Soundful Dickens

THE NARRATIVE FUNCTIONS OF SOUNDS IN DICKENS'S FICTIONAL WORLDS
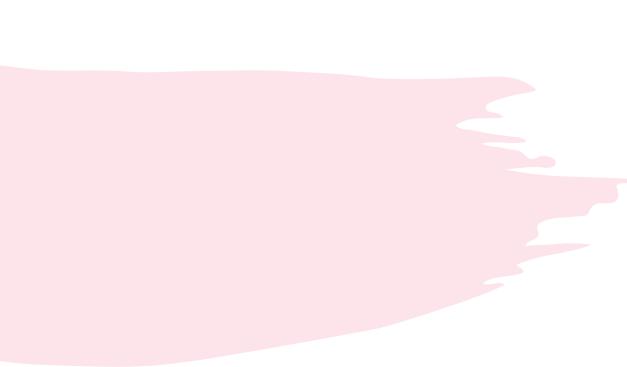
Michaela Mahlberg   Svenja Guhr

Talk Outline

1. Sound in Literary Fiction

2. Use Case: Sounds in the Dickens Novel Corpus (DNov)

Sound in Literary Fiction

Sound in Literary Fiction

"

But there was nothing on the back of the door, except the screws and nuts that held the knocker on, so he said, "Pooh, pooh!" and closed it with a bang. The sound resounded through the house like thunder. […]

He tried to say 'Humbug!' but stopped at the first syllable. […]

The curtains of his bed were drawn aside, I tell you, by a hand. […]

"Jacob!" he said imploringly. "Old Jacob Marley, tell me more! Speak comfort to me Jacob!" "I have none to give", the Ghost replied. "It comes from other regions, Ebenezer Scrooge, and is conveyed by other ministers to other kinds of men. Nor can I tell you what I would. […]"

(A Christmas Carol, C. Dickens)

Sound in Literary Fiction

> But there was nothing on the back of the door, except the screws and nuts that held the knocker on, so **he said**, "Pooh, pooh!" and closed it **with a bang**. The **sound resounded** through the house **like thunder**. […]
>
> He **tried to say** 'Humbug!' but **stopped at the first syllable**. […]
>
> The curtains of his bed were drawn aside, **I tell you**, by a hand. […]
>
> "Jacob!" **he said imploringly**. "Old Jacob Marley, **tell me more! Speak comfort** to me Jacob!" "I have none to give", the **Ghost replied**. "It comes from other regions, Ebenezer Scrooge, and is conveyed by other ministers to other kinds of men. **Nor can I tell you** what I would. […]"

(*A Christmas Carol*, C. Dickens)

Sound in Literary Fiction

But there was nothing on the back of the door, except the screws and nuts that held the knocker on, so **he said**, "Pooh, pooh!" and closed it **with a bang.** The **sound resounded** through the house **like thunder.** […]

He **tried to say** 'Humbug!' but **stopped at the first syllable.** […]

The curtains of his bed were drawn aside, **I tell you**, by a hand. […]

"Jacob!" **he said imploringly.** "Old Jacob Marley, **tell me more! Speak comfort** to me Jacob!" "I have none to give", the **Ghost replied.** "It comes from other regions, Ebenezer Scrooge, and is conveyed by other ministers to other kinds of men. **Nor can I tell you** what I would. […]"

(*A Christmas Carol*, C. Dickens)

Research Questions

- **Methodologically:**
  How can we operationalize sound in literary fiction so that its textual representation can be automatically detected and made measurable for distant reading?

- **Literary Analysis:**
  How can sound annotations help us identify meaningful patterns and structural functions in narrative fiction?
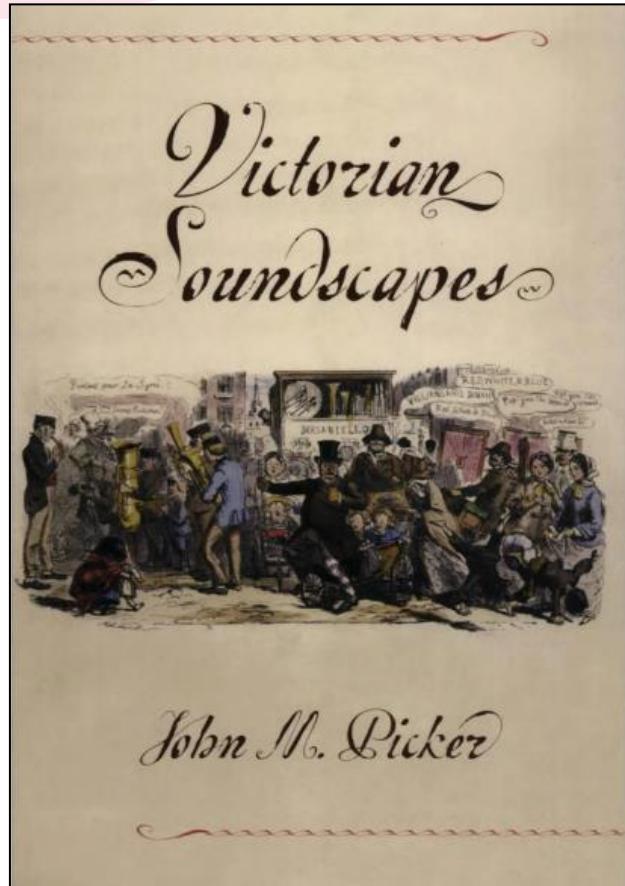
Sounds in Literary Fiction

→ Principle of Minimal Departure (Ryan 1991, 2013: 15)

"
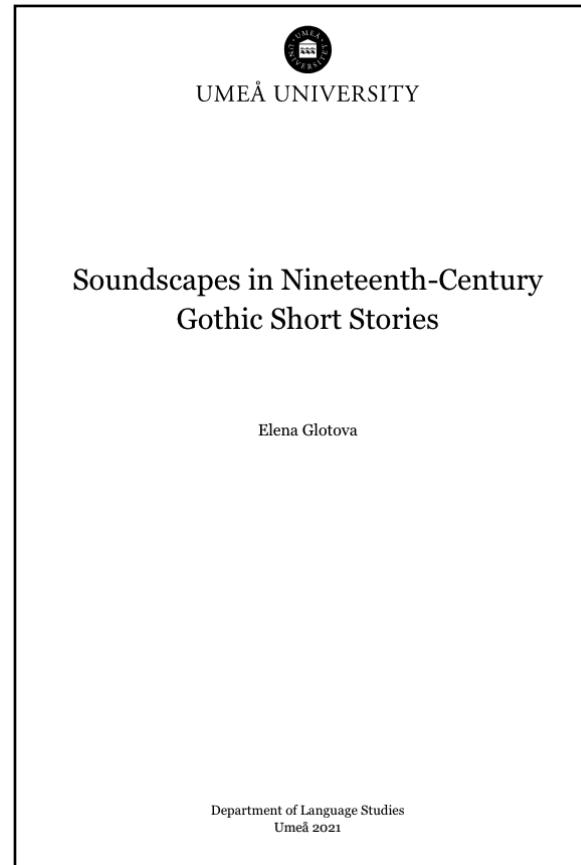
fictional text [is not limited] to an imitation of reality[, but] texts are free to construct fictional worlds that differ from [actual worlds] [...] [while] imagin[ing] fictional worlds as the closest possible to [actual worlds].
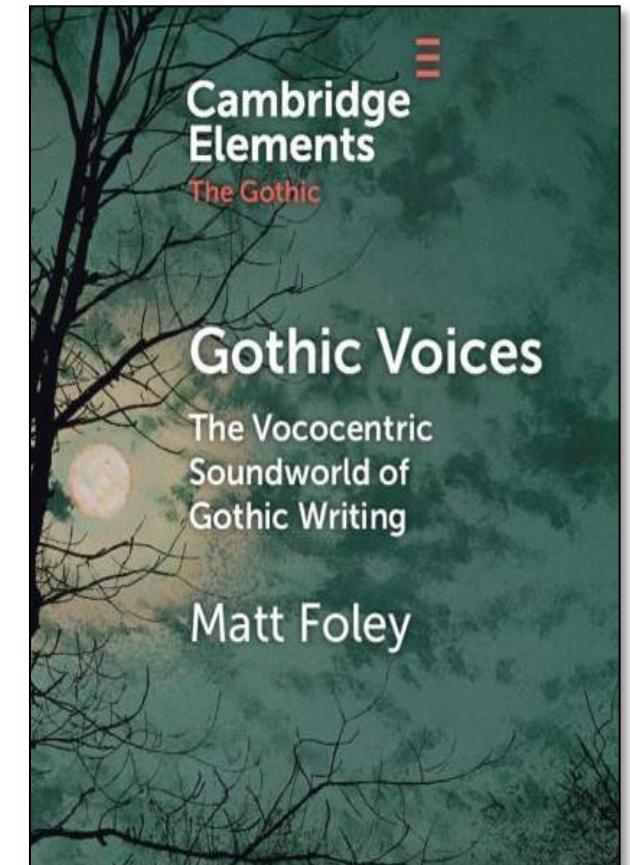
Research on Sound in Literary Studies

Picker (2003)

Glotova (2021)

Foley (2023)

Research on Sound in Literary Studies

Stadt hören

Auditive Wahrnehmung in *Berlin Alexanderplatz* von Alfred Döblin

Hearing the city. Aural perception in *Berlin Alexanderplatz* by Alfred Döblin
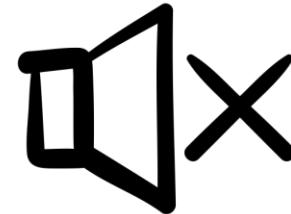
Published: 27 February 2017

Volume 38, pages 51–67, (2008)   Cite this article

Bernhart ([2008]2017)

Implicit vs. Explicit Sound

The train enters the station.

The train enters the station.

The train **sound** station.

