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18. abstract
Current status of science and technology
Operating rail transport with the highest automation level (GoA4) is key to a climate-neutral transport mix. Conventional automation cannot fully handle today's complex environments. However, major progress in highly automated driving, based on AI, shows potential. A key challenge remains linking AI methods with rail-specific requirements and approval processes.

Aim of the project
In this sub-project, SLR contributes to developing and validating new AI functions for driverless regional trains, building on experience with AI decision-making in the automotive sector. Knowledge from developing, integrating, and validating AI-based object recognition using camera and lidar systems—already applied in SLR's Automated Driving demonstrators—serves as the reference for railway applications.

Results
Transferring AI-based object recognition from road to rail is central to meeting safety demands in driverless rail operations. The rail context—signal patterns, route characteristics, object dynamics—requires adapted models and validation. The sub-project demonstrated feasibility and systematically adapted algorithms and datasets. The work clarified transferable components and necessary modifications, providing a solid foundation for future safety-oriented AI in rail. The results are crucial for transferring industrial AI innovations into safety-critical domains.

Possible Applications
Driverless trains and vehicles. Object recognition via sensor fusion.

19. keywords
Sensors, sensor fusion, autonomous systems, automated driving, regional train, artificial intelligence

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