CCLS 2023 Würzburg

2nd Conference for Computational Literary Studies
22nd and 23rd June 2023

TECHNISCHE UNIVERSITÄT DARMSTADT

fortext lab

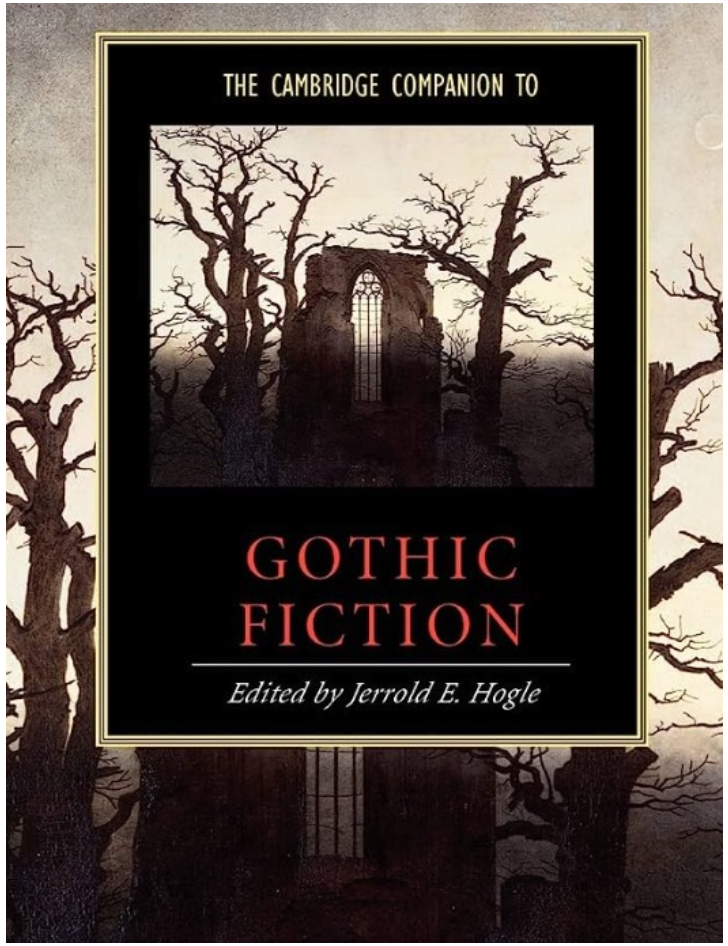
Svenja Guhr* & Mark Algee-Hewitt

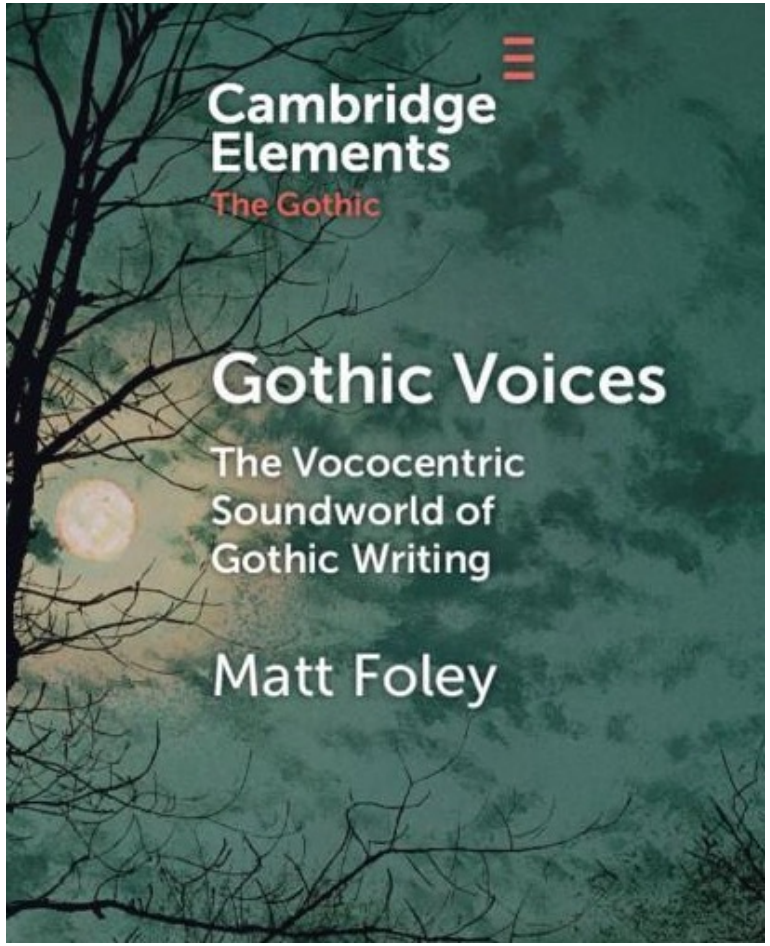
WHAT'S THAT SCARY SOUND?