Stadt hören

Auditive Wahrnehmung in *Berlin Alexanderplatz* von Alfred Döblin

Hearing the city. Aural perception in *Berlin Alexanderplatz* by Alfred Döblin

Published: 27 February 2017

Volume 38, pages 51–67, (2008)   Cite this article

Bernhart ([2008]2017)

From Sound Word to Sound Event
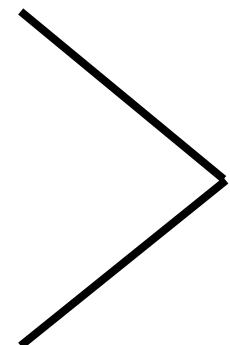
But there was nothing on the back of the door, except the screws and nuts that held the knocker on, so he said, "Pooh, pooh!" and closed it with a bang. The sound resounded through the house like thunder.

From Sound Word to Sound Event

But there was nothing on the back of the door, except the screws and nuts that held the knocker on, so he **said**, "Pooh, pooh!" and closed it with a **bang**. The **sound resounded** through the house like **thunder**.

Sound Words:
say, bang, sound, resound

Sound Quality:
like thunder
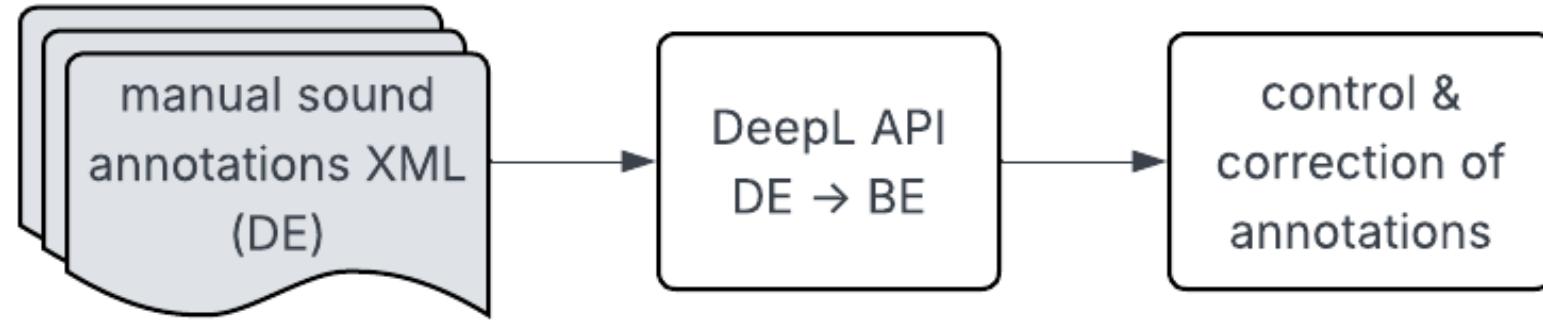
Sound Events:
- he said
- closed it with a bang
- The sound resounded through the house like thunder

(Gius/Vauth 2021; Guhr 2026)

Manual Annotation

- Annotation in XML TEI:
  - <character_sound>sound event</character_sound>
  - <ambient_sound>sound event</ambient_sound>

But there was nothing on the back of the door, except the screws and nuts that held the knocker on, so <character_sound>**he said**</character_sound>, "Pooh pooh!" and <ambient_sound>**closed it with a bang**</ambient_sound>. <ambient_sound>**The sound resounded through the house like thunder**</ambient_sound>.

(Guhr 2026)
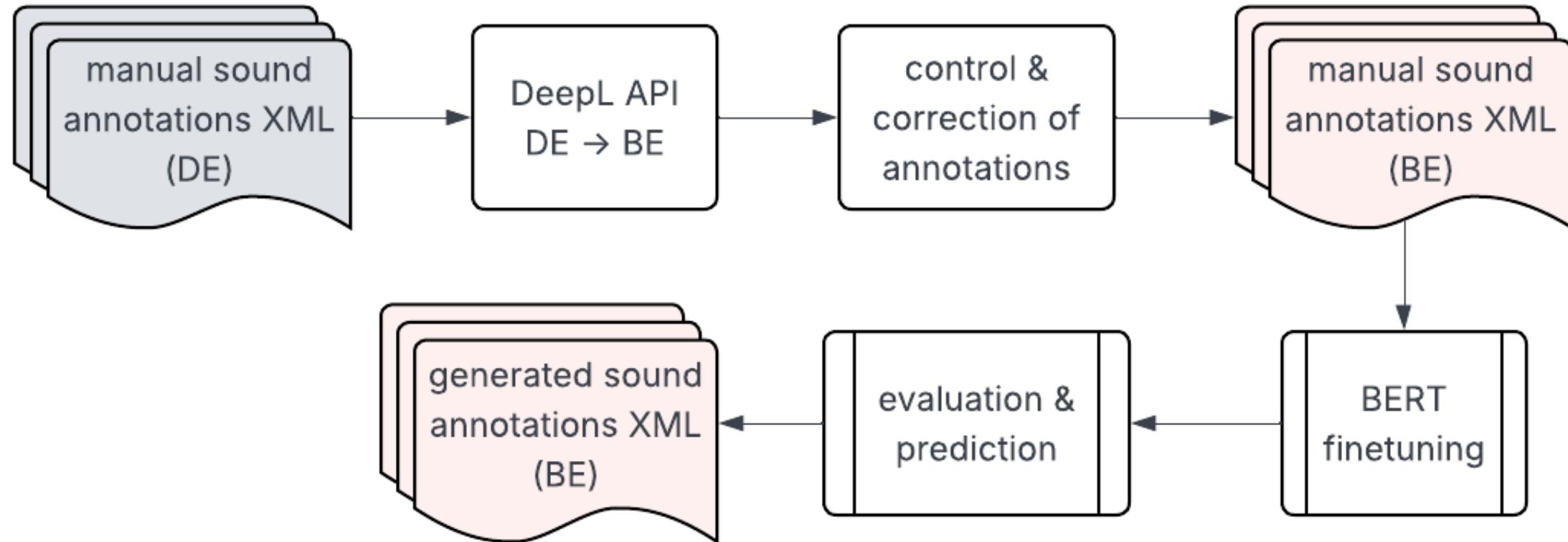
Experiment: Can machine translations enrich hand-labeled training data?

Workflow from German-language manual XML annotations to British English automatically generated XML annotations.

