

Bachelor's Thesis: Systematic Literature Review on the Use of Natural Language Processing in AI-Based Dashboards

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Start date: at the next possible date

Motivation and Goals

Dashboards are graphical user interfaces that allow for a concise and comprehensible presentation of data to users (Becker et al., 2023). In the realm of Explainable Artificial Intelligence (XAI), they typically enable users to assess a machine learning model's output and, e. g., recognize its flaws (Becker et al., 2023). Yet, visualizations can be quite difficult to comprehend and may even presuppose visualization literacy on behalf of the users (Hohman et al., 2019). If the transparent interaction of users with the dashboard is hampered, they might not be able to extract relevant information (Ruoff & Gnewuch, 2021). Natural Language Processing (NLP) can foster human-machine communication by enabling Artificial Intelligence (AI) systems to interact with their users through human language (Becker et al., 2023).

Based on this, the goal of the thesis is to provide a comprehensive overview on the current state of research concerning the integration of NLP components in AI-based Dashboards. More specifically, the thesis shall provide insights into the application domains of dashboards featuring NLP, their reported benefits and/or drawbacks, potential implementation challenges, and future research opportunities, to ultimately guide researchers and practitioners in designing better AI-based Dashboards.

Required Skills

- Strong interest in (X)AI and NLP
- Good English skills
- Ideally, prior experience in conducting Systematic Literature Reviews

Starting Literature (Topic)

Becker, M., Vishwesh, V., Birnstill, P., Schwall, F., Wu, S., & Beyerer, J. (2023). RIXA - Explaining Artificial Intelligence in Natural Language. *2023 IEEE International Conference on Data Mining Workshops (ICDMW)*, 875–884. <https://doi.org/10.1109/ICDMW60847.2023.00118>

Hohman, F., Srinivasan, A., & Drucker, S. M. (2019). TeleGam: Combining Visualization and Verbalization for Interpretable Machine Learning. *2019 IEEE Visualization Conference (VIS)*, 151–155. <https://doi.org/10.1109/VISUAL.2019.8933695>

Ruoff, M., & Gnewuch, U. (2021). Designing Conversational Dashboards for Effective Use in Crisis Response. *ECIS 2021 Research-in-Progress Papers*. 45. https://aisel.aisnet.org/ecis2021_rip/45

Starting Literature (Method)

Vom Brocke et al. (2009). Reconstructing the Giant: On the Importance of Rigour in Documenting the Literature Search Process. *ECIS 2009 Proceedings*. 161. <https://aisel.aisnet.org/ecis2009/161>

Webster, J., & Watson, R. T. (2002). Analyzing the Past to Prepare for the Future: Writing a Literature Review. *MIS Quarterly*, 26(2), xiii–xxiii. <https://www.jstor.org/stable/4132319>