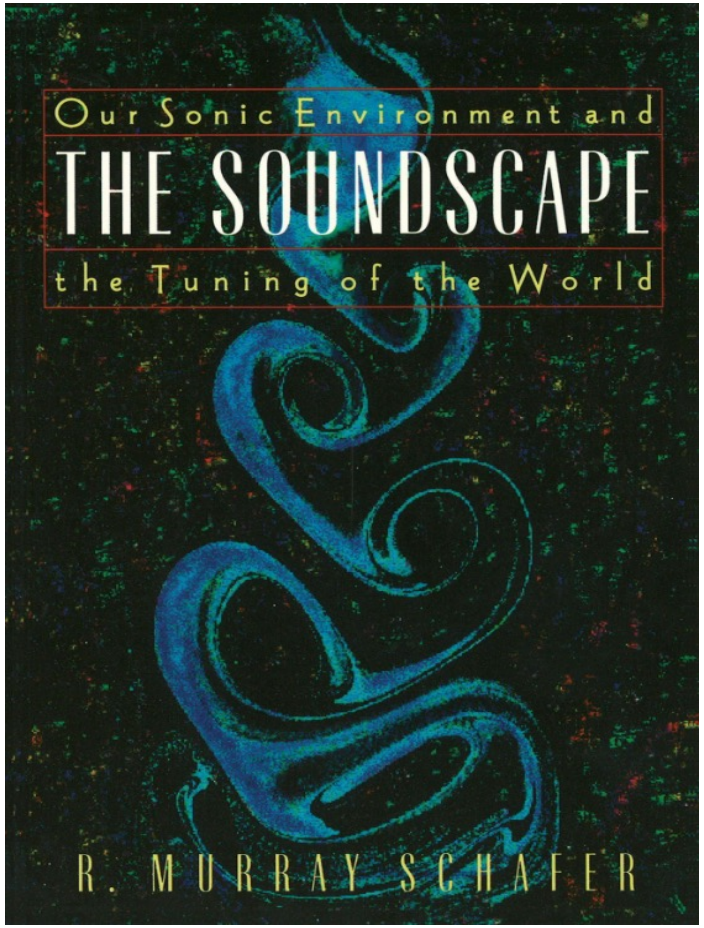
Ambient Sound in Gothic Fiction

TECHNISCHE UNIVERSITÄT DARMSTADT

SOUND IN GOTHIC FICTION







TECHNISCHE UNIVERSITÄT DARMSTADT

"'It's eleven o'clock **striking** by the **bell** of Saint Paul's. **Listen** and you'll **hear** all the **bells** in the city **jangling**.' Both sit **silent**, **listening** to the metal **voices**, near and distant, **resounding** from towers of various heights, in **tones** more various than their situations. When these at length **cease**, all **seems** more **mysterious** and **quiet** than before."

(Dickens *Bleak House*)

DALL-E mini by craiyon.com

TECHNISCHE UNIVERSITÄT DARMSTADT

AMBIENT SOUND IN FICTION

Soundscape (Schafer 1994)
=
sound + ~~land~~scape

pixabay

RESEARCH QUESTIONS

What is the function of ambient sound indications in fiction?

How differ soundscapes in English literary prose of the 19th century?

Does Gothic fiction contain particularly many ambient sound indications and provide a soundscape of loud and quiet sounds?

TECHNISCHE UNIVERSITÄT DARMSTADT

CORPUS

28 British Gothic novels and short stories mentioned in *The Handbook of the Gothic* (Mulvey-Roberts 2009)

27 other canonical 19th century British fiction

pixabay

TECHNISCHE UNIVERSITÄT DARMSTADT

METHOD

TECHNISCHE UNIVERSITÄT DARMSTADT

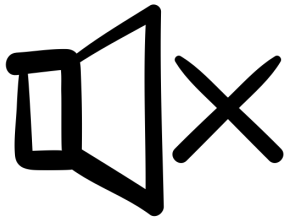
METHOD

Manual Annotation

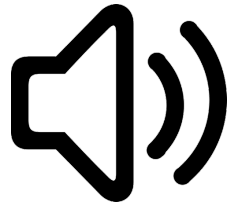
- *Guidelines for Ambient Sound Annotation* (Guhr 2023)
- manual annotation of 14 corpus texts (~1.5 Mio words)
- IAA: 0.80 *Cohen's kappa*

TECHNISCHE UNIVERSITÄT DARMSTADT

THE CHALLENGE:
IMPLICIT VS. EXPLICIT SOUND



The train enters the station.



The train rattles into the station.

The train **<sound>** rattles **</sound>** into the station.

pixabay

TECHNISCHE UNIVERSITÄT DARMSTADT

METHOD

Dictionary Approach

- Sound Dictionary {sound word : loudness level [1-4]}
- 228 sound words manually annotated (extracted from manually annotated training data)
- useful for the detection of lexical sound words
- many false positives (F1-score: 0.62)
- context independent annotation

TECHNISCHE UNIVERSITÄT DARMSTADT

THE CHALLENGE:
LEXICAL SOUND WORD ≠ SOUND IN FICTION

Sample from sound word dictionary:

```
{ 'sound'      : 3,
  'silence'    : 1,
  'cry'        : 4,
  'weeping'    : 2,
  'silent'     : 1,
  'loud'       : 4,
  'thunder'    : 4,
  'scream'     : 4,
  'singing'    : 3 }
```

False positives:

- Sounds in the past: "Last night I heard a woman screaming."
- Hypothetical sounds: "I might have cried, but I didn't."
- Negated sounds: "She heaved not one sigh."
- Non-sound-indicating properties: "The bird sang beautifully."

dictionary approach used as pre-annotation:
→ control and correction of false positives to get more training data

TECHNISCHE UNIVERSITÄT DARMSTADT

METHOD

Automatized Classification

- Software NEISS TEI Entity Enricher (Zöllner et al. 2021)
- based on:
  - implemented pre-trained BERT model for English (bert-base-cased by Devlin et al. 2019)
  - transfer learning algorithm (Kamath 2019)
- fine-tuning on 1.323.574 manually annotated words
- F1-Score: 0.71
- classification task: ‘sound’ vs. ‘no sound’

TECHNISCHE UNIVERSITÄT DARMSTADT

RESULTS

"As winter drew on and the days grew shorter I was sometimes almost certain that I heard a <sound level = 3>**noise**</sound> as if someone was <sound level=3>**playing**</sound> on the great organ in the hall.

