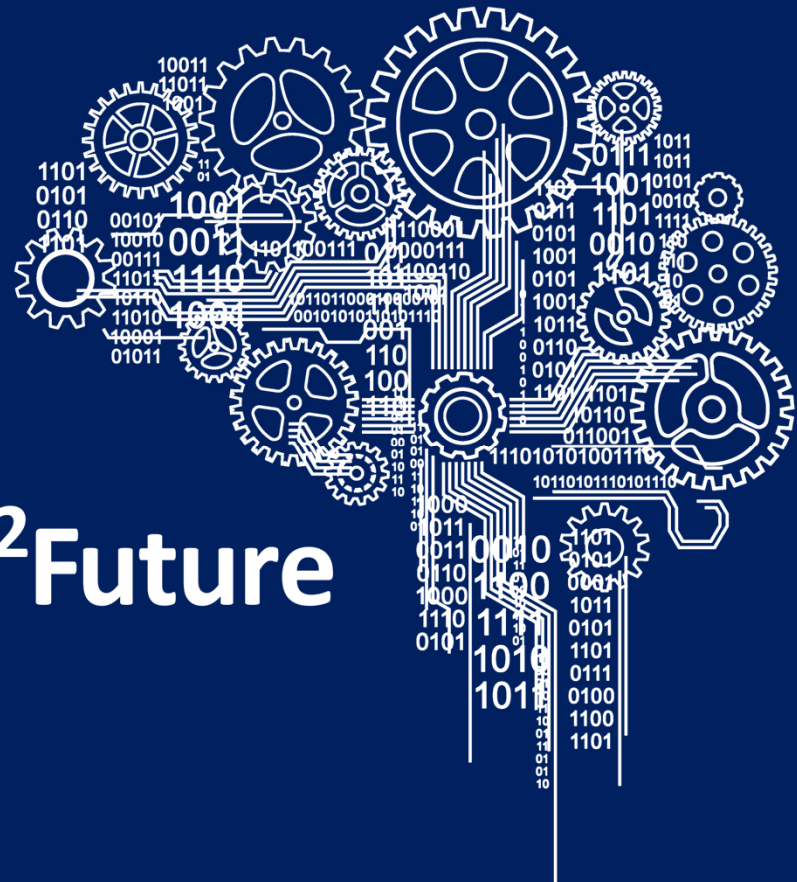


AICCELERATE

AI-Cognitive Control and Enhanced Learning for Embedded Real-Time Automotive Technologies and Ecosystems



Pro²Future

Daniel Kraus¹, Amel Jelidi¹, Peter Priller², Anna Glaser², Martin Rechberger³, Olga Saukh³

Pro2Future GmbH¹, AVL List GmbH, Graz², TUG-ITI (Institute of Technical Informatics)³

¹ Sandgasse 34, 3.OG, 8010 Graz

² Hans-List-Platz 1, 8020 Graz

³ Inffeldgasse 16, 8010 Graz



MOTIVATION & GOALS

AICCELERATE develops AI-driven toolchains and real-time workflows for in-vehicle data analysis using embedded edge systems. By integrating **Large Language Models (LLMs)**, **Vision-Language Models (VLMs)**, and **multimodal sensor data fusion**, the project enables intelligent, context-aware functions such as automated driving, anomaly detection, and driver monitoring. A key focus lies on human-centered system integration, robustness of AI models, and efficient, event-triggered data processing for scalable deployment in **Software-Defined Vehicles (SDVs)**.

Project FactBox

Project Name SAFECOGNITION
Project ID MFP Prod.2
Duration 48 Months

Area 4.1
Cognitive Products

Project Lead
DI Daniel Kraus

APPROACH & METHODS

AICCELERATE	Multimodal Data Fusion and Scenario Management	Sensor Integration
	Scalable AI Toolchains and Event Detection	Scenario Generation and Handling in OpenScenario
	Model Robustness, Safety & Adversarial Testing	Real-time Algorithms for Edge AI
	Human-Centered Integration	LLM-driven Automation
		Vulnerability Analysis, Forensic Evaluation
		Model Improvement
		HMI Design, Usability Testing
		Driver Monitoring & SDV Integration