Experiment: Can machine translations enrich hand-labeled training data?
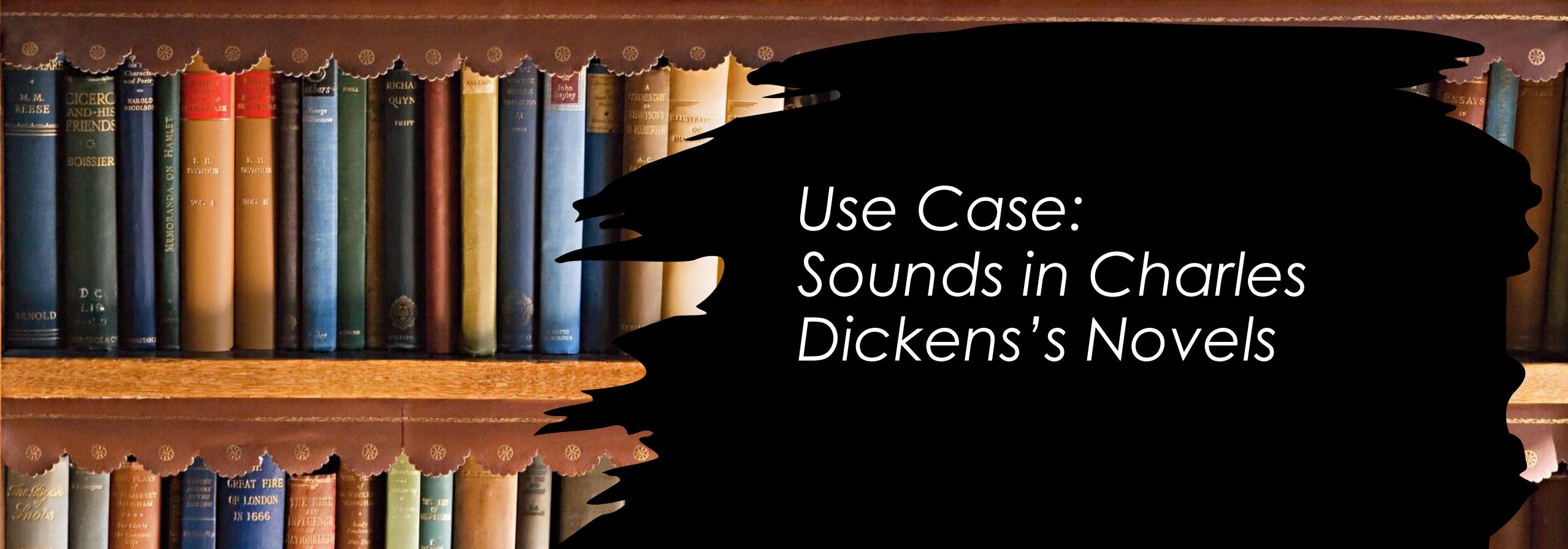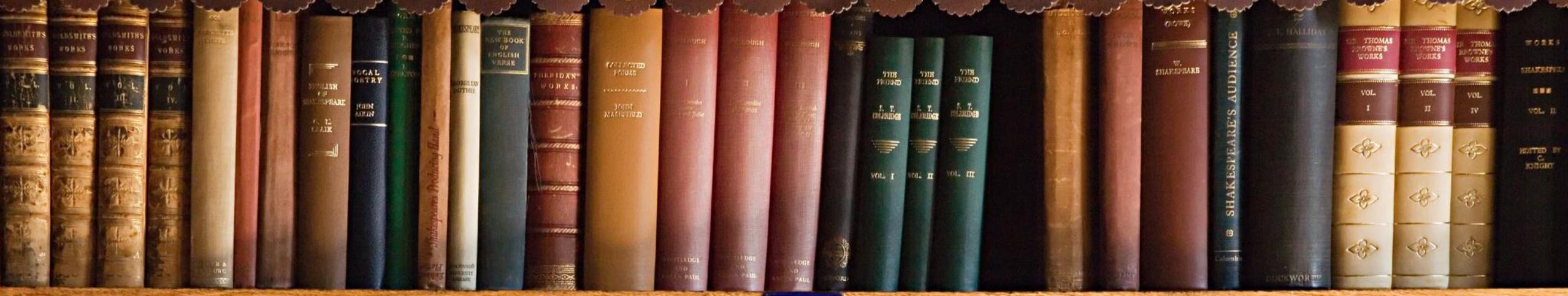
Workflow from German-language manual XML annotations to British English automatically generated XML annotations.
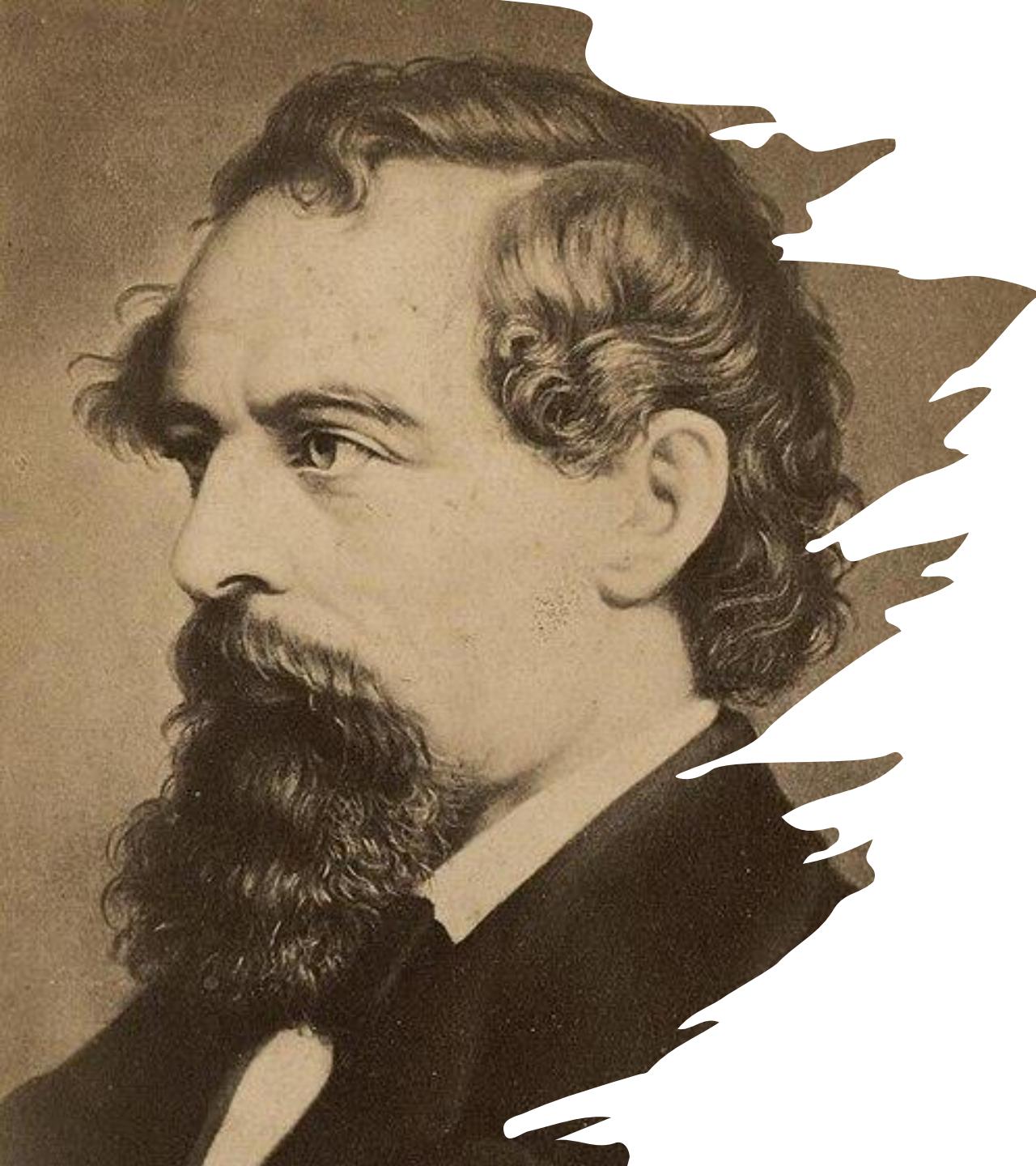
Evaluation

BE sound event models	texts	words	annotations	E-F1-Score	precision	recall	F1-score
training set with translations	5	50,804	1,046	0.65	0.54	0.62	0.58
training set without translations	3	62,462	1,066	0.62	0.52	0.54	0.53
mixed training set	7	82,999	1,464	0.66	0.55	0.61	0.58

Evaluation results of the three different models calculated in NEISS NTEE (Lemke et al. 2023).

Use Case:
Sounds in Charles
Dickens's Novels
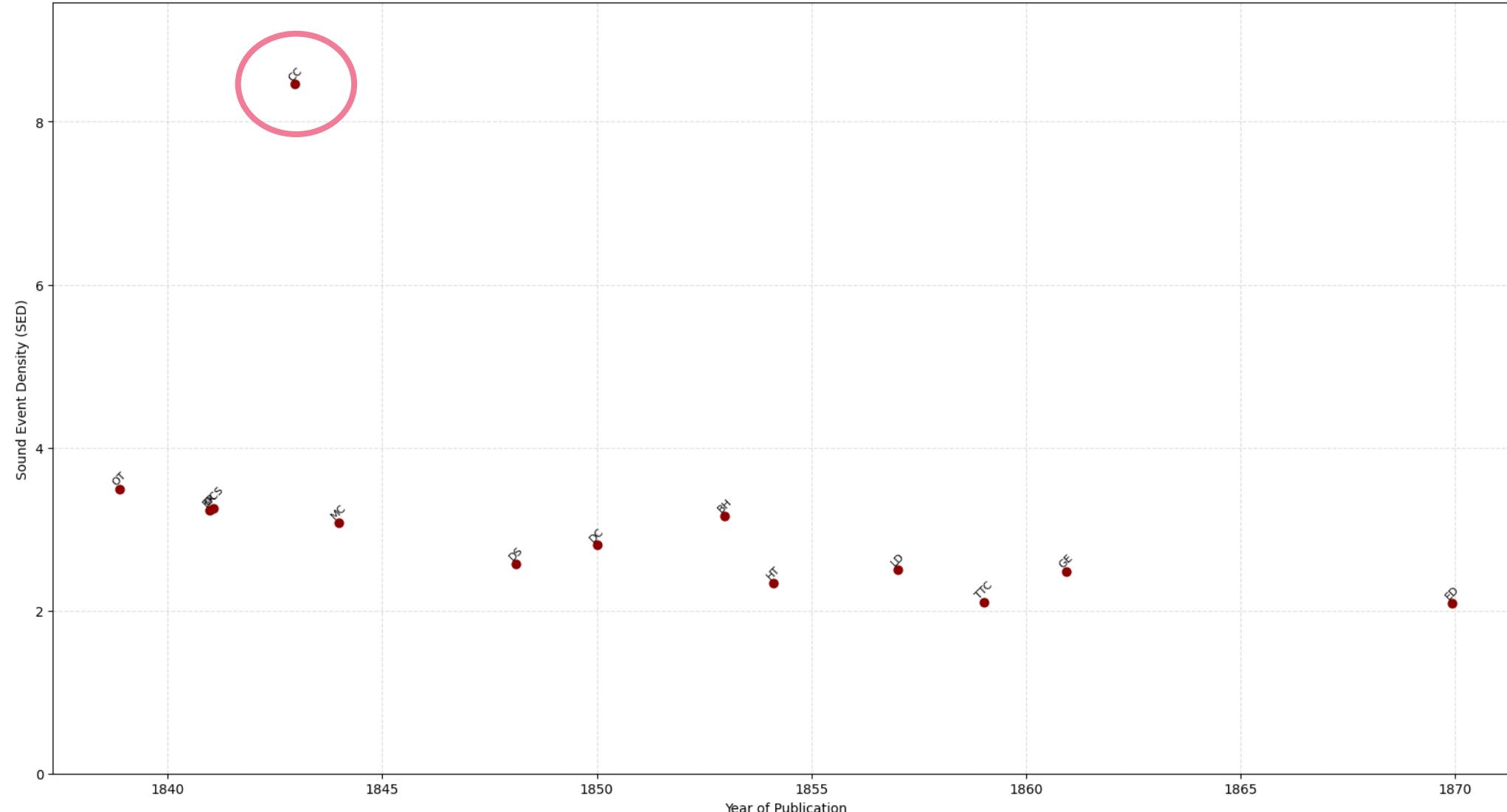
Analysis of the Charles Dickens Novel Corpus (DNov)

