Style Change Detection on Real-World Data using an LSTM-powered Attribution Algorithm

Robert Deibel & Denise Löfflad

Eberhard-Karls University Tübingen

23.09.2021

Overview

1 Approach

2 Results

3 Future Work

Task 1 - Approach

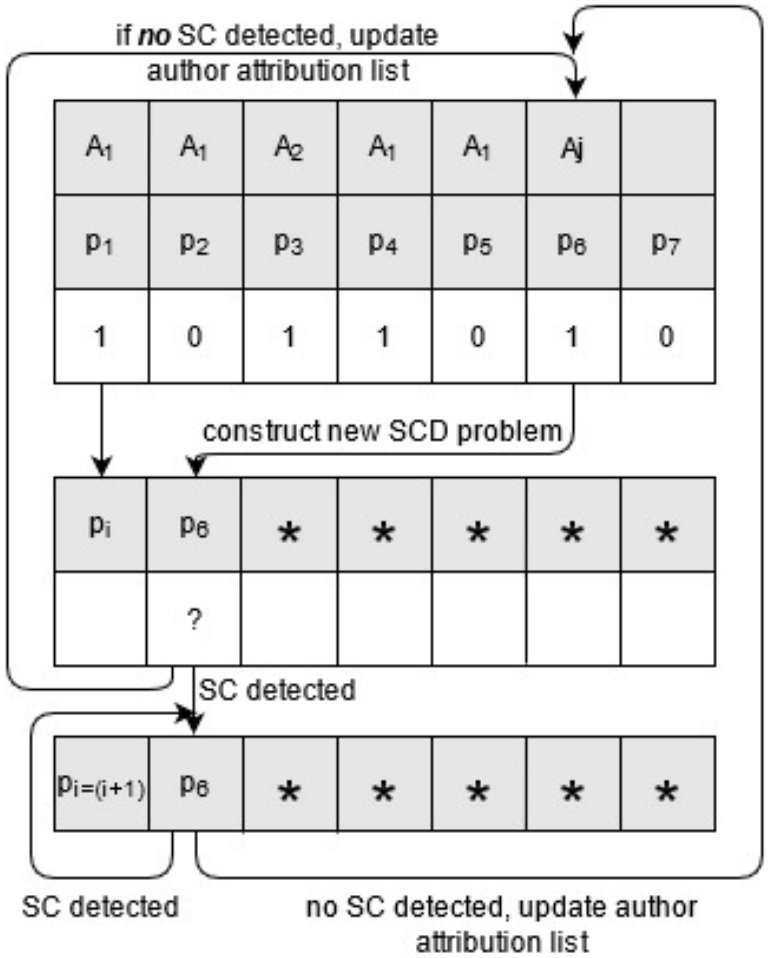
- MLP with 3 hidden FC layers with ReLU activation
- Utilize per-document embeddings
- We suppose MLPs can differentiate on a per-document basis

Task 2 - Approach

- Based on per-paragraph word embeddings and textual features
- Two-layered Bidirectional LSTM model with 128 hidden units per layer
- Masking layer, and a Time-Distributed layer as the output layer with a sigmoid activation function
- Binary cross-entropy as the loss function
- We anticipate LSTMs can learn similarities/changes in style on a per-paragraph basis

Task 3 - Approach

- Iterative per-paragraph authorship attribution decision
- Utilize Task-2 LSTM for comparing current paragraph with all previous paragraphs
- Decision *change*: Continue to next iteration
- Decision *no change*: Author is the same as author of reference
- New author when iterations done



Results & Discussion

	F_1	Accuracy	Precision	Recall	**Test set** F_1
Task 1	86.86	79.16	91.88	82.37	62.08
Task 2	79.18	95.95	87.26	72.47	66.90
Task 3	-	-	-	-	26.25

Table: Results on the validation data and test data

- Task 1 and Task 2 could be solved with relatively simple models
- Low score on test set suggests bad generalization
- Bottleneck of Task 3 is iterative prediction
- Low score suggests: Using one-on-one comparison is not enough

Future Work

- Create author profiles
- Parallelizing the loop of the attribution algorithm to increase computation speed
- Clustering/classification model

References

Robert Deibel and Denise Löfflad.
Style change detection on real-world data using lstm-powered attribution algorithm.
In *CLEF*, 2021.

Thank you for your attention!