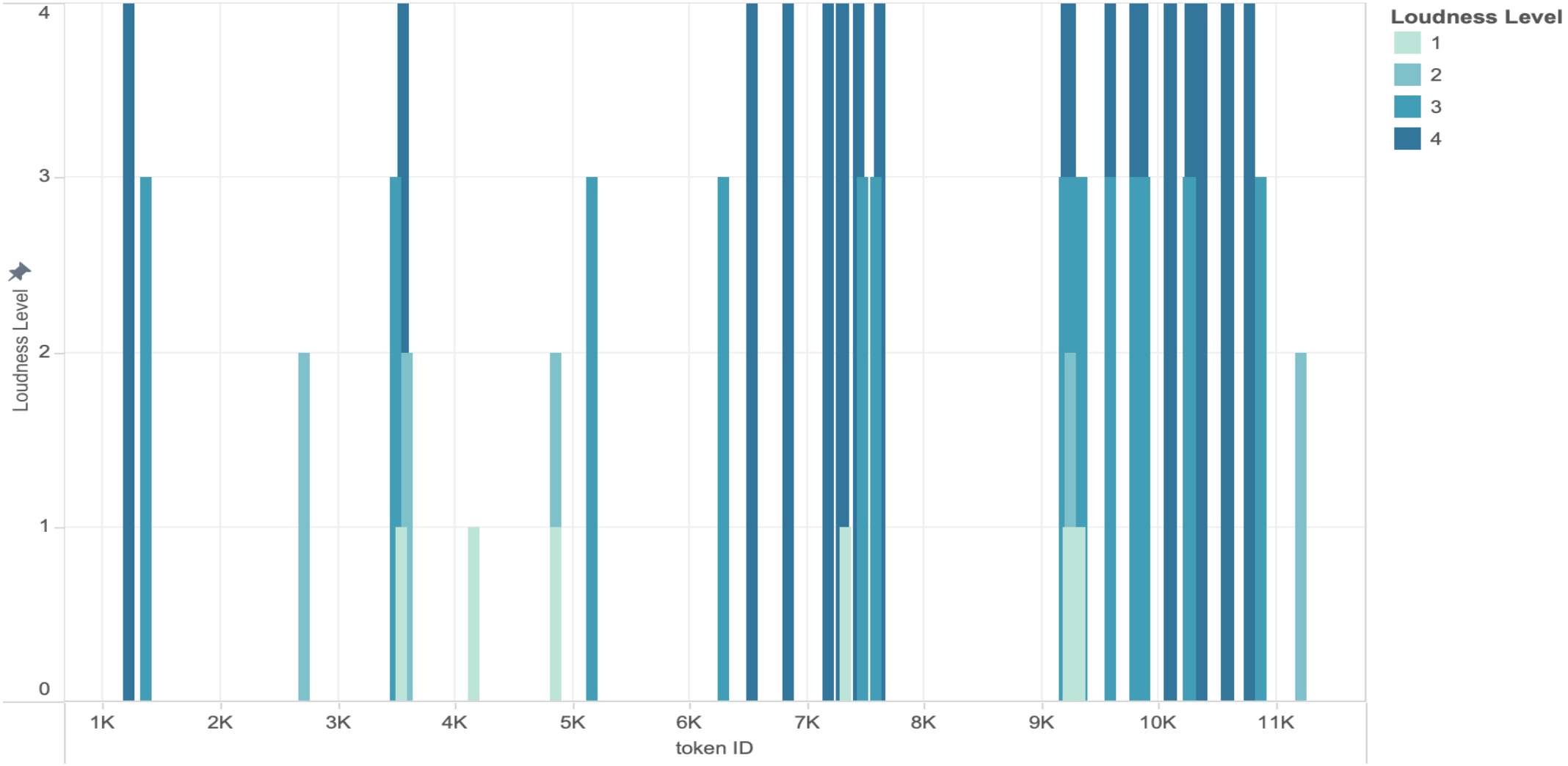
I did not hear it every evening; but certainly I did very often usually when I was sitting with Miss Rosamond after I had put her to bed and keeping quite <sound level=1>**still**</sound> and <sound level=1>**silent**</sound> in the bedroom.

Then I used to hear it <sound level=4>**booming**</sound> and <sound level=3>**swelling**</sound> away in the distance."

