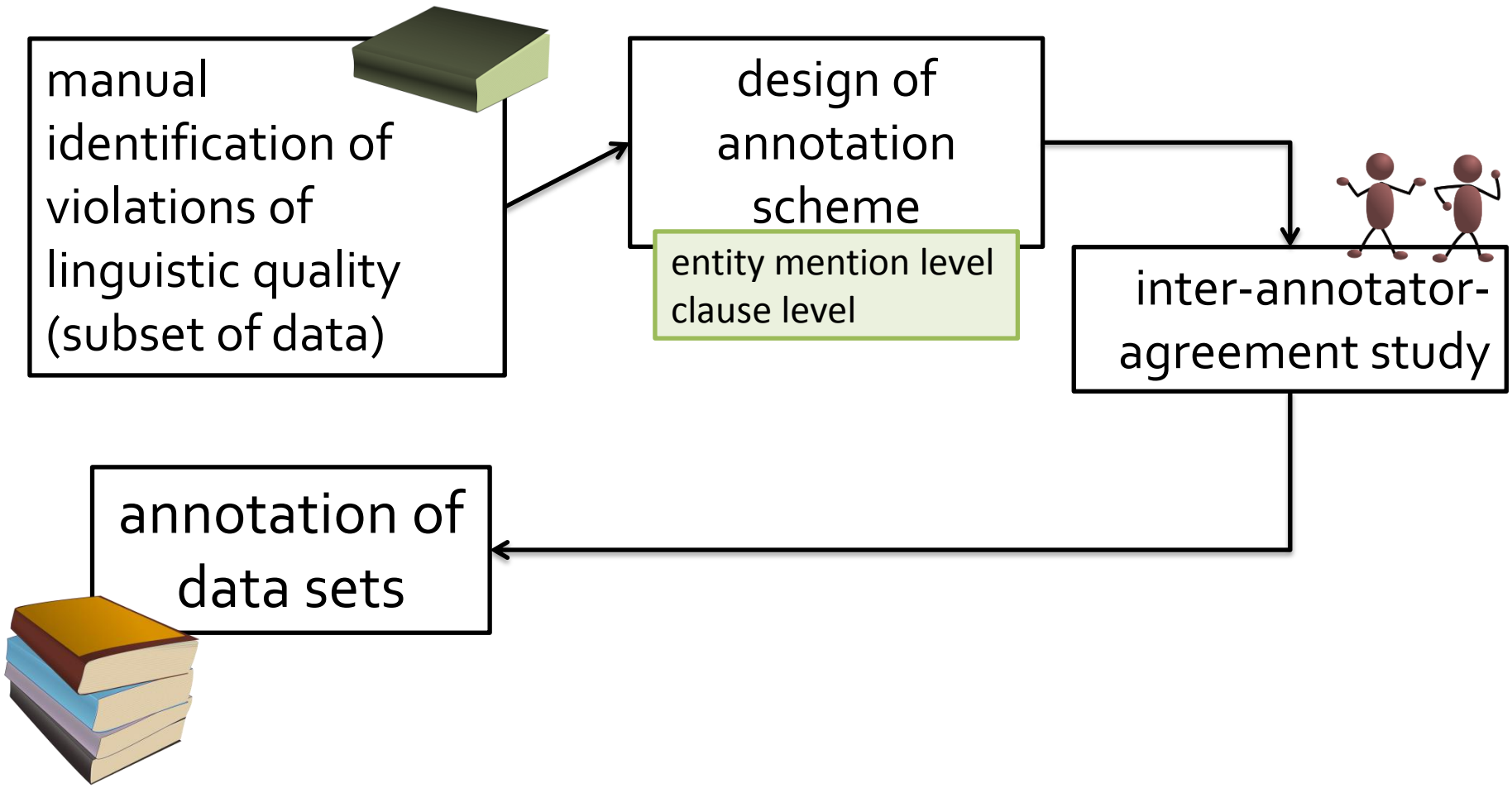

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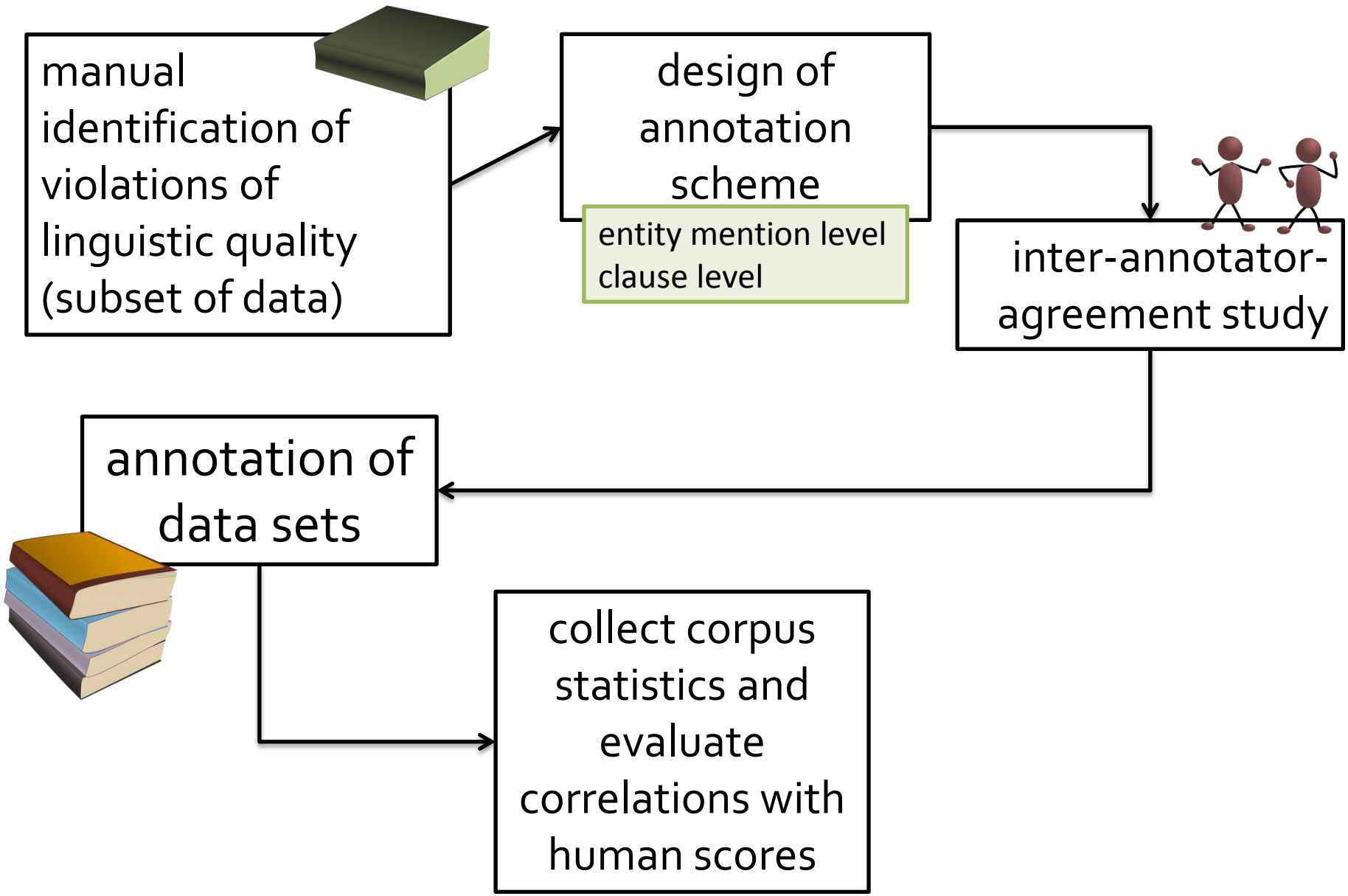

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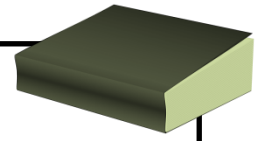
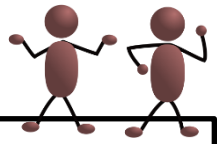


manual identification of violations of linguistic quality (subset of data)

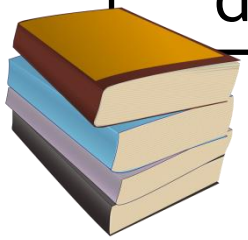
design of annotation scheme

- entity mention level
- clause level



inter-annotator-agreement study

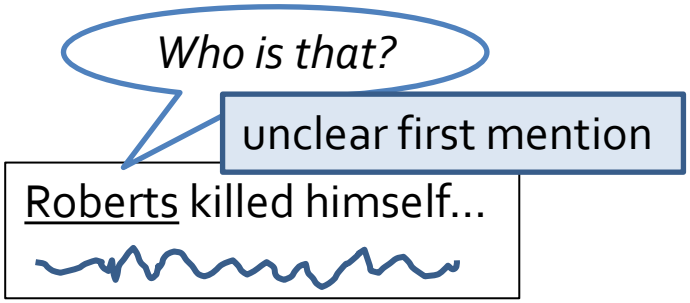
annotation of data sets



collect corpus statistics and evaluate correlations with human scores

FUTURE WORK: modeling: detection of violation types, evaluation tool

Annotation Scheme: **Entity Mention level**



Annotation Scheme: **Entity Mention level**

Who is that?

unclear first mention

Roberts killed himself…

Taylor's attorney …

Tony Taylor, 34, of Hampton, Va., has …

overly-specific subsequent mention

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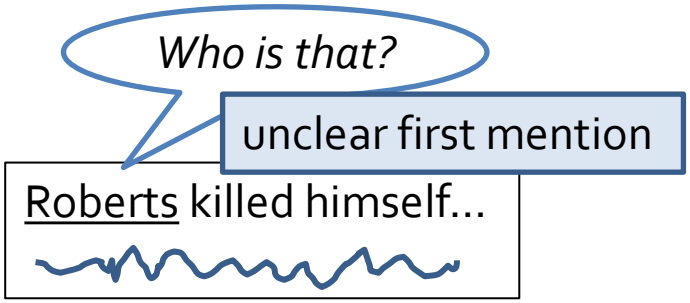