- DNov Corpus: 15 novels by Charles Dickens
  + novella *A Christmas Carol*

- Published between 1836 – 1870

- 3,835,807 words

- Open Access: https://github.com/mahlberg-lab/corpora

Sound Event Density (SE$_D$)

$$SE_D = \frac{T_{se}}{T_{pe}} \cdot 100$$

Sound Event Density per Text by Year

n = 16

Signal Sounds in *A Christmas Carol*
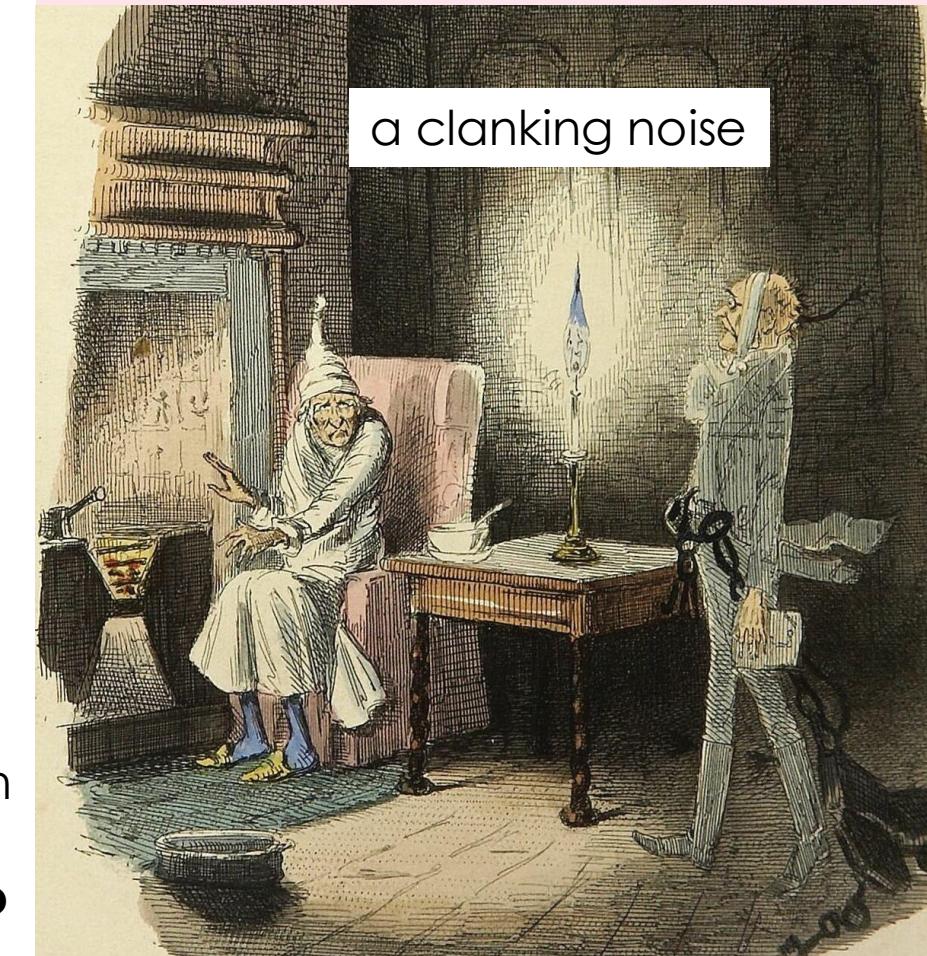
As he threw his head back in the chair, his glance happened to rest upon a bell, a disused bell, that hung in the room, and communicated, for some purpose now forgotten, with a chamber in the highest story of the building.

It was with great astonishment, and with a strange, inexplicable dread, that, as he looked, he saw this bell begin to swing.
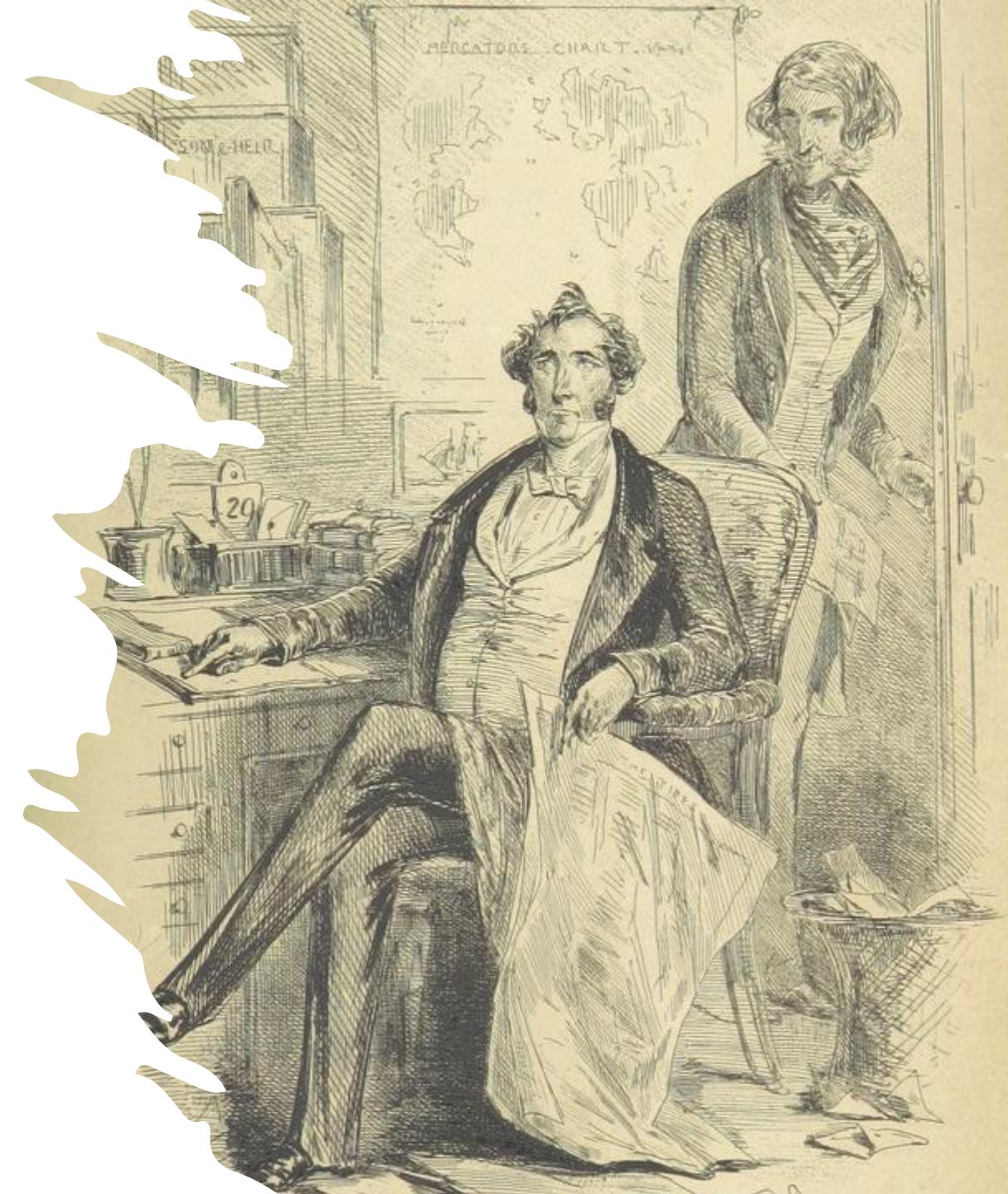
It swung so softly in the outset <ambient_sound>**that it scarcely made a sound**</ambient_sound>; <ambient_sound>**but soon it rang out loudly**</ambient_sound>, <ambient_sound>**and so did every bell in the house**</ambient_sound>.

This might have lasted half a minute, or a minute, but it seemed an hour. The bells ceased as they had begun, together. <ambient_sound>**They were succeeded by a clanking noise, deep down below** </ambient_sound>; as if some person were dragging a heavy chain over the casks in the wine-merchant's cellar.
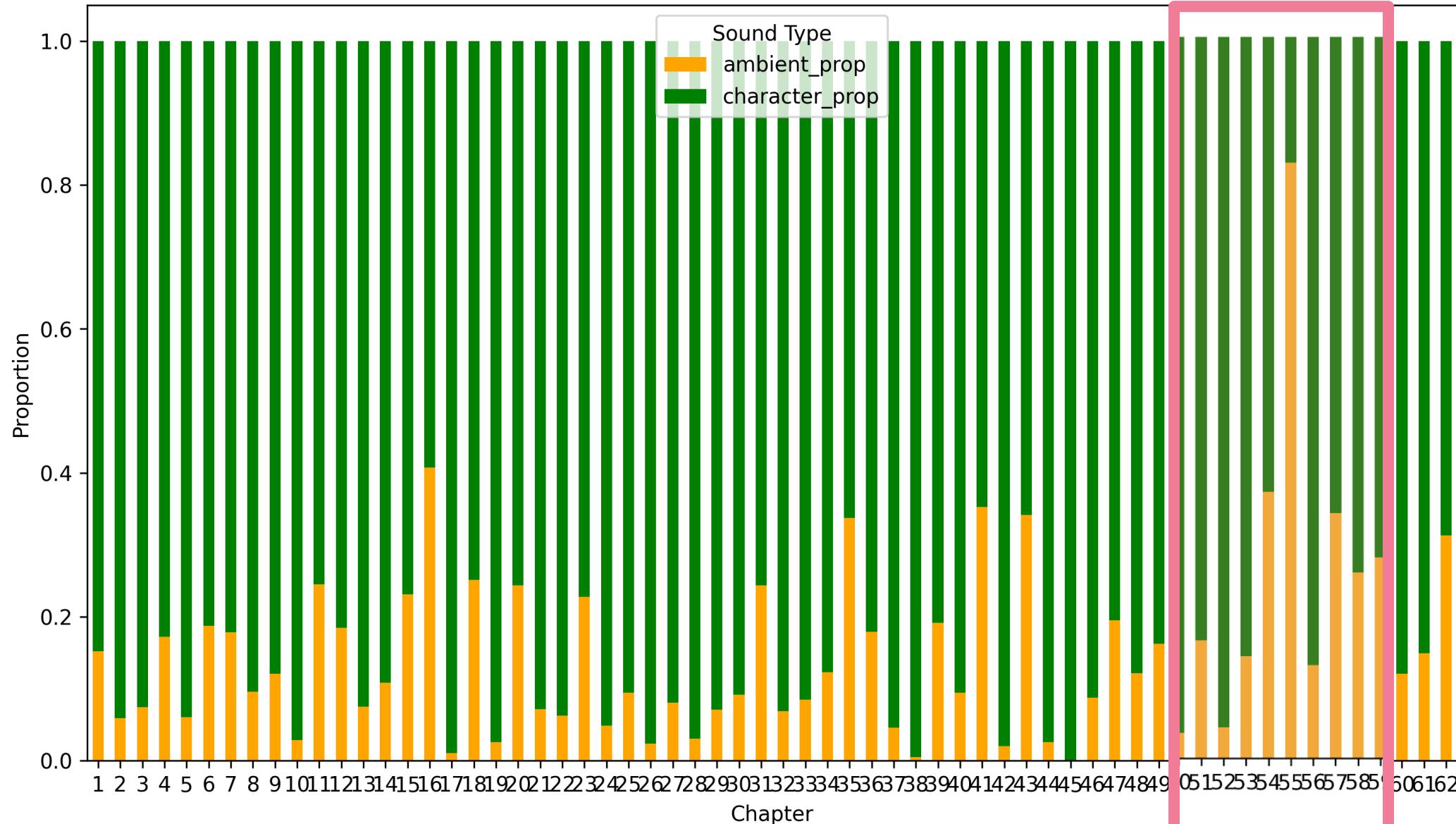
a clanking noise