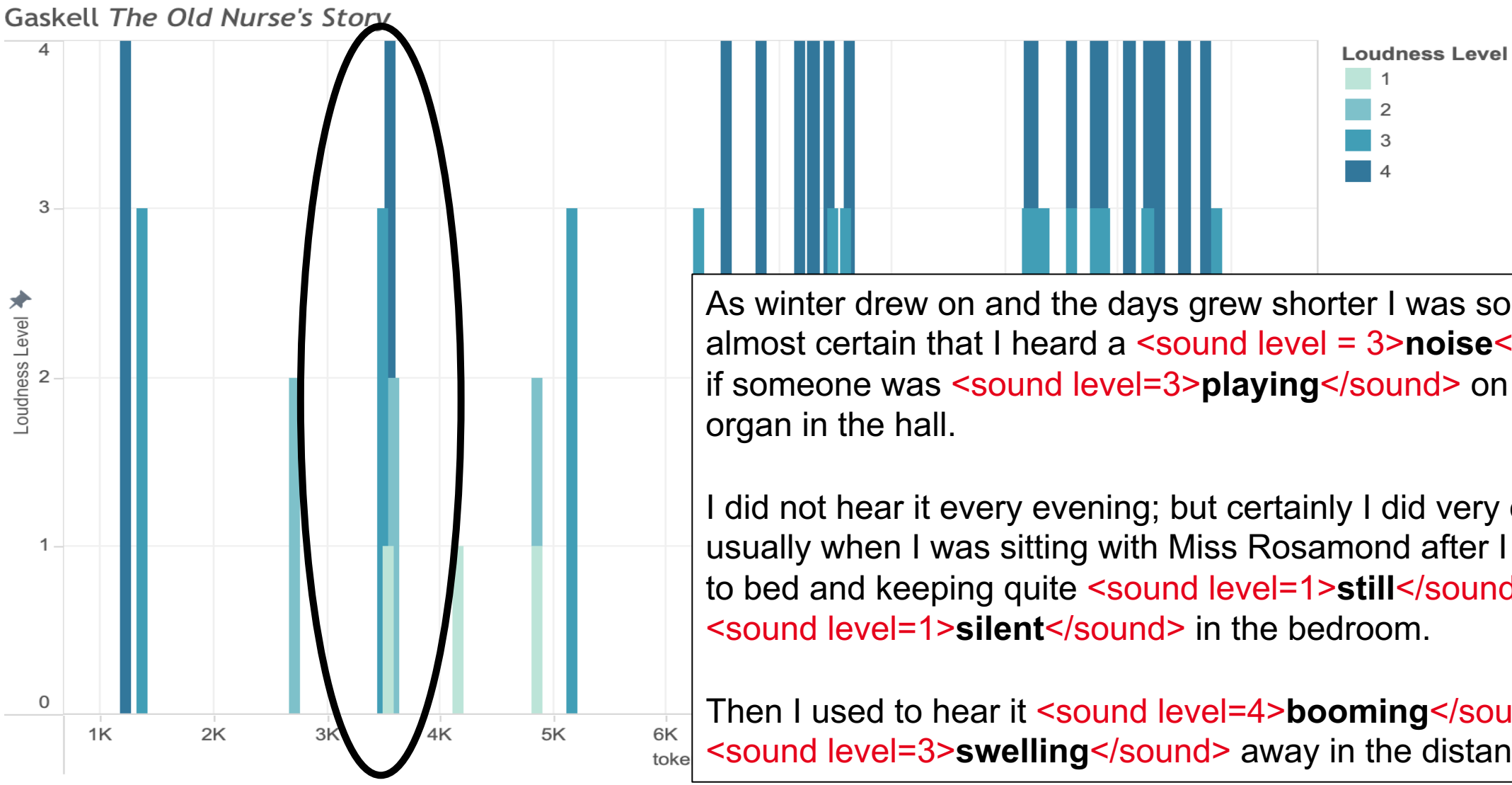
(Gaskell *The Old Nurse's Story*)

TECHNISCHE UNIVERSITÄT DARMSTADT

Gaskell *The Old Nurse's Story*



TECHNISCHE UNIVERSITÄT DARMSTADT



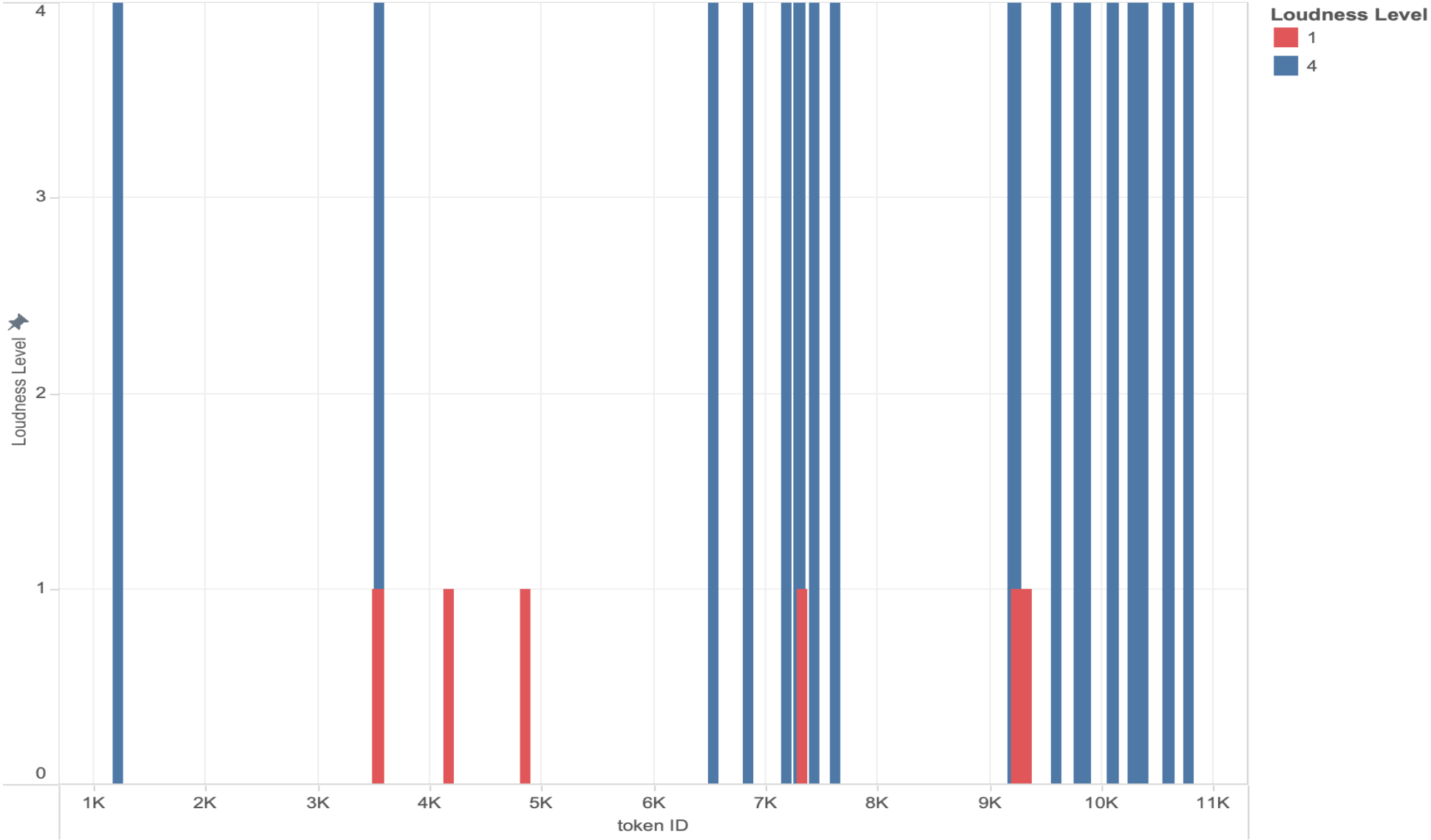
As winter drew on and the days grew shorter I was sometimes almost certain that I heard a <sound level = 3>**noise**</sound> as if someone was <sound level=3>**playing**</sound> on the great organ in the hall.