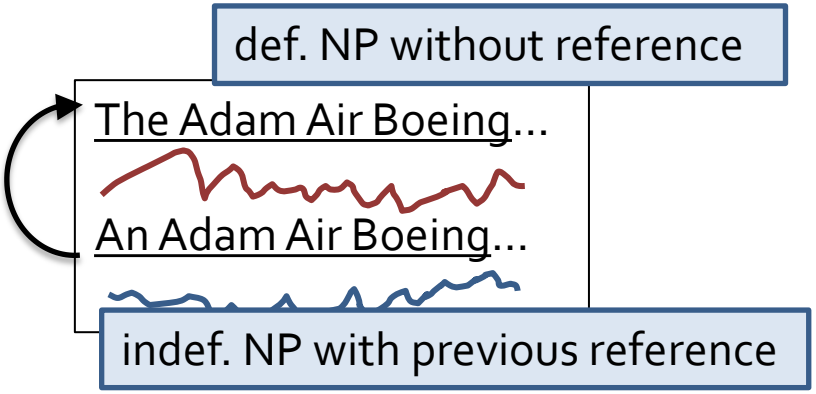

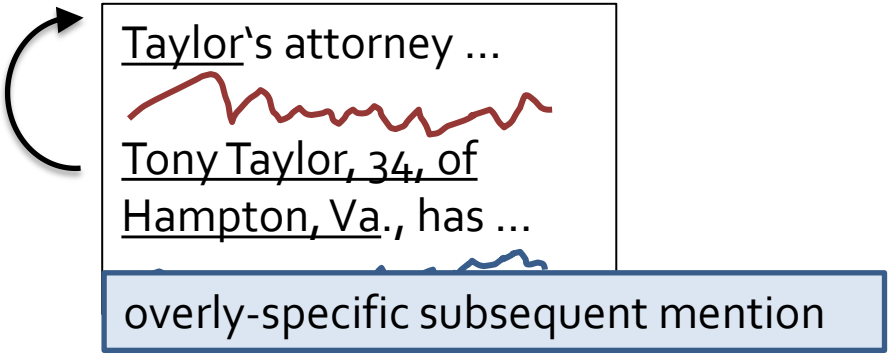

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def. NP without reference

The Adam Air Boeing…

An Adam Air Boeing…

indef. NP with previous reference

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overly-specific subsequent mention

pronouns without antecedents

pronouns with misleading antecedents

unclear acronyms

Annotation Scheme: **Clause level**

(sentence, phrase, sequence of tokens)

ungrammaticality

incomplete sentence

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GEORGETOWN, Pennsylvania
2006-10-05 16:53:53 UTC

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GEORGETOWN, Pennsylvania
2006-10-05 16:53:53 UTC

no semantic relatedness between clauses

It is popularly known as the pink city.
He said there was no justification for such killings.

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redundant information

He was acting out in revenge for something that happened 20 years ago....

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inappropriate use of discourse connective

LQVSumm: Annotated Data

	TAC
data source	1935 summaries, TAC 2011 (initial summaries), generated by 44 different extractive summarization systems
input to systems	sets of 10 news articles
Output	100-word summaries
summarization approaches	sentence selection + compression

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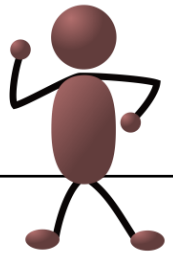
Output	100-word summaries
summarization approaches	sentence selection + compression
manual scores for summaries	Readability (1-5), Pyramid (content), Responsiveness (1-5)



Inter-annotator agreement

- 100 randomly chosen summaries
- two annotators (A) and (B)
- annotations match if same type & overlapping span

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entity mention	90.4	54.5	67.5
clause	84.1	83.3	83.6

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A creates twice as many annotations,
B's annotations are a subset of A's

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Agreement higher on clause level than on entity mention level

Inter-annotator agreement

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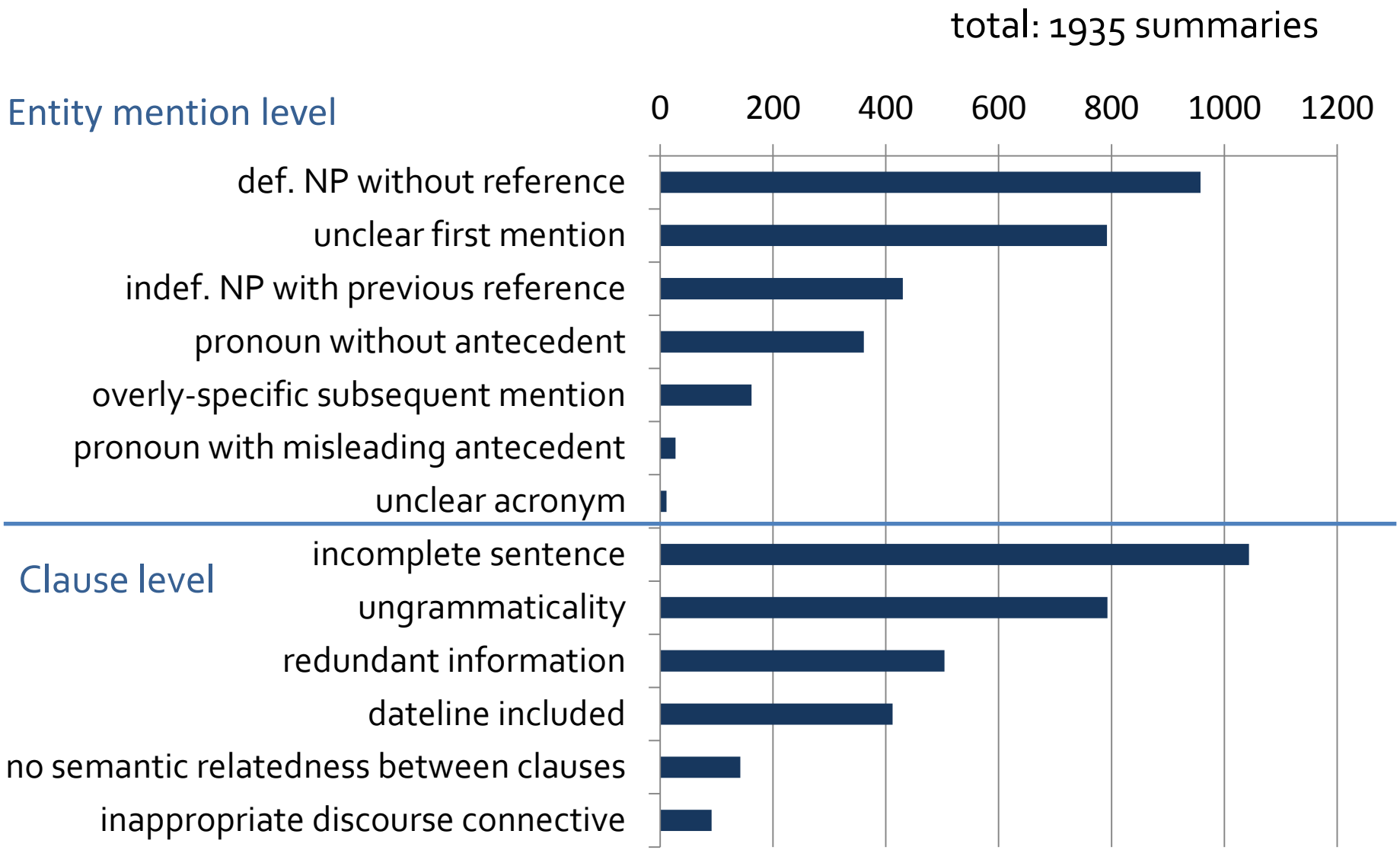
→ degree of subjectivity is manageable

