

Brielen Madureira

University of Potsdam
Karl-Liebknecht-Straße 24-25
14476 Potsdam
Germany

madureiralasota@uni-potsdam.de
<https://www.ling.uni-potsdam.de/~madureiralasota/>

1 Research interests

I am broadly interested in **evaluation** of dialogue systems, in all its many facets: The data they are trained on, their ability to perform a task successfully, their skills with respect to various dialogue phenomena, their resemblance to human cognitive processes, and their ethical and societal impact. More specifically, my research topics focus on understanding the possibilities and limits of current multimodal neural network-based models to incrementally encode information for natural language understanding in general and also for **building common ground** and **asking for clarification**. Besides, I am interested in **dialogue games** as a means to elicit and collect dialogue data and to evaluate the abilities of dialogue models.

1.1 Incremental Processing in the Age of Non-Incremental Encoders

My main line of research has been on employing bidirectional models, like bidirectional LSTMs (Hochreiter and Schmidhuber, 1997) and Transformers (Vaswani et al., 2017), for **incremental processing**. When used under a restart-incremental paradigm (Schlangen and Skantze, 2011), these models incrementally build partial representations that are useful despite they typically being trained on full sequences. I have assessed their incremental behaviour on multiple tasks (Madureira and Schlangen, 2020; Kahardipraja et al., 2021). Then, I supervised a thesis on modelling a recomputation policy (Kahardipraja et al., 2023), which led to a proposal of an **evaluation methodology for revisions** (to be presented at SIGdial 2023). I am currently interested in finding means to interpret these sequences of partial hypotheses, linguistically and with the aid of cognitively-motivated signals.

1.2 Scorekeeping

Beyond token-level incremental processing, dialogue models should handle the **conversational grounding** turn by turn, incrementally building representations that encode what information is private and at which moment something becomes (and remains) shared. I have proposed an evaluation method (Madureira and Schlangen,

2022) to investigate to what degree visual dialogue models appropriately do **scorekeeping** (Lewis, 1979). This method has been realised both as a probing task with the internal state representations and also by posing direct questions to an agent.

1.3 Clarification Requests in Multimodal Dialogue Games

Dialogue games can be useful means both to collect dialogue data and to evaluate a dialogue model. I have been studying the **multimodal, instruction-following CoDraw game** (Kim et al., 2019) in more detail, and have provided annotation on **Instruction Clarification Requests** which shows that this is a very rich and large CR dataset (Madureira and Schlangen, 2023b,a). I have been working on the task of detecting the moments to ask iCRs and am also interested in the problems of *what* and *how* to ask.

2 Spoken dialogue system (SDS) research

I do not dare trying to predict what the field of dialogue research will be in 5 to 10 years given the pace of the latest innovations. But I am convinced that evaluation is a cornerstone for model development and deployment, and that evaluation has to be much more than optimising metrics. We need evaluation for transparency, for policy making, for increasing the literacy and awareness of users interacting with SDS. I strongly support that everyone involved in building SDS continuously seek to sharpen their perspectives on our responsibility, as individuals and as a community, also beyond the technical and theoretical aspects. We need opportunities to promote and take part in *dialogues* on many urgent topics, for instance: The impact of these technologies in the world, the protection of vulnerable groups, the options for regulation, the mitigation of risks, the influence of commercial interests on research and on users, and the power concentration. I am interested in discussing what *actions* can or should be taken and what should we really be aiming for when building or evaluating SDS.

3 Suggested topics for discussion

- Modelling decisions token by token or turn by turn, when the signal is sparse.
- Limitations of crowdworking as a method for data collection and evaluation. Impact of task instructions, misunderstandings, subjective judgements, quality of the data.
- Ethical considerations of what can be done *versus* what should be done.

References

- Sepp Hochreiter and Jürgen Schmidhuber. 1997. Long short-term memory. *Neural Comput.* 9(8):1735–1780. <https://doi.org/10.1162/neco.1997.9.8.1735>.
- Patrick Kahardipraja, Brielen Madureira, and David Schlangen. 2021. Towards incremental transformers: An empirical analysis of transformer models for incremental NLU. In *Proceedings of the 2021 Conference on Empirical Methods in Natural Language Processing*. Association for Computational Linguistics, Online and Punta Cana, Dominican Republic, pages 1178–1189. <https://doi.org/10.18653/v1/2021.emnlp-main.90>.
- Patrick Kahardipraja, Brielen Madureira, and David Schlangen. 2023. TAPIR: Learning adaptive revision for incremental natural language understanding with a two-pass model. In *Findings of the Association for Computational Linguistics: ACL 2023*. Association for Computational Linguistics, Toronto, Canada, pages 4173–4197. <https://aclanthology.org/2023.findings-acl.257>.
- Jin-Hwa Kim, Nikita Kitaev, Xinlei Chen, Marcus Rohrbach, Byoung-Tak Zhang, Yuandong Tian, Dhruv Batra, and Devi Parikh. 2019. CoDraw: Collaborative drawing as a testbed for grounded goal-driven communication. In *Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics*. Association for Computational Linguistics, Florence, Italy, pages 6495–6513. <https://doi.org/10.18653/v1/P19-1651>.
- David Lewis. 1979. Scorekeeping in a language game. In *Semantics from different points of view*, Springer, pages 172–187.
- Brielen Madureira and David Schlangen. 2020. Incremental processing in the age of non-incremental encoders: An empirical assessment of bidirectional models for incremental NLU. In *Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing (EMNLP)*. Association for Computational Linguistics, Online, pages 357–374. <https://doi.org/10.18653/v1/2020.emnlp-main.26>.
- Brielen Madureira and David Schlangen. 2022. Can visual dialogue models do scorekeeping? exploring how dialogue representations incrementally encode shared knowledge. In *Proceedings of the 60th Annual Meeting of the Association for Computational Linguistics (Volume 2: Short Papers)*. Association for Computational Linguistics, Dublin, Ireland, pages 651–664. <https://doi.org/10.18653/v1/2022.acl-short.73>.
- Brielen Madureira and David Schlangen. 2023a. “are you telling me to put glasses on the dog?” content-grounded annotation of instruction clarification requests in the codraw dataset.
- Brielen Madureira and David Schlangen. 2023b. Instruction clarification requests in multimodal collaborative dialogue games: Tasks, and an analysis of the CoDraw dataset. In *Proceedings of the 17th Conference of the European Chapter of the Association for Computational Linguistics*. Association for Computational Linguistics, Dubrovnik, Croatia, pages 2303–2319. <https://aclanthology.org/2023.eacl-main.169>.
- David Schlangen and Gabriel Skantze. 2011. A General, Abstract Model of Incremental Dialogue Processing. *Dialogue and Discourse* 2(1):83–111. <https://doi.org/10.5087/dad.2011.105>.
- Ashish Vaswani, Noam Shazeer, Niki Parmar, Jakob Uszkoreit, Llion Jones, Aidan N Gomez, Łukasz Kaiser, and Illia Polosukhin. 2017. Attention is all you need. *Advances in neural information processing systems* 30.

Biographical sketch



Brielen Madureira is a fourth-year Ph.D. student at the Computational Linguistics Lab in the University of Potsdam, Germany, being supervised by Prof. David Schlangen. She holds a M.Sc. degree in Language Science and Technology from the University of Saarland, Germany, and a B.Sc. in Applied and Computational Mathematics from the University of São Paulo, Brazil. She has helped create the group Brazilian Women in NLP and organise the Student Research Workshop at ACL 2022. When she is not working towards graduating, she can often be found bird watching (🐦❤️) and admiring nature (🌿🌻🌻).