KAUSTmine – Offensive Comment Classification of German Language Microposts

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Overview of Data sets

Data set	Offensive	Other	Total
Training set	1688	3321	5009
Test set	1202	2330	3532

Table 1: Class distribution of datasets

Experimental setup

Systems used word vectors published by Deriu et al. (2017)
- trained on a total of 200 million tweets
- dimensionality of *d = 200*

Data preprocessing steps:
- Replace URLs, usernames and retweets with replacement tokens *URLTOK*, *USRTOK* and *rt*
- Convert tweet text to lowercase
- Convert categorical classification variables into an One-Hot encoded vector
- Tokenize tweets and create a list of word indexes with length *l = 100*

Classifier systems

Classifiers used to participate in Task 1 (binary classification) of GermEval 2018 shared task:

SVM
- Support Vector Machine (SVM)
- Implemented with Scikit-learn
- Classifier trained on TF-IDF vectors using count matrices of 5-grams

Bidirectional LSTM
- Bidirectional Long short-term memory (LSTM)
- Implemented with Keras library
- Consists of two layers with 64 and 2 units respectively
- Dropout & early-stopping to prevent model from overfitting

CNN
- Convolutional Neural Network (CNN)
- Implemented with Keras library
- Consists of one convolutional layer with 64 units
- Dropout & early-stopping to prevent model from overfitting

Results

Deep-learning systems (LSTM, CNN) were able to out-perform machine-learning based classifier (SVM)
- LSTM model showed best result with 69.15% F1 score
- Only little effort put into improvement of the proposed systems

Further improvements possible via:
- Usage of additional features (e.g. hate-speech dictionary)
- Fine-tuning of hyper-parameters
- Creation of ensembles

First personal experience in Machine Learning / Deep Learning research
- Rapidly advancing research area
- Already excited to learn more during master's study

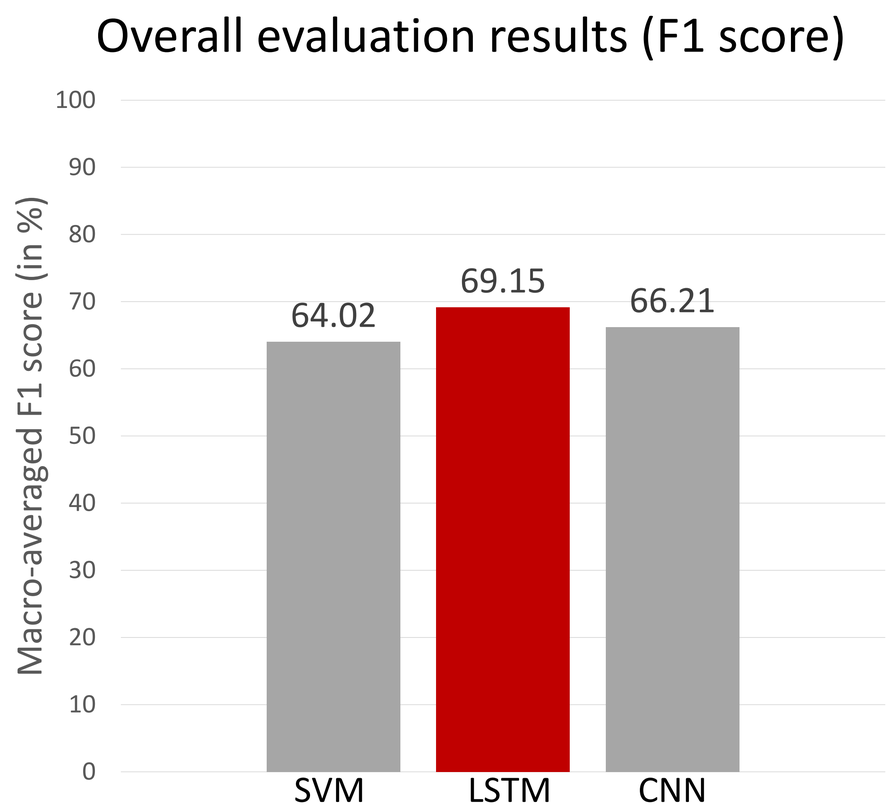

Figure 1: Overall evaluation results

	Accuracy			Offensive			Other			Average		
System	in %	# correct	# total	Precision	Recall	F1 score	Precision	Recall	F1 score	Precision	Recall	F1 score
SVM	70.1	2476	3532	60.22	35.77	44.89	72.6	87.81	79.49	66.41	61.79	64.02
LSTM	72.93	2576	3532	61.41	55.07	58.07	78	82.15	80.02	69.7	68.61	69.15
CNN	68.29	2412	3532	52.92	61.9	57.06	78.46	71.59	74.87	65.69	66.74	66.21

Table 2: Evaluation results for submission runs by KAUSTmine team

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