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Idiap & UAM participation at GermEval 2020: Classification and Regression of Cognitive and Motivational Style from Text

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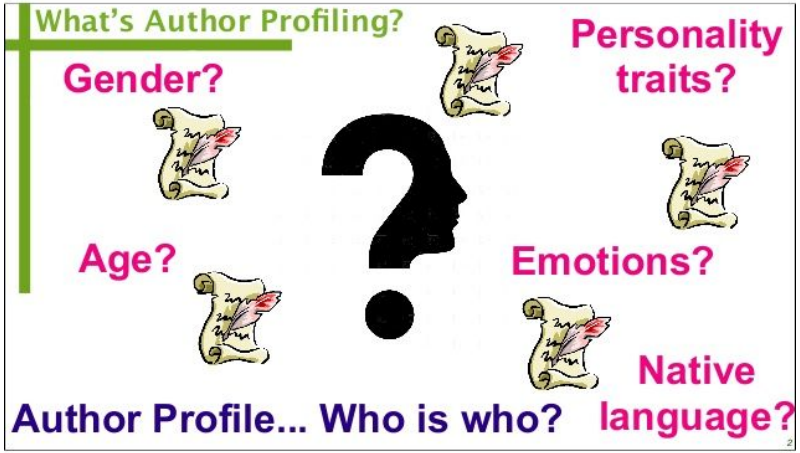
Introduction(1/2)

- The idea that language use reveals information about users has long circulated in the research community
- This problem is also known as **Author Profiling (AP)**



  - AP aims at modeling authors general sociolinguistic features that apply to a group of them
  - The main hypothesis establishes that extracted features might be indicative of how authors use these words given their language, gender, age, personality, etc.

Introduction (2/2)

- Giving the nature of the OMT task, we assume the task of detecting **motives** and its corresponding **levels** as an additional dimension of the AP problem
- The main goal of our participation was to **evaluate the impact of deep learning architectures** (Transformers based), and compare its performance against more traditional ML methods
- Our best configuration obtains a F1=69.8%, meaning a 7.4% relative improvement in comparison to the baseline system

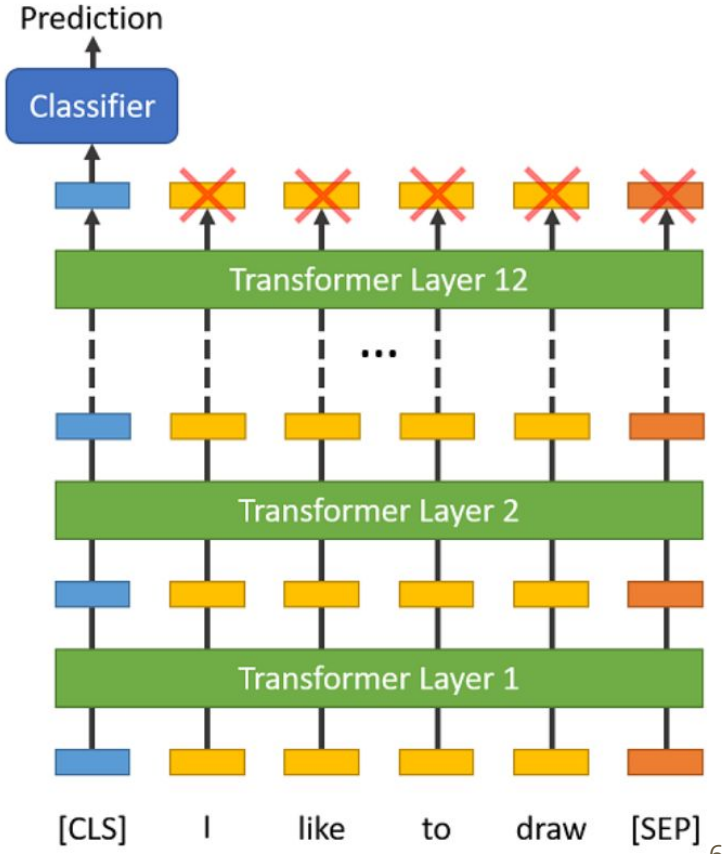
Dataset

- Provided by the organizers of the **GermEval 2020** shared task on the Classification and Regression of Cognitive and Motivational style from the text**:**
  - Language: German
  - Training: 167,200*
  - Development: 20,900
  - Test: 20,900