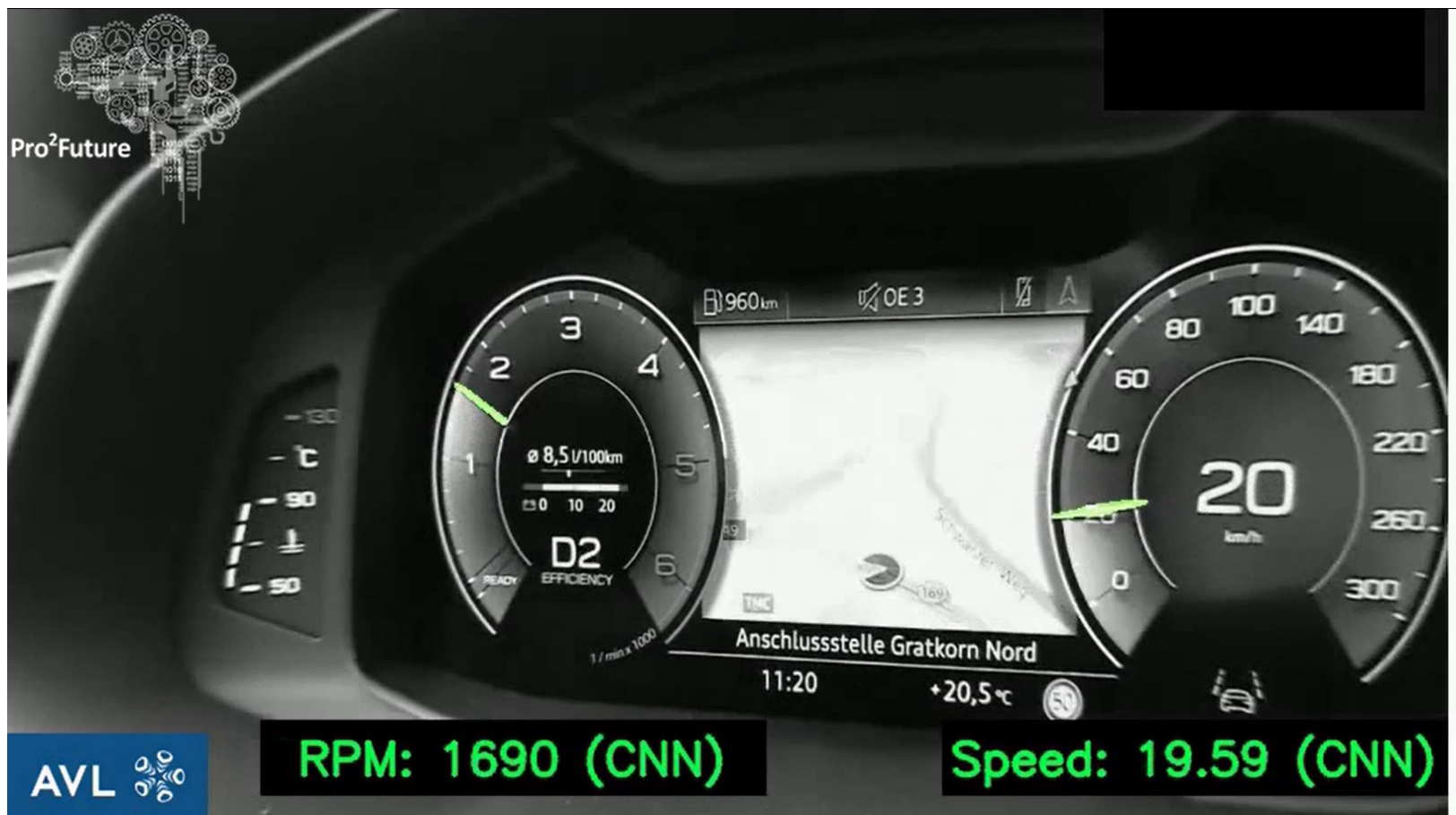
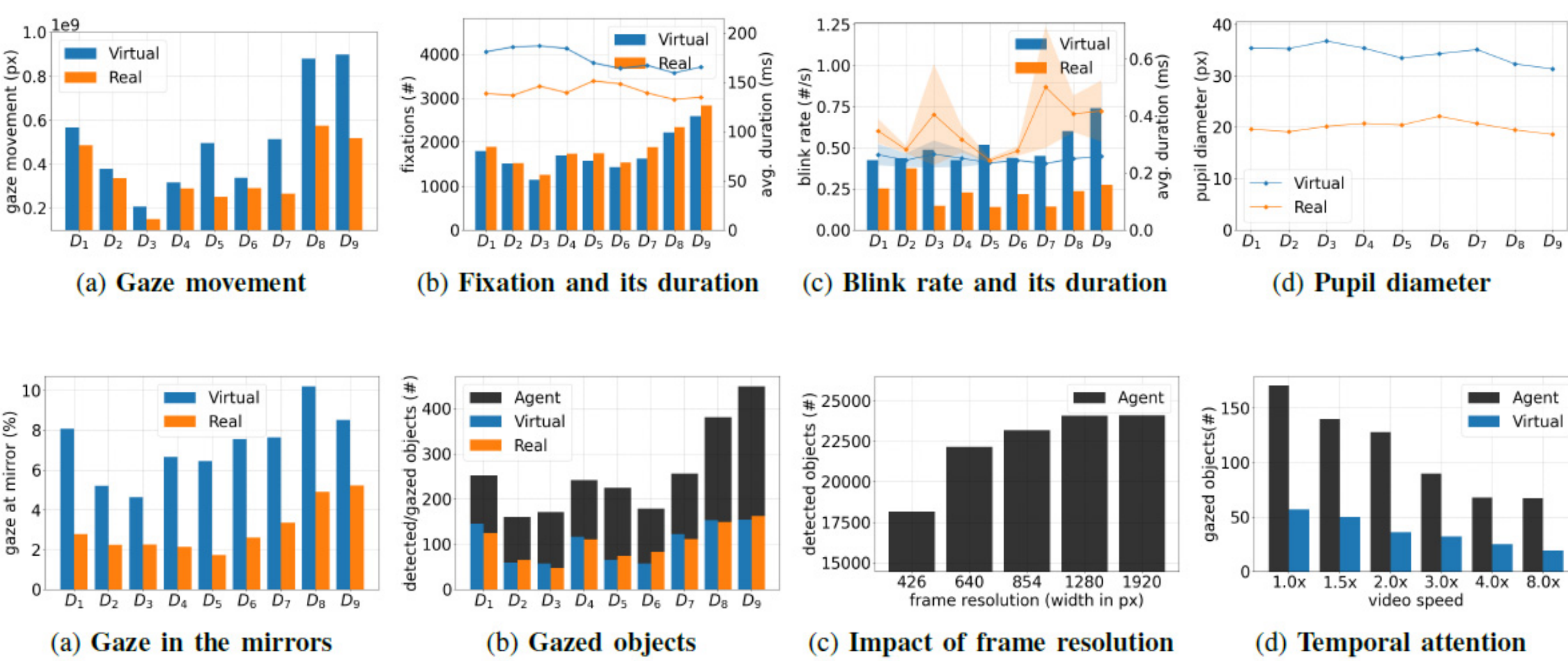
CONTRIBUTION