Sound Event Density in *Dombey & Son*

Proportion of Ambient vs. Character Sounds per Chapter
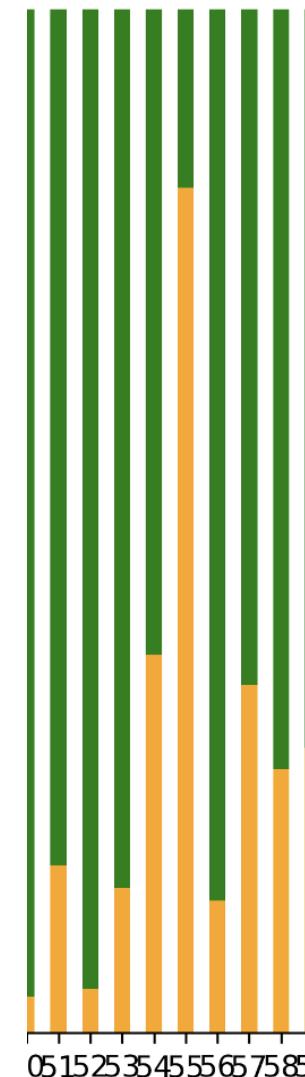
Sound events per chapter in *Dombey and Son* with peak of ambient sounds in chapter 55.

Chapter 55: Flight and Death of the villain *Mr.* Carker
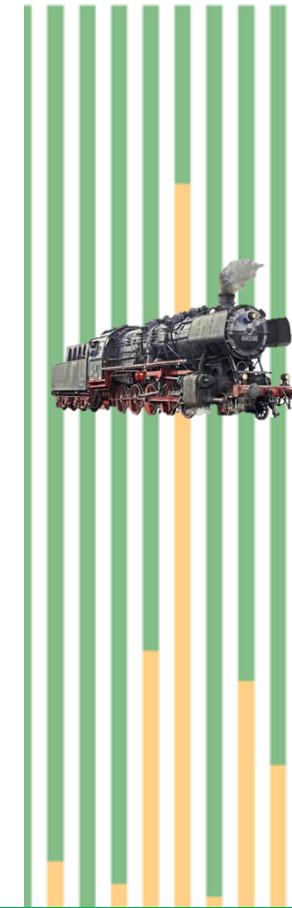
- Key plot element stands out

- Restlessness, eerie soundscape of the journey

- Repetition and ambiguous use of "monotony"
  - "bells and wheels and horses' feet"

	of change upon change, and still the same	monotony of bells	and wheels, and horses' feet, and no rest.	DS
	ow, wet weather and dry, and still the same	monotony of bells	and wheels, and horses' feet, and no rest.	DS
	rs, coaches, military drums, arcades. Of the	monotony of bells	and wheels and horses' feet being at length	DS
	e travelled on towards the seacoast, of the	monotony of bells	and wheels, and horses' feet, and no rest.	DS
	n windows by the roadside; and still the old	monotony of bells	and wheels, and horses' feet, and no rest.	DS
	height and hollow, jaded and scared by the	monotony of bells	and wheels, and horses' feet, and no rest.	DS
	led by the vision of his journey, and the old	monotony of bells	and wheels and horses' feet, until another	DS

05 15 25 35 45 55 65 75 85 9

Chapter 55: Flight and Death of the villain Mr. Carker

- Key plot element stands out

- Restlessness, eerie soundscape of the journey

- Repetition and ambiguous use of "monotony"
  - "bells and wheels and horses' feet"

- Peak in loudness when struck by a train

```
<ambient_sound>He heard a shout</ambient_sound>--another--saw the face change from its vindictive passion to a faint
sickness and terror--felt the earth tremble--knew in a moment that the rush was come--<character_sound>uttered a
shriek</character_sound>--looked round--saw the red eyes, bleared and dim, in the daylight, close upon him--was
beaten down, caught up, and whirled away upon a jagged mill, that spun him round and round, and struck him limb from
limb, and licked his stream of life up with its fiery heat, and cast his mutilated fragments in the air.
```

Conclusion

- Small training set + powerful language model = useful predictions
- But: the more data, the better the model
- Automated translation of data sets offers new opportunities:
  - → Reuse of existing other language data sets
- Sound annotations in literary fiction:
  - Structural elements
  - Foregrounding function
  - Key plot elements

Code and Data

Find corpus, slides, code, further visualisations, and updates on:

https://github.com/mahlberg-lab/corpora
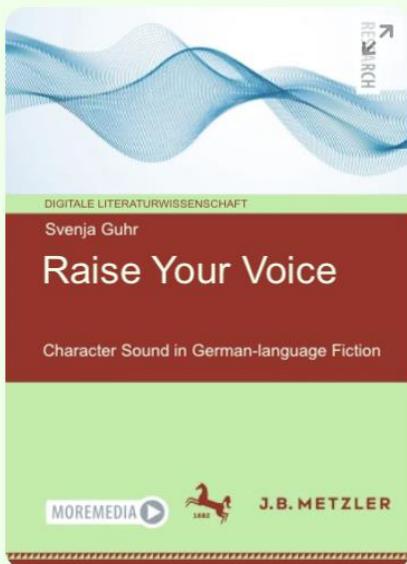
https://github.com/SvenjaGuhr/Literary_Soundscapes

https://github.com/SvenjaGuhr/Raise-Your-Voice

Home > Book

Raise Your Voice

Character Sound in German-language Fiction

coming soon

DIGITALE LITERATURWISSENSCHAFT

Svenja Guhr

Raise Your Voice

Character Sound in German-language Fiction

MOREMEDIA ▶   J.B. METZLER
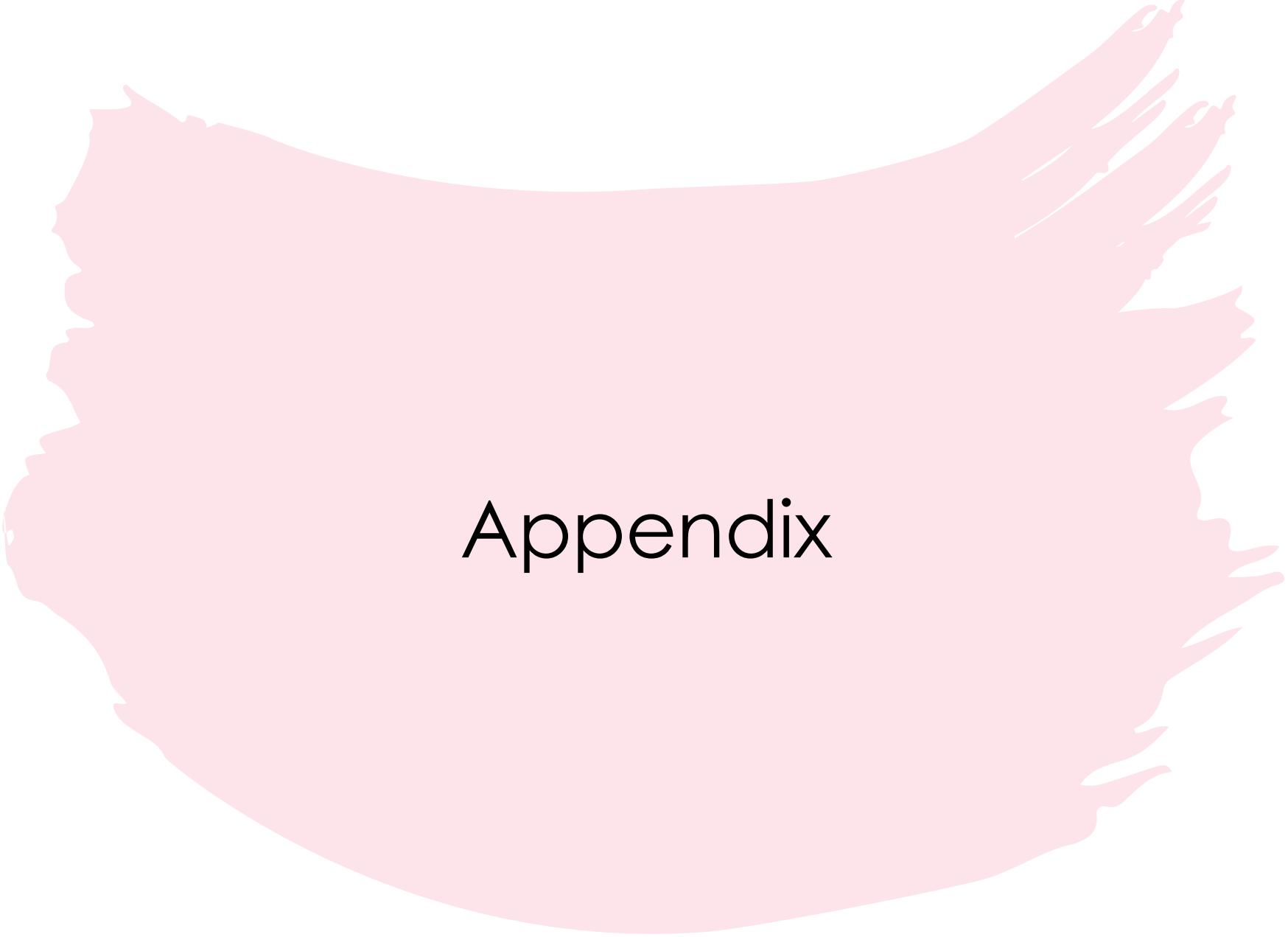
References

Breitsameter, Sabine. 2018. „Soundscape". In *Handbuch Sound: Geschichte – Begriffe – Ansätze,* edited by Daniel Morat and Hansjakob Ziemer, 89–95. Stuttgart: J.B. Metzler. doi: 10.1007/978-3-476-05421-0_17.