Absolute Frequencies of LQVs by type



Ranking systems: average number of violations per summary

- compare rankings with TAC 2011 rankings
- draw conclusions about strengths/weaknesses of systems

System	Entity mention level	Clause level	All LQV types
1 (baseline using first 100 words as summary)	0.34	1	1.34
21	0.84	0.45	1.3
…	…	…	…
7	1.14	4.63	5.77

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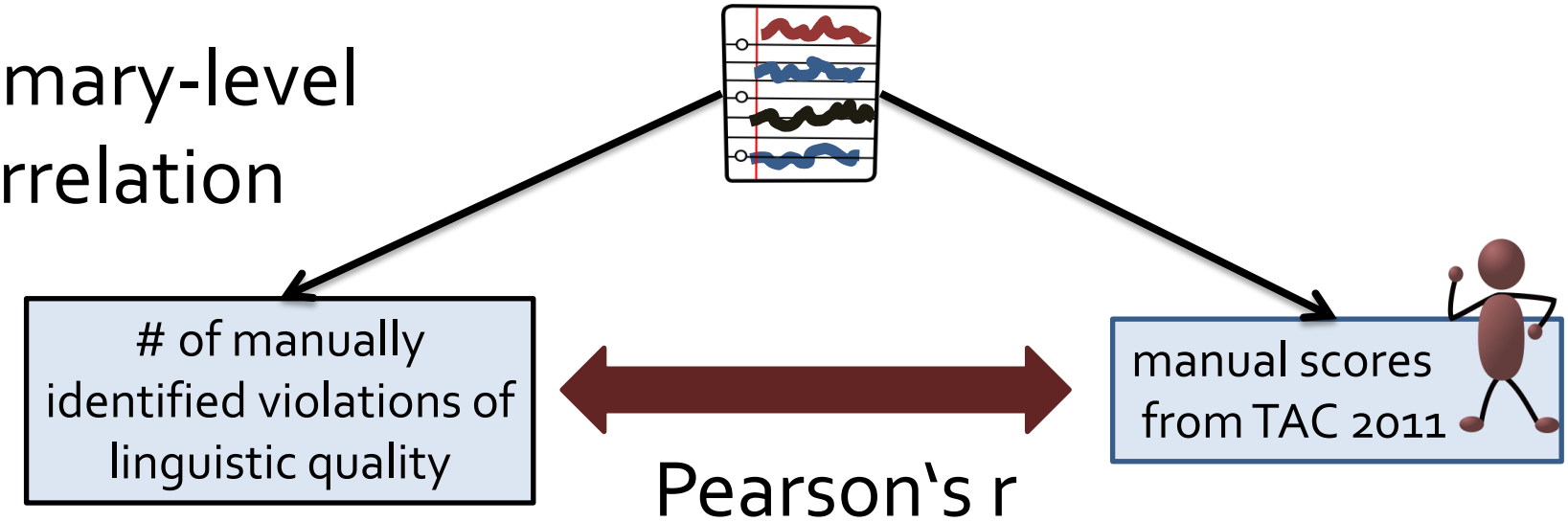
7	1.14	4.63	5.77
Best TAC system (differs for each column, TAC 2011)	(System 1) 0.34	(System 16) 0.23	(System 21) 1.30
Average of systems in TAC	1.42	1.54	2.96