	Training	
	Average (σ)	*Total*
Tokens	20.27 ($\pm$12.08)	3,389,945
Vocabulary	18.07 ($\pm$9.82)	267,620
LR	0.92 ($\pm$ 0.08)	0.08
	Development	
	Average (σ)	*Total*
Tokens	20.38 ($\pm$12.17)	425,880
Vocabulary	18.17 ($\pm$9.94)	55,606
LR	0.92 ($\pm$ 0.08)	0.13
	Test	
	Average (σ)	*Total*
Tokens	20.24 ($\pm$12.01)	423,018
Vocabulary	18.05 ($\pm$9.76)	55,592
LR	0.92 ($\pm$0.08)	0.13

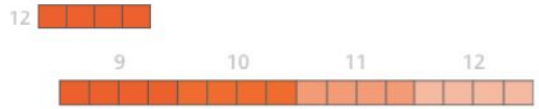
Methodology(1/2)

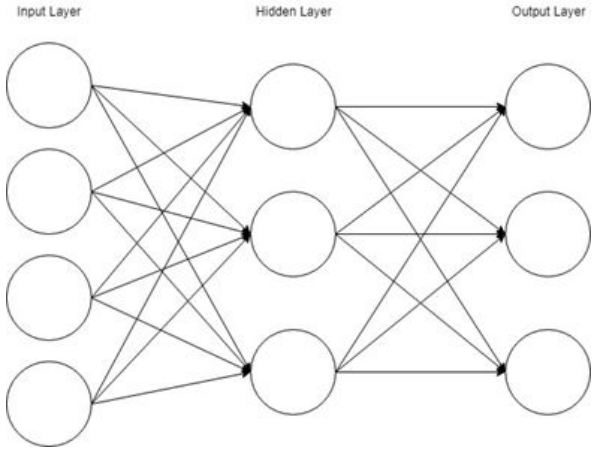
- **Simple transformers**: we add an untrained layer of neurons on the end, and re-train the model with the OMT classification task at the output
- **max_length** parameter is set to **90**, and models are re-trained up to **2 epochs**
- Three different configurations:
  - BERT
  - XLM
  - DistilBERT



Methodology(2/2)

- **Fully connected neural network (FC):** the FC is feed with the representation of the textual descriptions using:
  - **Pre-train** BERT
  - **Fine-tuned** BERT
- We reported results using two distinct ways for building the sentences representation
  - Last Hidden Layer
  - Concat Last Four Hidden





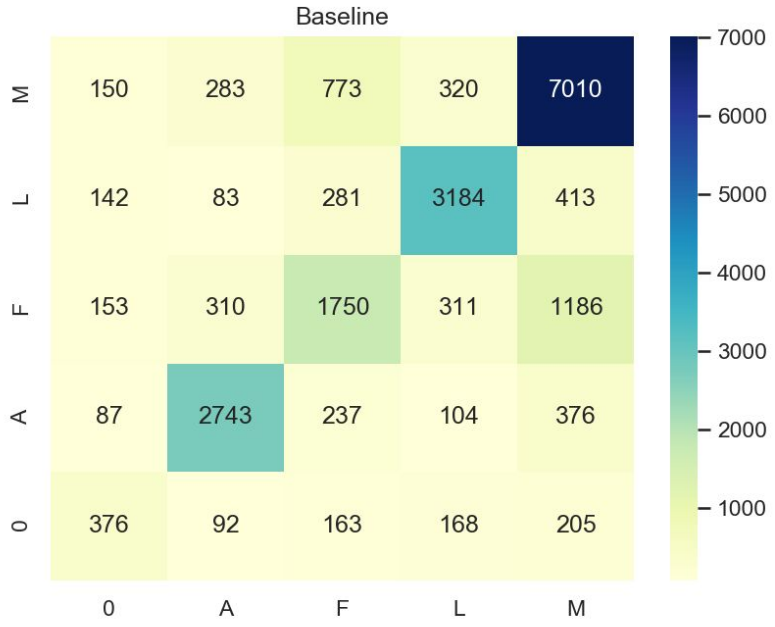
Hyper Parameter	Range
number of layers	3
number of hidden layers	1
nodes in hidden layer	16
activation function	ReLU

