



"Beste Grüße, *Maria Meyer*" — Pseudonymization of Privacy-Sensitive Information in Emails

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PSEUDONYMIZATION

- protects privacy-sensitive information in raw text data
- enables sharing of privacy-sensitive language resources



	Kind regards from London Irene	entities	Kind regards from London Irene	realistic surrogates	Kind regards from Istanbul Vera	
Original Emails			Original Emails		Pseudonymized Emails	

TASK 1: RECOGNIZE PRIVACY-SENSITIVE INFORMATION USING ORIGINAL EMAILS



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Model Architecture	Image: Architecture(Concatenated) Embeddings		F <u>1</u>
LSTM+CRF	BPEmb+Character		81.44
LSTM+CRF	GELECTRA-large		86.22
LSTM+CRF	GELECTRA-large+FastText+BPEmb		86.79
LSTM+CRF	GELECTRA-large	✓	87.01
LSTM+CRF	GELECTRA-large+FastText+BPEmb	✓	86.95
Transformer	GELECTRA-large		87.31
Transformer	GELECTRA-large+FastText+BPEmb		87.56
Transformer	GELECTRA-large	✓	87.52
Transformer	GELECTRA-large+FastText+BPEmb	1	88.09
Transformer	XLM-R		87.25
Transformer	XLM-R German (fine-tuned on NER)		86.85
Transformer	XLM-R HRL (fine-tuned on NER)		87.11

Results for different setups for recognizing privacy-sensitive

FINDINGS

Fine-tuned transformers outperform LSTM+CRF architectures

 Fine-tuning transformers already fine-tuned on traditional NER tasks does not improve performance

information on personally donated original emails (10-fold cross validation)

TASK 2: RECOGNIZE PRIVACY-SENSITIVE INFORMATION USING PSEUDONYMIZED EMAILS



Training		Testing	F <u>1</u>
	Pseudonymized Emails	Original Emails	
-	manual	personally donated	46.54
	manual + automatic	personally donated	65.07
	Original Emails		
	manual	personally donated	57.77
_	Pseudonymized Emails	Original Emails	
_	manual	public archive	56.64
	manual + automatic	public archive	61.12
	Origina	al Emails	
	manual	public archive	72.68

Results for training on pseudonymized emails with manually and automatically annotated privacy-sensitive entities in comparison to training on original emails, while testing on personally donated original emails and original emails from a public archive

FINDINGS

- Enlarging manually annotated pseudonymized data with automatically annotated pseudonymized data is beneficial
- Training on pseudonymized data is inferior to training on original data

SHAREABLE OUTPUT

A tagger for privacy-sensitive information recognition in German emails and similar text genres

A new pseudonymized version of the German-language email corpus CodE Alltag compliant with the General Data Protection Regulation (GDPR)

https://github.com/codealltag/