Summary-level correlation



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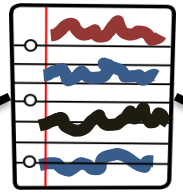
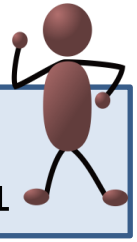
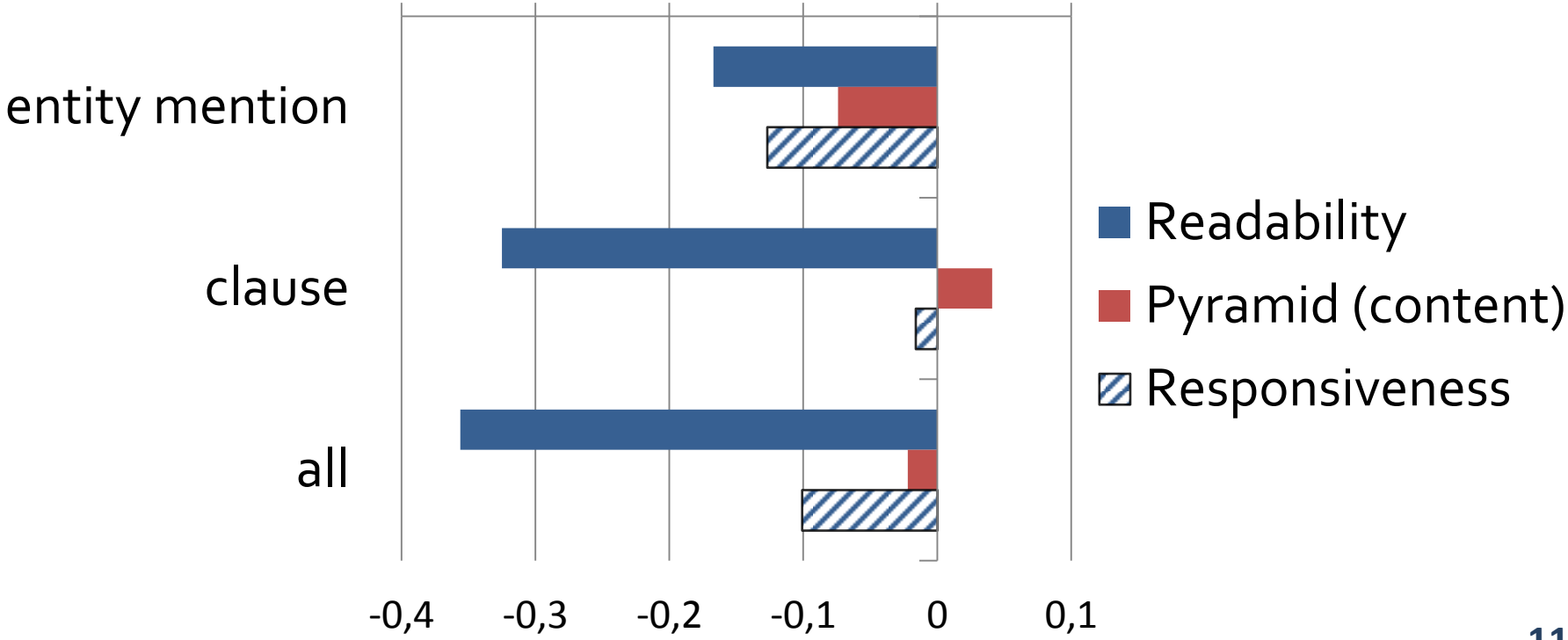


# of manually identified violations of linguistic quality

Pearson's r

manual scores from TAC 2011





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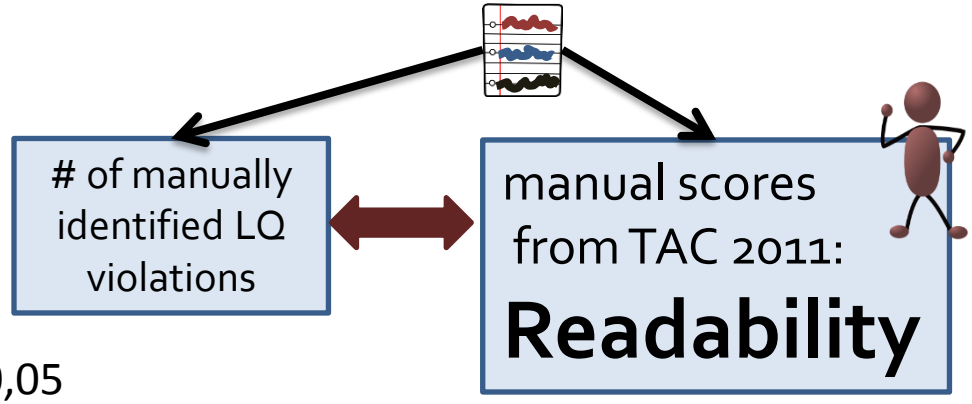
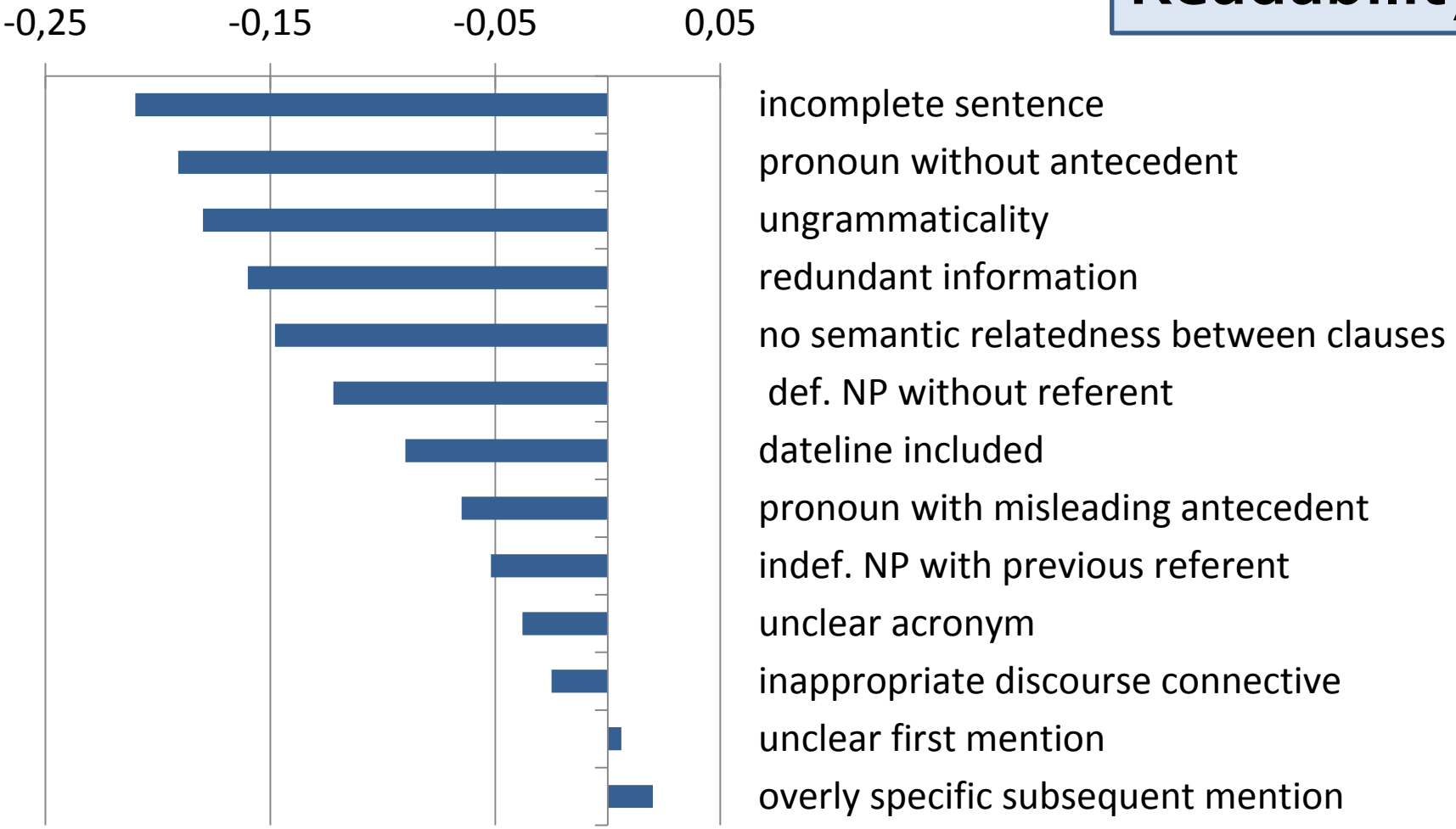