I did not hear it every evening; but certainly I did very often usually when I was sitting with Miss Rosamond after I had put her to bed and keeping quite <sound level=1>**still**</sound> and <sound level=1>**silent**</sound> in the bedroom.

Then I used to hear it <sound level=4>**booming**</sound> and <sound level=3>**swelling**</sound> away in the distance.

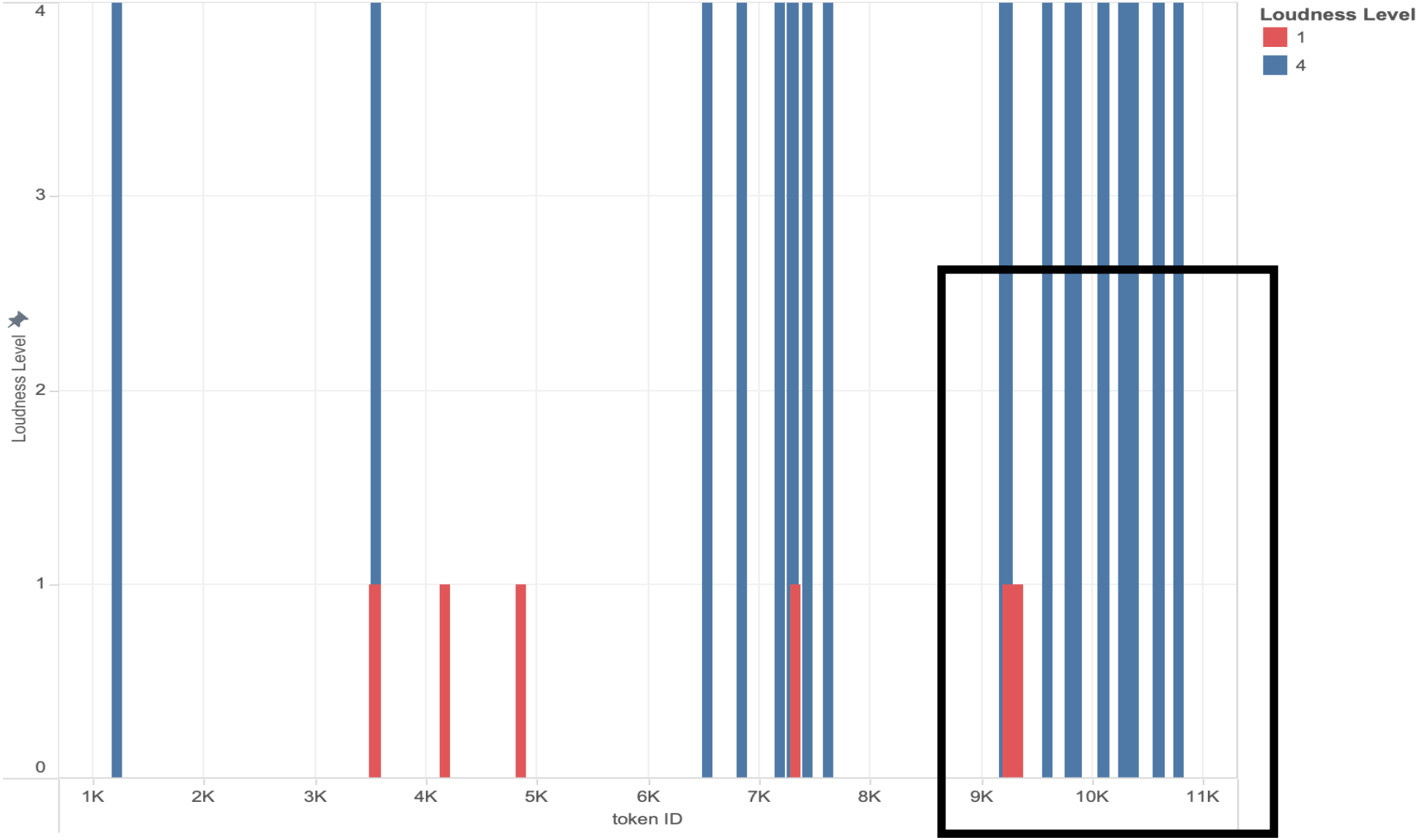