AICCELERATE Applications

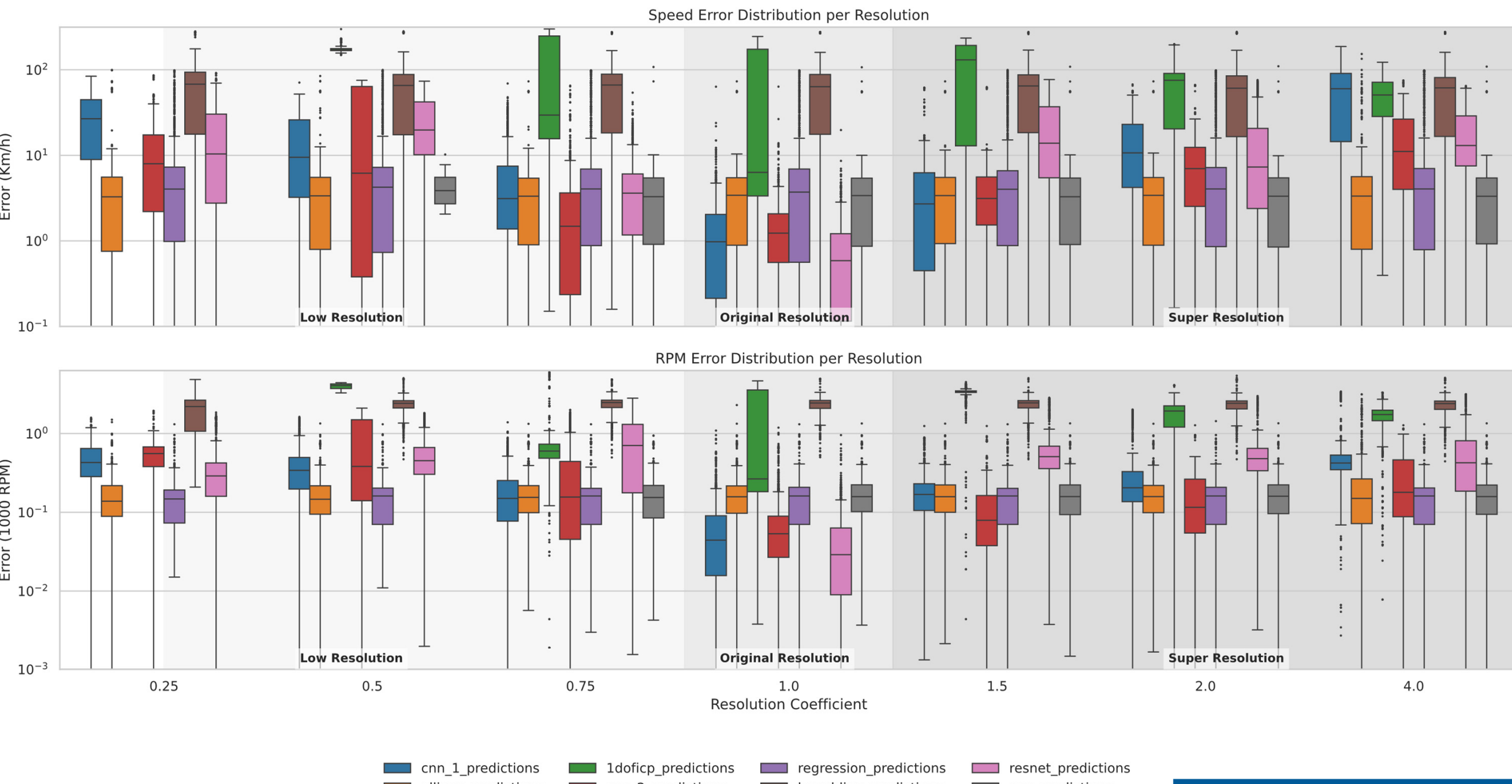