Pearsons's r



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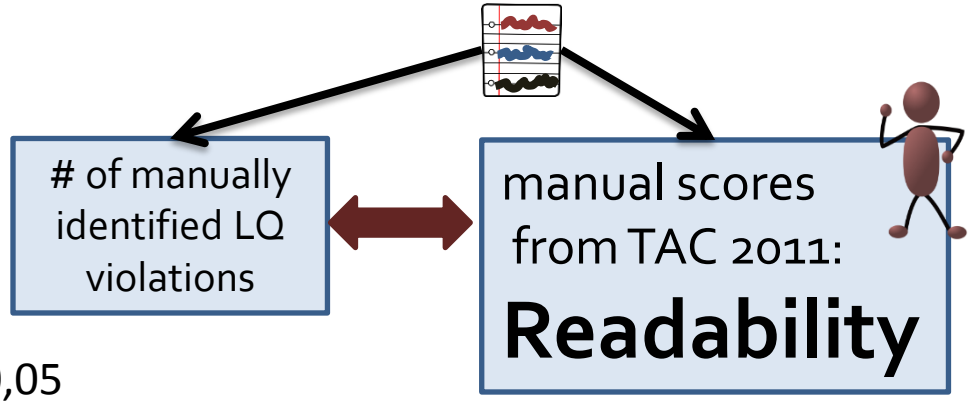

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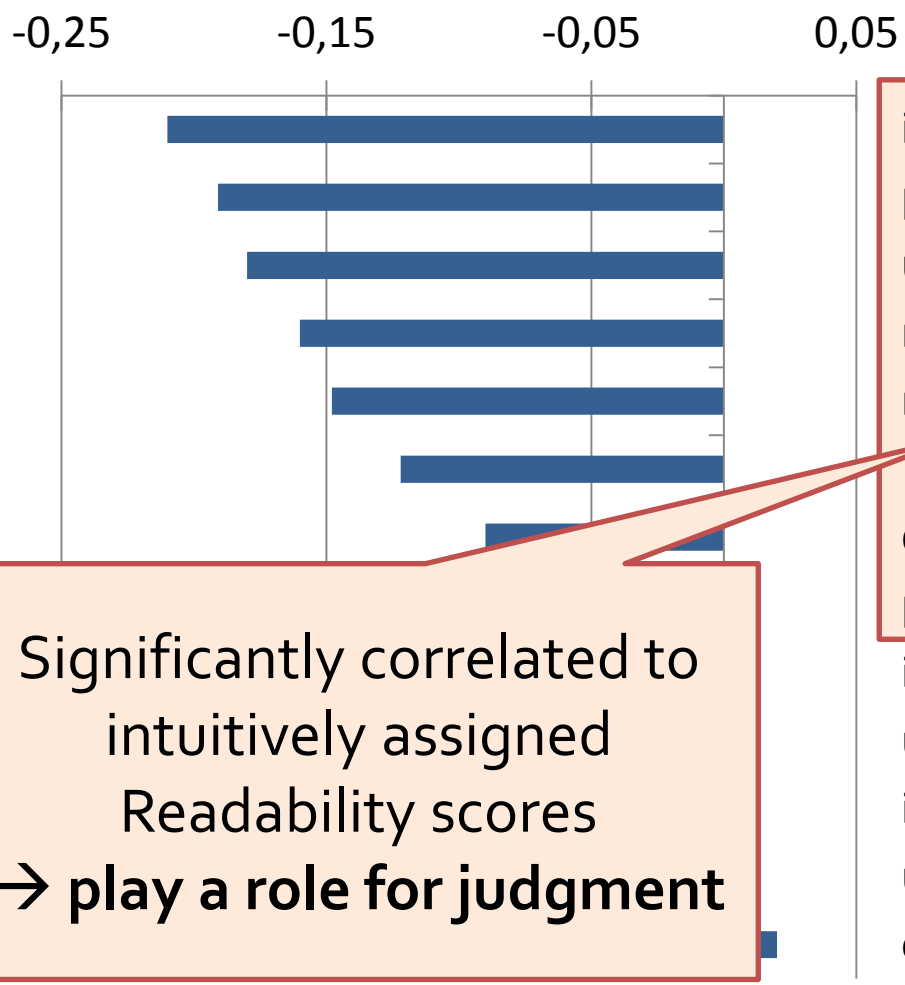