Chan, Branden, Stefan Schweter, and Timo Möller. 2020. German's Next Language Model. In *Proceedings of the 28th International Conference on Computational Linguistics,* 6788–6796. Barcelona, Spain (Online): International Committee on Computational Linguistics. doi: 10.18653 /v1/2020.coling-main.598.

Devlin, Jacob, Ming-Wei Chang, Kenton Lee, and Kristina Toutanova. 2018. „BERT: pre-training of deep bidirectional transformers for language understanding". *CoRR* abs/1810.04805. doi: 10.48550/arXiv.1810.04805.

Foley, Matt. 2023. *Gothic Voices: The Vococentric Soundworld of Gothic Writing.* 1st ed. Cambridge University Press. doi: 10.1017/9781009162579.

Gius, Evelyn, Svenja Guhr, and Inna Uglanova. 2021. "d-Prose 1870–1920" a Collection of German Prose Texts from 1870 to 1920. *Journal of Open Humanities Data* 7 (0): 11. doi: 10.5334/johd.30.

Glotova, Elena. 2021. Soundscapes in nineteenth-century Gothic short stories. Doctoral Thesis, Umeå University.

Guhr, Svenja, and Mark Algee-Hewitt. 2024. What's that Scary Sound? Ambient Sound in Gothic Fiction. *Journal of Computational Literary Studies* 2 (1). doi: 10.48694/jcls.3583.

Hillebrandt, Claudia. 2018. „Literaturwissenschaft". In *Handbuch Sound: Geschichte – Begriffe – Ansätze,* edited by Daniel Morat and Hansjakob Ziemer, 120– 125. Stuttgart: J.B. Metzler. doi: 10.1007/978-3-476-05421-0_22.

References

Lemke, Marc, Konrad Sperfeld, and Jochen Zöllner. Forthcoming. Introducing NTEE: An easy to use tool to enrich TEI files with entities based on state of the art neural networks. Edited by Bernhard Geiger, Ulrike Henny- Krahmer, Fabian Kaßner, Marc Lemke, Gerlinde Schneider, and Martina Scholger.

Morat, Daniel, and Hansjakob Ziemer, eds. 2018. Handbuch Sound: Geschichte - Begriffe - Ansätze. Stuttgart: J.B. Metzler.

Pichler, Axel, and Nils Reiter. 2020. Reflektierte Textanalyse. In Reflektierte algorithmische Textanalyse, edited by Nils Reiter, Axel Pichler, and Jonas Kuhn, 43–60. De Gruyter. doi: 10.1515/9783110693973-003.

Picker, John M. 2003. Victorian soundscapes. New York: Oxford University Press.

Ryan, Marie-Laure. 2013. Possible worlds. In The living handbook of narratology, edited by Peter Hühn, Jan Christoph Meister, John Pier, and Wolf Schmid. url: www-archiv.fdm.uni-hamburg.de/lhn/node/54.html.

Schafer, R. Murray. (1977a) 1994. 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.

Zöllner, Jochen, Konrad Sperfeld, Christoph Wick, and Roger Labahn. 2021. Optimizing Small BERTs Trained for German NER. Information 12 (11): 443. doi: 10.3390/info12110443.
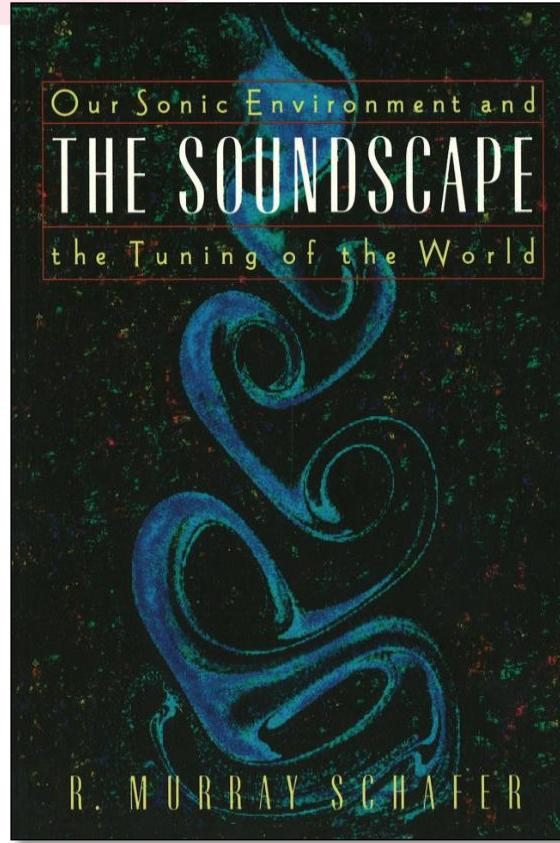
Appendix

Fictional Sounds

- Sound events (event concept → Gius/Vauth 2021)
- With asserted *realis* in the fiction
- Explicitly represented in the narration through sound words (sound-representing content words)
- Carry information about fictional soundscapes
- E.g., 'voice', 'rattling', 'saying', 'quiet'
- Extendable by sound qualities such as loudness

(Guhr 2026)

Research on Sound in Literary Studies

Schafer (1994: 9)

keynote sounds, signals, and soundmarks

- Keynote sound – omnipresent, characteristic, and dominant for a defined space (cars on the highway)

- Signal – foreground sound conveying a message (alarm clock in the morning)

- Soundmark – unique sound for a particular setting, (Big Ben bell in the district of Westminster, London)

Research on Sound in Literary Studies

Stadt hören

Auditive Wahrnehmung in *Berlin Alexanderplatz* von Alfred Döblin

Hearing the city. Aural perception in *Berlin Alexanderplatz* by Alfred Döblin

Published: 27 February 2017
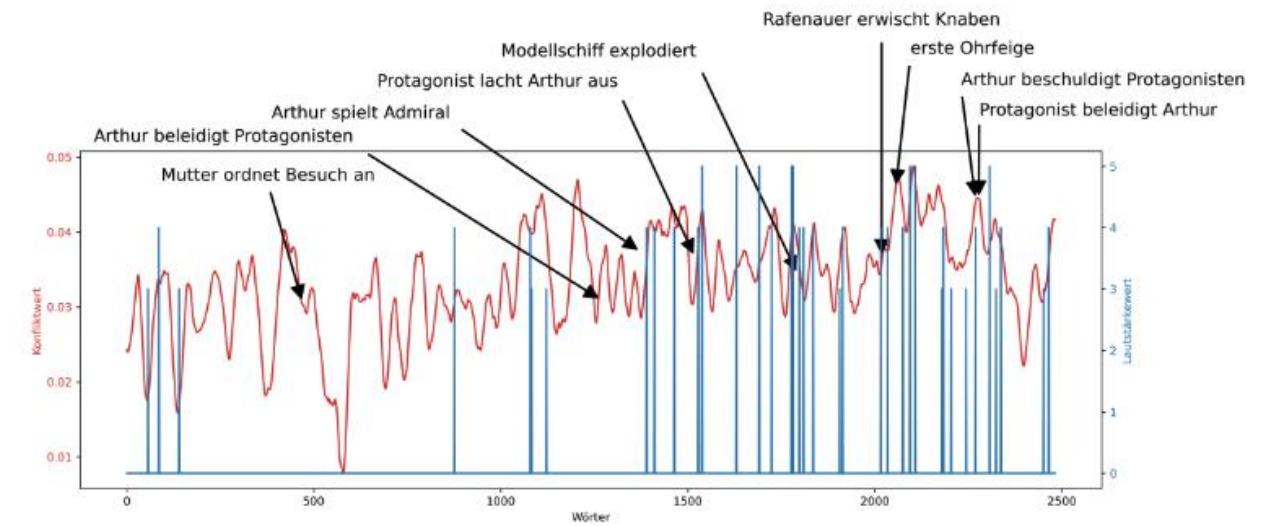
Volume 38, pages 51–67, (2008)   Cite this article

Lautstärke und Konflikt in Realismus und Naturalismus

Häußler, Julian[1] (iD); Guhr, Svenja[1] (iD); Gius, Evelyn[1] (iD)

Conflict values (cosine smoothing, window size 40) and sound words + loudness values in *The Noble Boy* (L. Thoma)

Bernhart ([2008]2017)   Häußler/Guhr/Gius (2024)

Automation Output

- Annotation in XML TEI:
  - <character_sound loudness="n">sound event</character_sound>
  - <ambient_sound loudness="n">sound event</ambient_sound>

But there was nothing on the back of the door, except the screws and nuts that held the knocker on, so <character_sound loudness="3.0">**he said**</character_sound>, "Pooh pooh!" and <ambient_sound loudness="4.0">**closed it with a bang**</ambient_sound>.
<ambient_sound loudness="4.0">**The sound resounded through the house like thunder**</ambient_sound>.