TECHNISCHE UNIVERSITÄT DARMSTADT

Gaskell *The Old Nurse's Story*



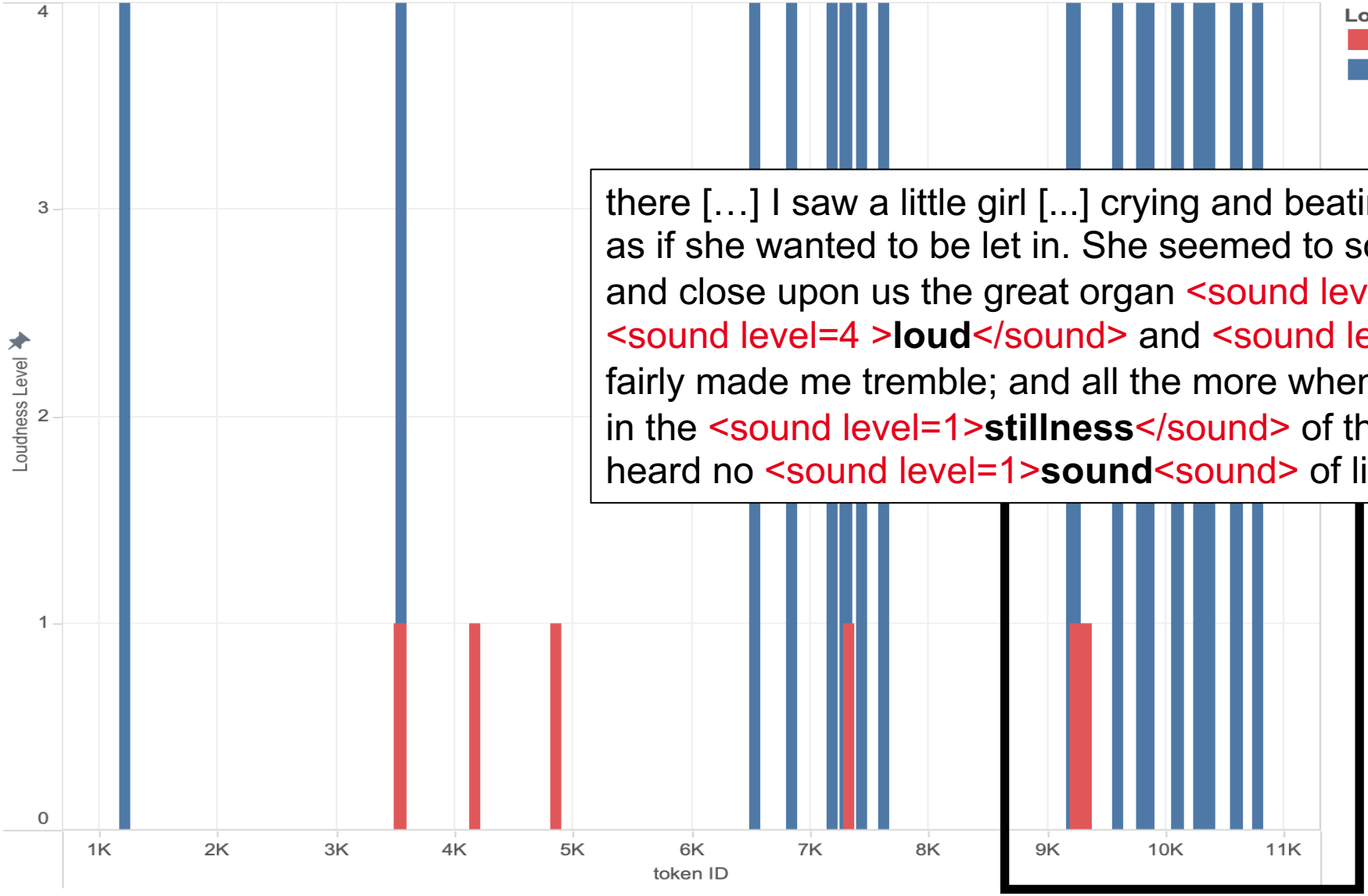
TECHNISCHE UNIVERSITÄT DARMSTADT

Gaskell *The Old Nurse's Story*



TECHNISCHE UNIVERSITÄT DARMSTADT

Gaskell *The Old Nurse's Story*

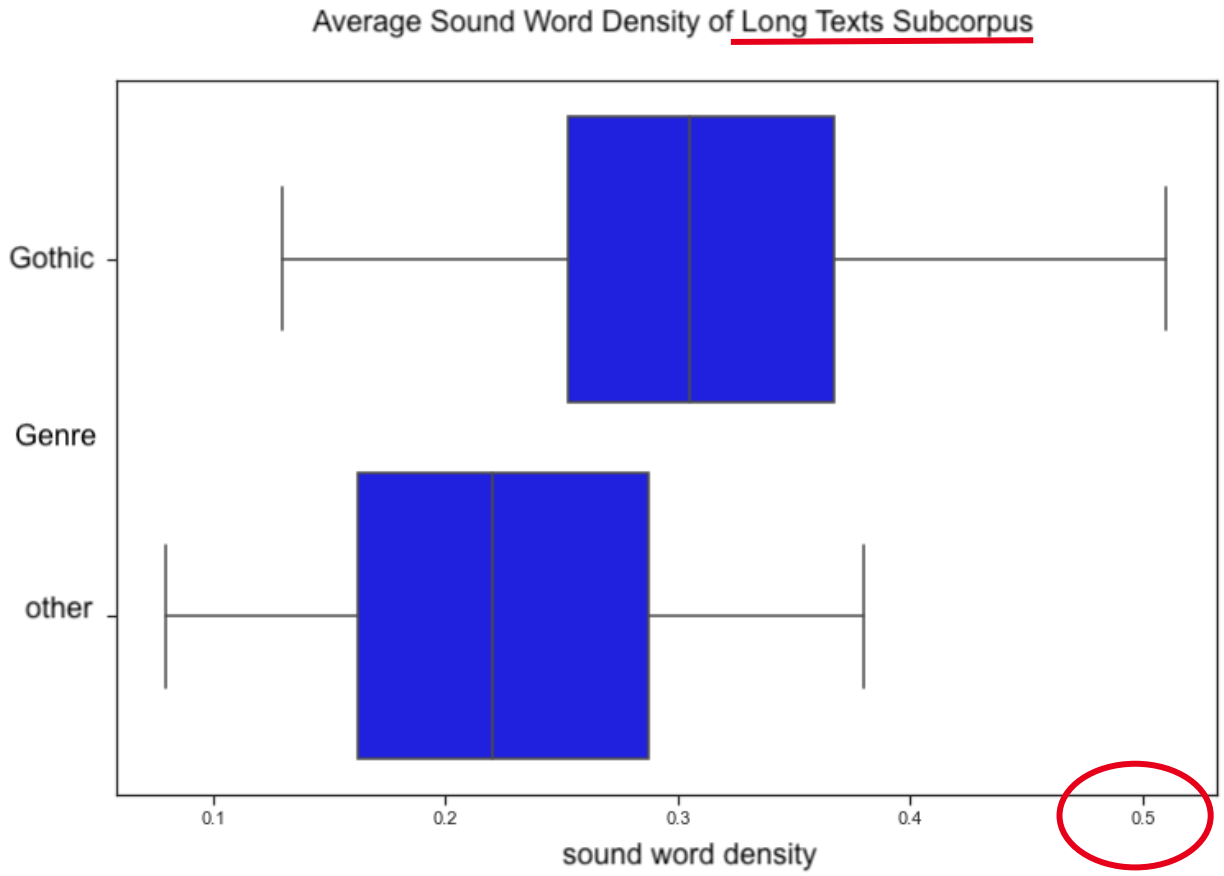


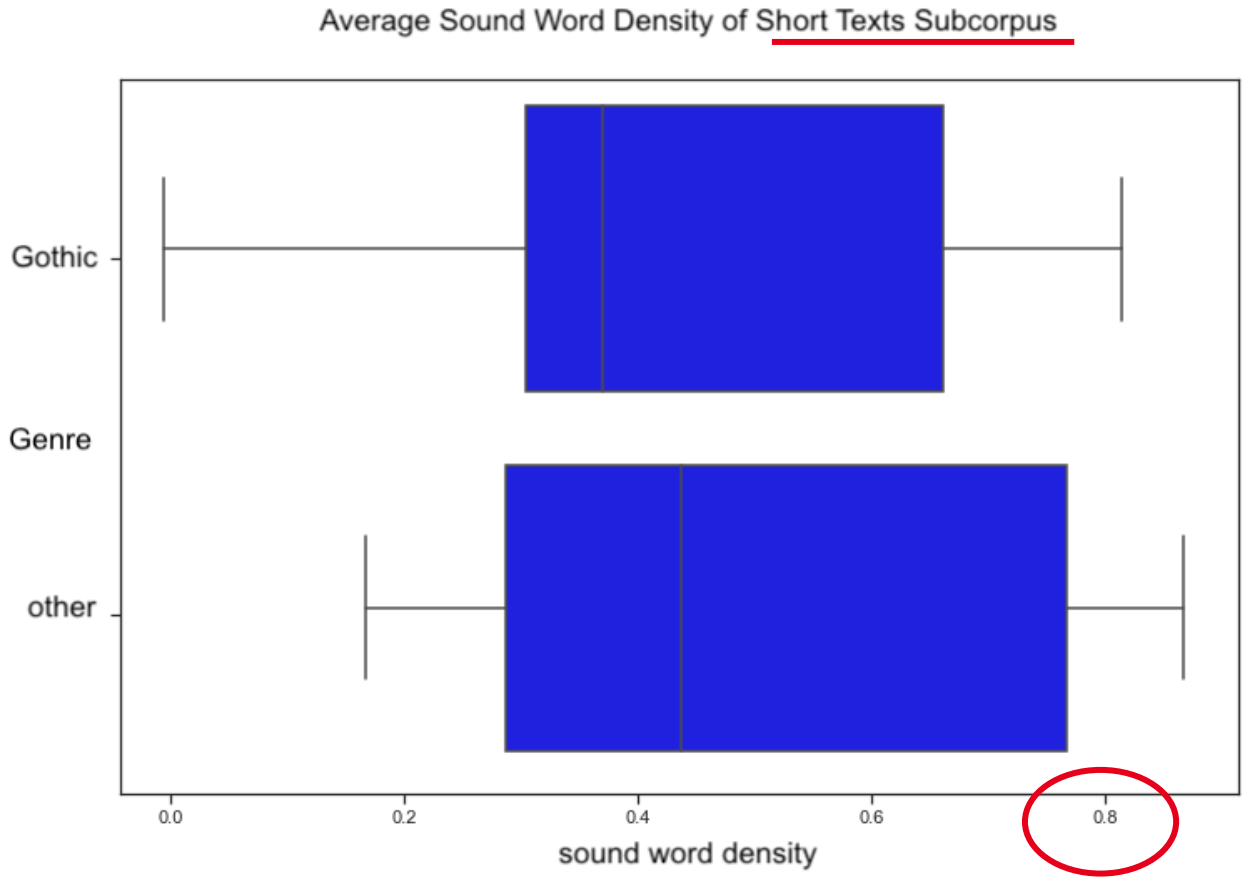
there […] I saw a little girl [...] crying and beating against the window-panes as if she wanted to be let in. She seemed to sob […] when all of a sudden and close upon us the great organ <sound level=4 >**pealed**</sound> out so <sound level=4 >**loud**</sound> and <sound level=4>**thundering**</sound> it fairly made me tremble; and all the more when I remembered me that even in the <sound level=1>**stillness**</sound> of that dead-cold weather I had heard no <sound level=1>**sound**<sound> of little battering hands.