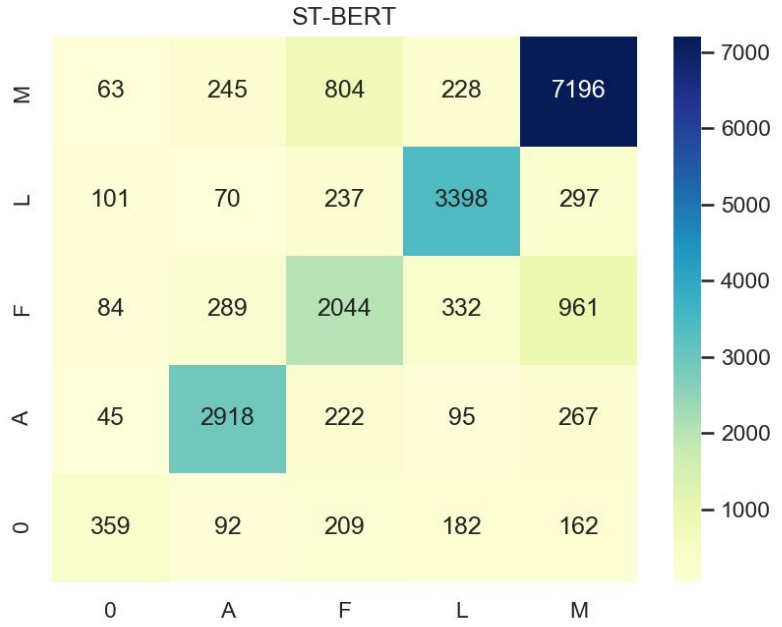
Official results

Method	*Configuration type*	*Configuration sub-type*	**F1-macro** *(dev)*	**F1-macro** *(test)*
ST	Bert	bert-base-german-cased	**0.694**	**0.698**
ST	XLM	xlm-mlm-ende-1024	0.688	0.686
ST	DistilBert	distilbert-base-german-cased	0.692	0.688
FC	Bert (pre-trained)	LHL	0.589	0.589
FC	Bert (pre-trained)	Concat4LHL	0.616	0.579
FC	Bert (fine-tuned)	LHL	0.673	0.671
FC	Bert (fine-tuned)	Concat4LHL	0.675	0.230
Baseline	SVM	*tf-idf*	0.639	0.644
1st place	–	–	–	0.704

Results analysis(1/3)