incomplete sentence
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no semantic relatedness between clauses
def. NP without referent
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indef. NP with previous referent
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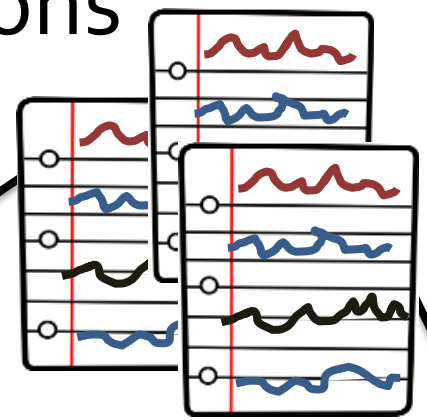
overly specific subsequent mention

Significantly correlated to intuitively assigned Readability scores
→ **play a role for judgment**

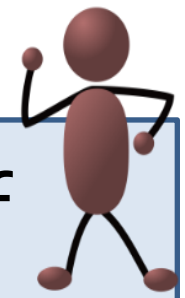
System-level correlations



All summaries created by one system

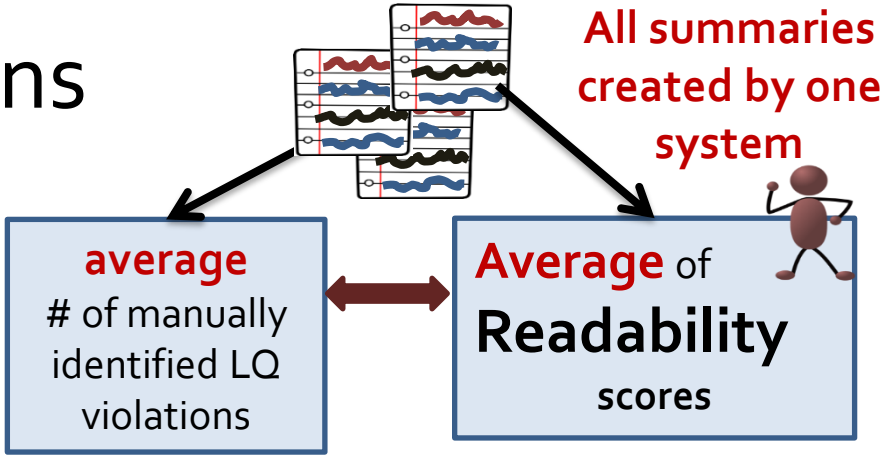
average
# of manually identified LQ violations

Average of **Readability scores**



System 21	1.30	3.75
System 2	1.74	3.34
System 7	5.77	2.09
…	…	…

System-level correlations

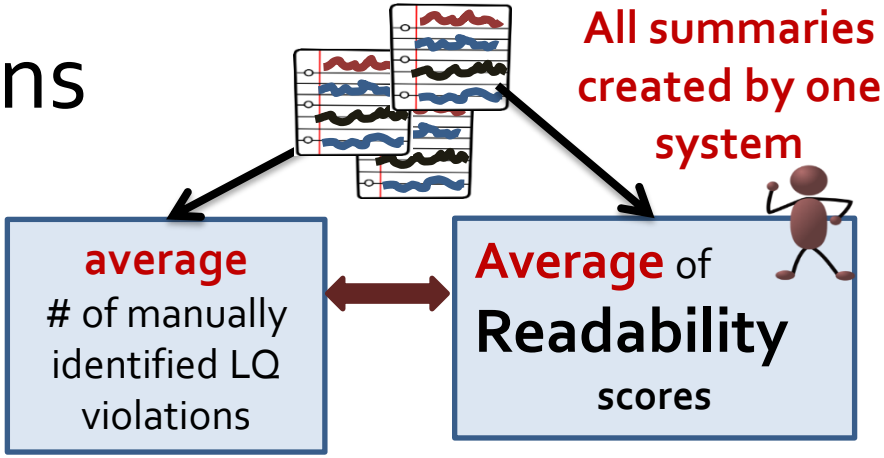


DICOMER: features from Penn Discourse TreeBank-style discourse parser

higher absolute correlation → better ranking

Method	***Ranking of***	**Pearson's r**	**Spearman's ρ**	**Kendall's τ**
DICOMER [Lin et al. 2012]	*all 50 systems*	**0.867**	0.712	0.535
LQVSumm $sum(violations)$	*44 systems*	-0.820	**-0.858**	**-0.713**

