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Digitalisation of the Railway Industry: Recent Advances in the Field of Dialogue Systems: Systematic Review

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Abstract : This paper discusses the development directions of dialogue systems within the digitalisation of the railway industry, where technologies based on conversational AI are already potentially applied or will be applied. Conversational AI is one of the popular natural language processing (NLP) tasks, as it has great prospects for real-world applications today. At the same time, it is a challenging task as it involves many areas of NLP based on complex computations and deep insights from linguistics and psychology. In this review, we focus on dialogue systems and their implementation in the railway domain. We comprehensively review the state-of-the-art research results on dialogue systems and analyse them from three perspectives: type of problem to be solved, type of model, and type of system. In particular, from the perspective of the type of tasks to be solved, we discuss characteristics and applications. This will help to understand how to prioritise tasks. In terms of the type of models, we give an overview that will allow researchers to become familiar with how to apply them in dialogue systems. By analysing the types of dialogue systems, we propose an unconventional approach in contrast to colleagues who traditionally contrast goal-oriented dialogue systems with open-domain systems. Our view focuses on considering retrieval and generative approaches. Furthermore, the work comprehensively presents evaluation methods and datasets for dialogue systems in the railway domain to pave the way for future research. Finally, some possible directions for future research are identified based on recent research results.

Keywords : digitalisation, railway, dialogue systems, conversational AI, natural language processing, natural language understanding, natural language generation
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