TECHNISCHE UNIVERSITÄT DARMSTADT

LONG VS. SHORT TEXTS

$$\text{swd} = \frac{n_{sw}}{n_t} \cdot 100$$





CONCLUSIONS

- Ambient sound indications in fiction can be detected manually and automatically
- Passages with a high sound word density often happen to contain important plot elements
- Gothic fiction novels provide more ambient sound indications than other genres
- Gothic fiction provides a high frequency of loud ambient sound indications
- Short stories provide a particularly high average density of ambient sound indications in relation to their brevity

TECHNISCHE UNIVERSITÄT DARMSTADT

REFERENCES

- Bacon, Simon, ed. *The Gothic: A Reader*. Oxford: Peter Lang, 2018.
- Devlin, Jacob, Ming-Wei Chang, Kenton Lee, and Kristina Toutanova. “BERT: Pre-Training of Deep Bidirectional Transformers for Language Understanding.” In *Proceedings of the 2019 Conference of the North*, 4171–86. Minneapolis, Minnesota: Association for Computational Linguistics, 2019. https://doi.org/10.18653/v1/N19-1423.
- Foley, Matt. *Gothic Voices: The Vococentric Soundworld of Gothic Writing*. 1st ed. Cambridge University Press, 2023. https://doi.org/10.1017/9781009162579.
- Hurley, Kelly. “British Gothic Fiction, 1885-1930.” In *The Cambridge Companion to Gothic Fiction*, edited by Jerrold E. Hogle, 189–207. Cambridge Companions to Literature. Cambridge: Cambridge University Press, 2002.
- Kamath, Uday, John Liu, and James Whitaker. “Transfer Learning: Domain Adaptation.” In *Deep Learning for NLP and Speech Recognition*, by Uday Kamath, John Liu, and James Whitaker, 495–535. Cham: Springer International Publishing, 2019. https://doi.org/10.1007/978-3-030-14596-5_11.
- Lemke,Marc. NEISSNTEE. UserInterface. Documentation, 2022. url: https://github.com/NEISSproject/tei_entity_enricher.
- Mulvey Roberts, Marie, ed. *The Handbook of the Gothic*. 2nd ed. New York: New York University Press, 2009.
- Pichler, Axel, and Nils Reiter. “Reflektierte Textanalyse.” In *Reflektierte Algorithmische Textanalyse*, edited by Nils Reiter, Axel Pichler, and Jonas Kuhn, 43–60. De Gruyter, 2020. https://doi.org/10.1515/9783110693973-003.
- Reiter, Nils. “Anleitung Zur Erstellung von Annotationsrichtlinien.” In *Reflektierte Algorithmische Textanalyse*, edited by Nils Reiter, Axel Pichler, and Jonas Kuhn, 193–202. De Gruyter, 2020. https://doi.org/10.1515/9783110693973-009.
- Schafer, R. Murray. *The Soundscape: Our Sonic Environment and the Tuning of the World*. Rochester, Vt. : [United States]: Destiny Books ; Distributed to the book trade in the United States by American International Distribution Corp, 1994.
- Schumacher, Mareike Katharina, Marie Flüh, and Marc Lemke. “The Model of Choice. Using Pure CRF- and BERT-Based Classifiers for Gender Annotation in German Fantasy Fiction.” In *Book of Abstracts*, 2022. https://dh2022.dhii.asia/dh2022bookofabsts.pdf.
- Zöllner, Jochen, Konrad Sperfeld, Christoph Wick, and Roger Labahn. “Optimizing Small BERTs Trained for German NER.” *Information* 12, no. 11 (2021): 443. https://doi.org/10.3390/info12110443.

CCLS 2023 Würzburg

2nd Conference for Computational Literary Studies
22nd and 23rd June 2023

TECHNISCHE UNIVERSITÄT DARMSTADT

fortext lab

Svenja Guhr* & Mark Algee-Hewitt

WHAT'S THAT SCARY SOUND?

Ambient Sound in Gothic Fiction

MY OPEN QUESTIONS

- Do you have an idea for an alternative approach to comparing long and short texts to the sound word density calculation?
- How can I ameliorate my visualizations for not having the absolute number of tokens as the x-axis but still a valid representation of the sound tokens?
- What do you think about the distinction between character sound with and without communicative purpose? And categorizing the latter as ambient sound?
- Is it time for a SoundBERT?

TECHNISCHE UNIVERSITÄT DARMSTADT

APPENDIX

SOUND WORD DENSITY

$$\text{swd} = \frac{n_{sw}}{n_t} \cdot 100$$

CORPUS

number of texts	55
number of texts mentioned in The Handbook of the Gothic (Mulvey Roberts 2009)	28
other 19th century British fictional prose	27
number of texts written by female authors	19
number of texts written by male authors	36
shortest text (in words)	981
longest text (in words)	357.469
texts manually sound annotated	14
texts dictionary-based sound annotated (corrected false positives)	7
texts automatically annotated for sound	36
training set (in words)	1.323.574
test set (in words)	144.267