System-level correlations



DICOMER: features from Penn Discourse TreeBank-style discourse parser

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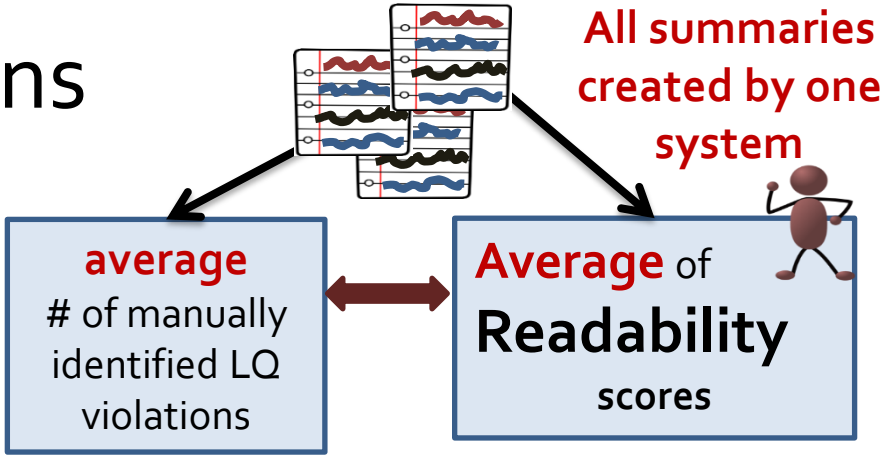

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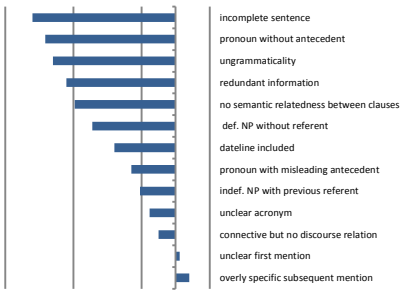
DICOMER is better (trained on TAC 2009 & TAC 2010)	**counting the number of violations works better than a supervised system.**

Conclusions

LQVSumm:
≈ 2000 summaries
marked with LQV types

Conclusions



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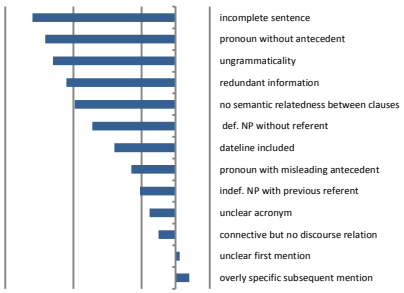

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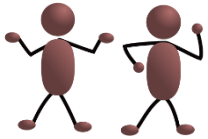

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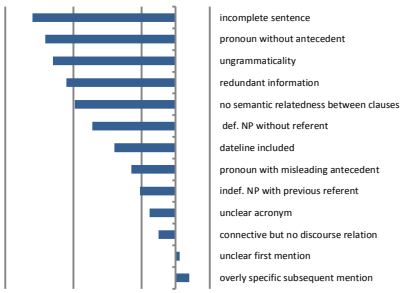

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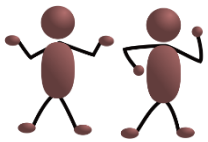

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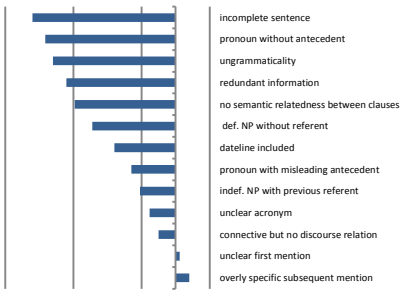

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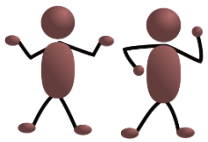

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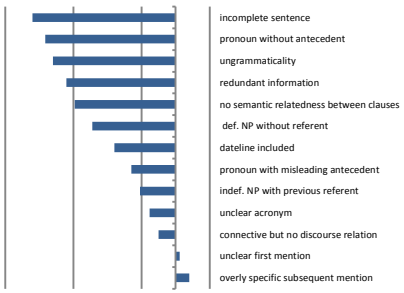

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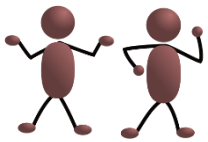

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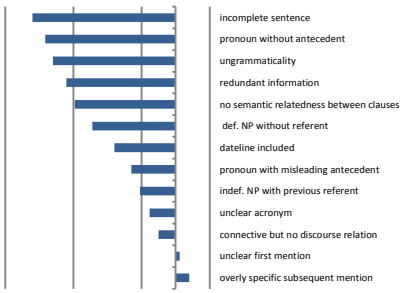

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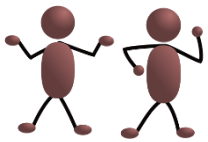

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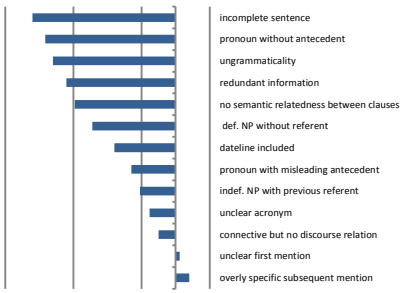
Thanks!



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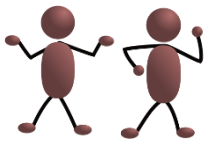

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Backup Slides

Annotation Scheme: Overview

entity mention level

- pronouns without antecedents
- indefinite NPs with a previous mention
- …

clause level

(sentence, phrase, sequence of tokens)

- ungrammatical sentences
- no semantic relatedness
- …

Performance of the G-Flow summarization system

- G-Flow system: Christensen et al. (NAACL 2013): Towards Coherent Multi-Document Summarization
- system incorporates coherence information into sentence extraction
- marked 50 summaries provided on the web site of the authors

System	Entity mention level	Clause level	All LQV types
Best TAC system (differs for each column, TAC 2011)	(System 1) 0.34	(System 16) 0.23	(System 21) 1.30
G-Flow (DUC 2004 data)	**0.30**	**0.20**	**0.50**

G-Flow succeeds in producing more coherent / readable summaries

inappropriate use of discourse connective