36

Two-Step-Automation

1. Software NEISS TEI Entity Enricher (Zöllner et al. 2021)
   - Based on:
     - Implemented pre-trained BERT-language models
     - Transfer-learning algorithm (Kamath 2019)
   - Finetuning for classification tasks
   - Input: XML-annotated texts

2. Dictionary-matching algorithm for loudness level labeling
   - key-value pairs, i.e. {'whisper': 2}

Experiment: Can machine translations enrich hand-labeled training data?

```
»Unbegreiflich! Die Sache liegt ja gar nicht in seiner Competenz!«  <character_sound loudness="4">rief
der Gouverneur</character_sound>. Auch der Oberst fand die Sache so auffällig als traurig.
Er entfernte sich indeß wiederum bald <character_sound loudness="3">und der Gouverneur befahl</
character_sound>, daß man sein Pferd sattele.


"Incomprehensible! The matter is not within his competence!" <character_sound loudness="4">cried
the governor</character_sound>. The colonel, too, found the matter as striking as it was sad.
He soon departed again <character_sound loudness="3">and the governor ordered</character_sound>
his horse to be saddled.
```

Comparison of a German original text extract of Auerbach's *Auf Wache* and its automatically generated British English translation (DeepL API).

Performance Comparison

```
Gold annotations
Many and many a time, in the day and in the night, with my head upon the pillow by her that my whispers might be
plainer to her, I kissed her, <character_sound>thanked her</character_sound>, <character_sound>prayed for her</
character_sound>, <character_sound>asked her for her blessing and forgiveness</character_sound>,
<character_sound>entreated her</character_sound> to give me the least sign that she knew or heard me.


BE_with_translations
Many and many a time, in the day and in the night, with my head upon the pillow by her that my whispers might be
plainer to her, <character_sound>I</character_sound> kissed <character_sound>her</character_sound>,
<character_sound>thanked her</character_sound>,
<character_sound>prayed for her</character_sound>, <character_sound>asked her for her blessing and forgiveness</
character_sound>, <character_sound>entreated her</character_sound> to give me the least sign that she knew or
heard me.


BE_no_translations
Many and many a time, in the day and in the night, with my head upon the pillow by her that my whispers might be
plainer to her, I kissed her, <character_sound>thanked her</character_sound>,
prayed <character_sound>for her</character_sound>, <character_sound>asked her for her blessing and forgiveness</
character_sound>, entreated <character_sound>her</character_sound> to give me the least sign that she knew or
heard me.


BE_mixed_training_set
Many and many a time, in the day and in the night, with my head upon the pillow by her that my whispers might be
plainer to her, I kissed <character_sound>her</character_sound>, <character_sound>thanked her</character_sound>,
<character_sound>prayed for her</character_sound>, <character_sound>asked her for her blessing and forgiveness</
character_sound>, <character_sound>entreated her</character_sound> to give me the least sign that she knew or
heard me.
```

Comparison of the outputs of the three models prior postprocessing of an extract from Dickens's Bleak House.

Making Sounds Measurable?

T	text
w	number of words
sw	sound word
se	sound event span
SW_D	sound word density
SE_D	sound event density
T_{se}	number of sound events in a text
T_{pe}	number of possible events in a text

$$SW_D = \frac{sw}{w} \cdot 100$$

$$SE_D = \frac{T_{se}}{T_{pe}} \cdot 100$$

Proportion of ambient vs character sounds per chapter in *A Christmas Carol*.

Ambiguity – Smooth Transition between *realis* and *irrealis* (Carker's delusions)

A troubled vision, then, of bridges, quays, interminable streets; of wine-shops, water-carriers, great crowds of people, soldiers, coaches, military drums, arcades. <ambient_sound> of the monotony of bells</ambient_sound> and <ambient_sound>wheels</ambient_sound> and <ambient_sound>horses' feet being at length lost in the universal din and uproar</ambient_sound>. <ambient_sound>of the gradual subsidence of that noise</ambient_sound> as he passed out in another carriage by a different barrier from that by which he had entered.

of long roads again, and dead of night, and feeble lights in windows by the roadside; and still the old monotony of bells and wheels, and horses' feet, and no rest. of dawn, and daybreak, and the rising of the sun.
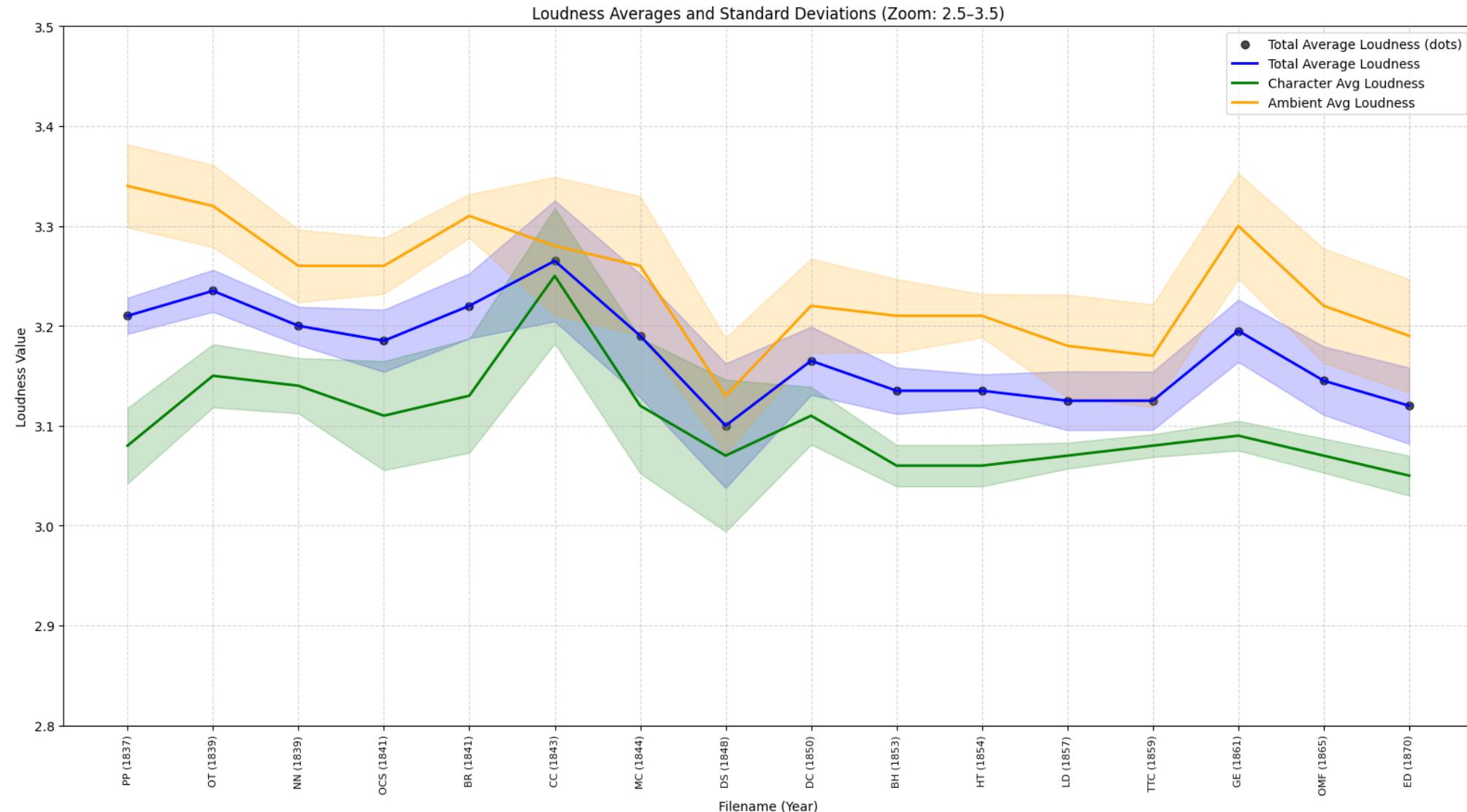
It was constantly before him all at once. She stood there, with her dark disdainful eyes again upon him; and he was riding on nevertheless, through town and country, light and darkness, wet weather and dry, over road and pavement, hill and valley, height and hollow, jaded and scared by the monotony of bells and wheels, and horses' feet, and no rest. 'What day is this?' <character_sound>he asked of the waiter</character_sound>, who was making preparations for his dinner. 'Day, Sir?' 'Is it Wednesday?' 'Wednesday, Sir? No, Sir. Thursday, Sir.' 'I forgot. How goes the time? My watch is unwound.'
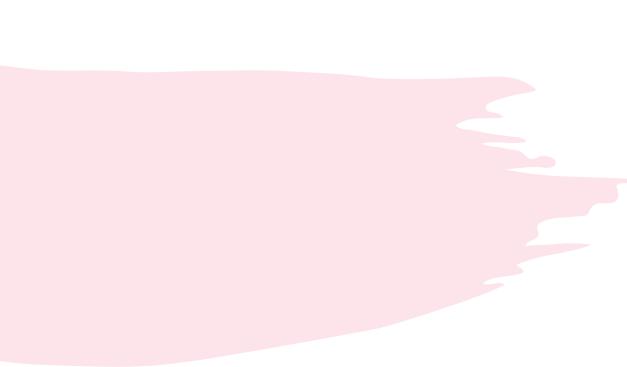
Making Loudness Measurable?

l	loudness level value
l_{sw}	loudness level value of a sound word
l_{se}	loudness level value of a sound event
SW_l	number of loudness level labeled sound words
SE_l	number of loudness level labeled sound events
T_{SE_l}	number of loudness level labeled sound event spans in a text
$\overline{T_l}$	a text's average loudness level
$\overline{T_{l_C}}$	a text's average loudness level of character sounds
$\overline{T_{l_A}}$	a text's average loudness level of ambient sounds

$$\overline{T_l} = \frac{\sum l_{se}}{SE_l}$$

Loudness Averages and Standard Dev.