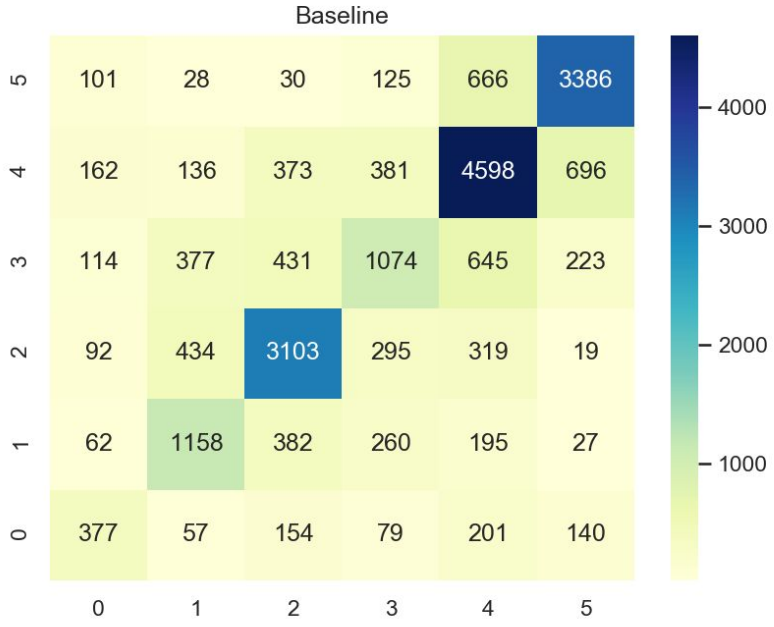
- **Motives** prediction

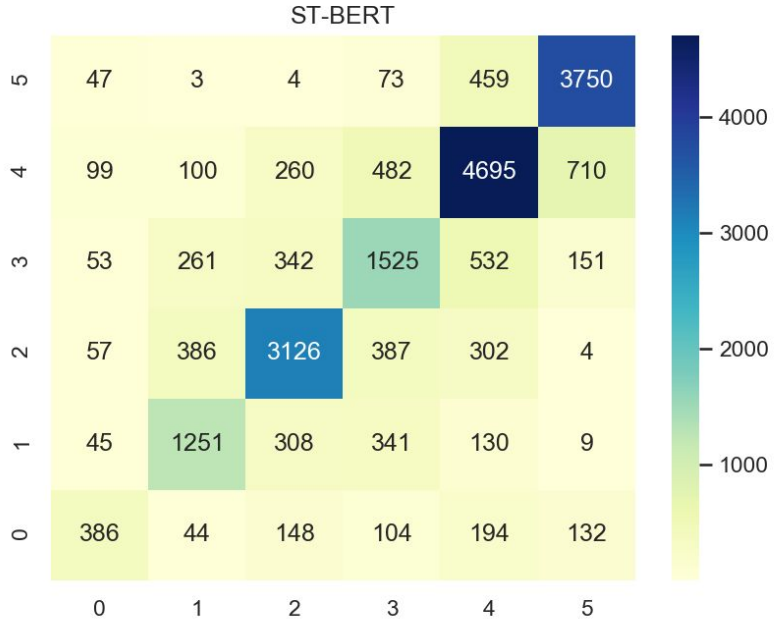




Results analysis(2/3)

- **Levels** prediction

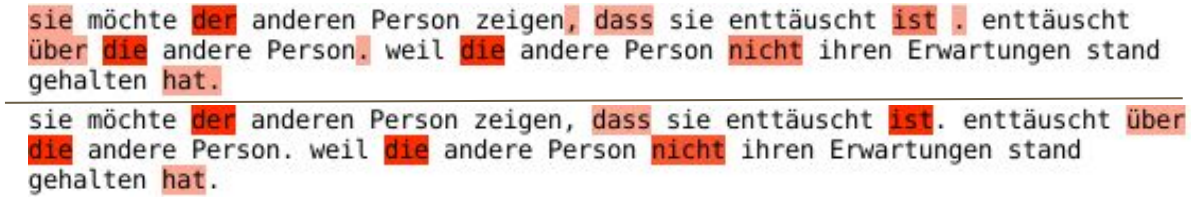




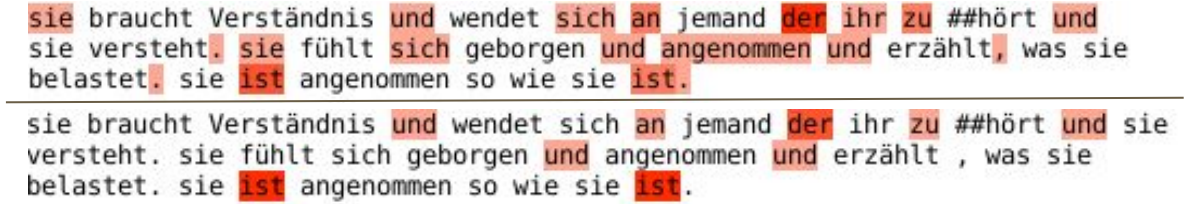
Results analysis(3/3)

- Where is the **attention** being focused?

M4	Pre-trained BERT
M4	Fine-tuned BERT



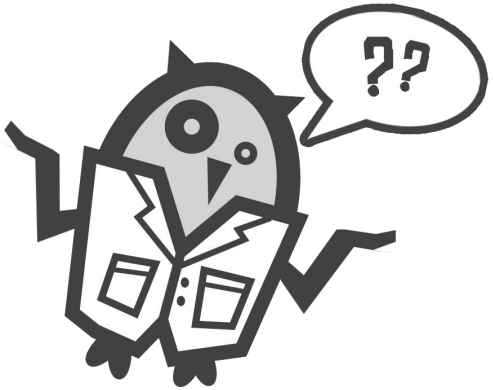
A4	Pre-trained BERT
A4	Fine-tuned BERT



Conclusions and future work

- Although the **ST** exhibith the best empirical results, there is plenty of room for improvement, as the best reported is close to 70%
- Accurately detecting the combination of motives and levels from very short descriptions is a **challenging task** even for recent NLP technologies
- Our initial analysis of the obtained results, indicates that the attention mechanism is mainly focussing on **stylistic features**: punctuation marks, functional words
- **Motive 0 and Level 0** seem to be very noisy elements

Q&A



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