n = 16
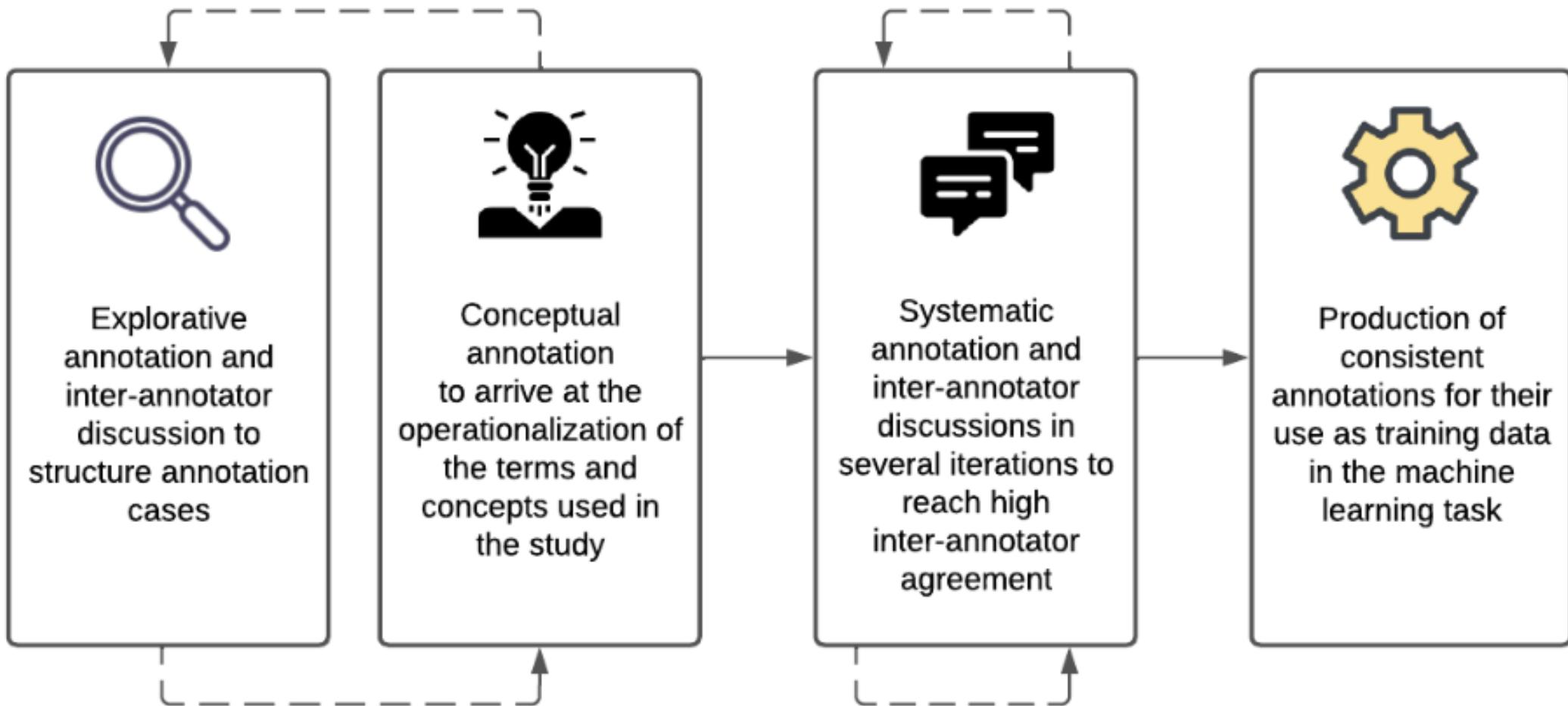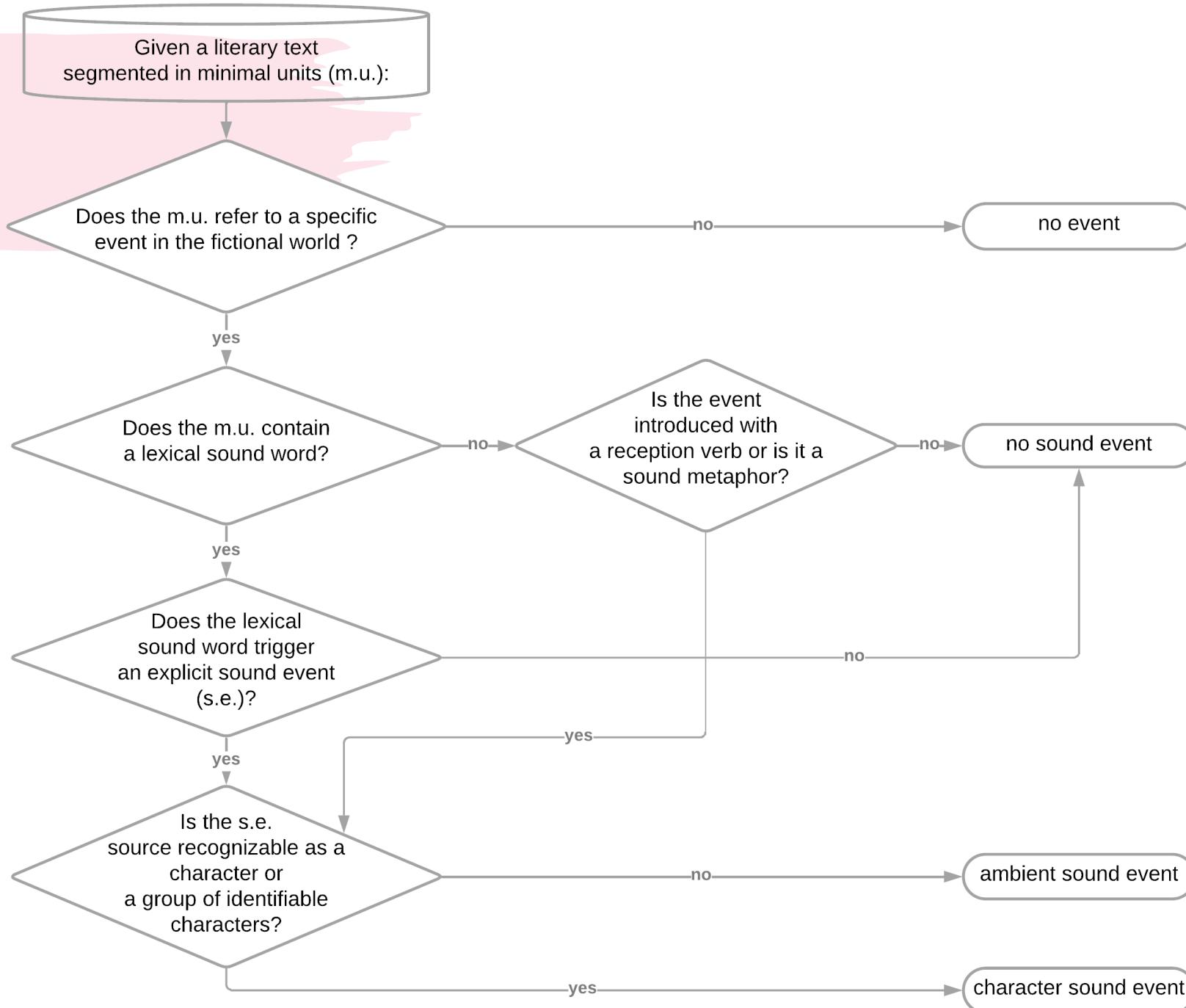
Talk Outline

1. **Sound in Literary Fiction**
   - Theoretical Background
   - Operationalisation
   - Automation
   - Measuring Sounds?

2. **Sounds in the Dickens Novel Corpus (DNov)**
   - Proportion of Ambient and Character Sounds
   - Sound as Elements for Structure and Foregrounding

Workflow

Explorative annotation and inter-annotator discussion to structure annotation cases

Conceptual annotation to arrive at the operationalization of the terms and concepts used in the study

Systematic annotation and inter-annotator discussions in several iterations to reach high inter-annotator agreement

Production of consistent annotations for their use as training data in the machine learning task

Annotation of Sound Events

Given a literary text segmented in minimal units (m.u.):

Does the m.u. refer to a specific event in the fictional world ?
— no → no event
— yes ↓

Does the m.u. contain a lexical sound word?
— no → **Is the event introduced with a reception verb or is it a sound metaphor?**
  — no → no sound event
  — yes ↓
— yes ↓

Does the lexical sound word trigger an explicit sound event (s.e.)?
— no → no sound event
— yes ↓

Is the s.e. source recognizable as a character or a group of identifiable characters?
— no → ambient sound event
— yes → character sound event

48

Annotation of Sound Events

Does the lexical sound word trigger an explicit sound event (s.e.)?

— no —

— yes —

yes

Is the s.e. source recognizable as a character or a group of identifiable characters?

— no — → ambient sound event

— yes — → character sound event

Annotation of Loudness

S	explicitly no sound	silence (*Schweigen* and *Stille*)
1	very low sound	falling leaves – breathing
2	low sound	ticking of a clock – whispering
3	medium loud sound	singing of a bird – room level conversations
4	loud sound	loudest human-made sound – barking dog
5	very loud sound	car horn – rocket launch

Manual Annotation

- Annotation in XML TEI:
  - <character_sound loudness="n">sound event</character_sound>
  - <ambient_sound loudness="n">sound event</ambient_sound>

But there was nothing on the back of the door, except the screws and nuts that held the knocker on, so <character_sound loudness="3.0">**he said**</character_sound>, "Pooh pooh!" and <ambient_sound loudness="4.0">**closed it with a bang**</ambient_sound>.
<ambient_sound loudness="4.0">**The sound resounded through the house like thunder**</ambient_sound>.

In Summary…

- Definition of fictional sounds
- Guidelines and decision tree for detecting the sounds
- 65 sound-annotated German *theme-d-Prose* texts
  - Divided into training (55 texts) and test data (10 texts)
- 7 sound-annotated texts in British English:
  - 3 manually annotated British 19C texts
  - 4 machine-translated texts from the annotated German-language corpus (19C)