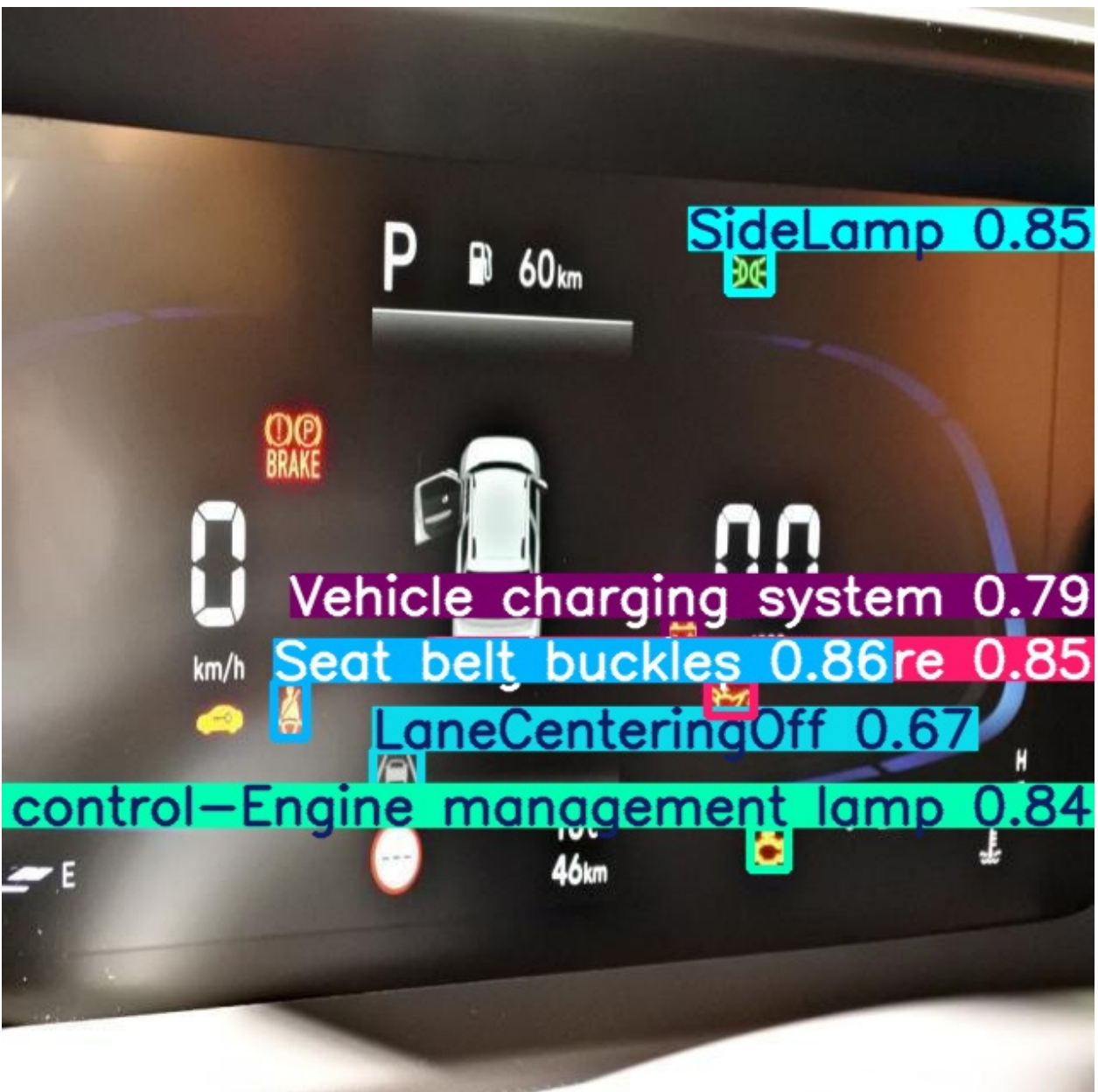
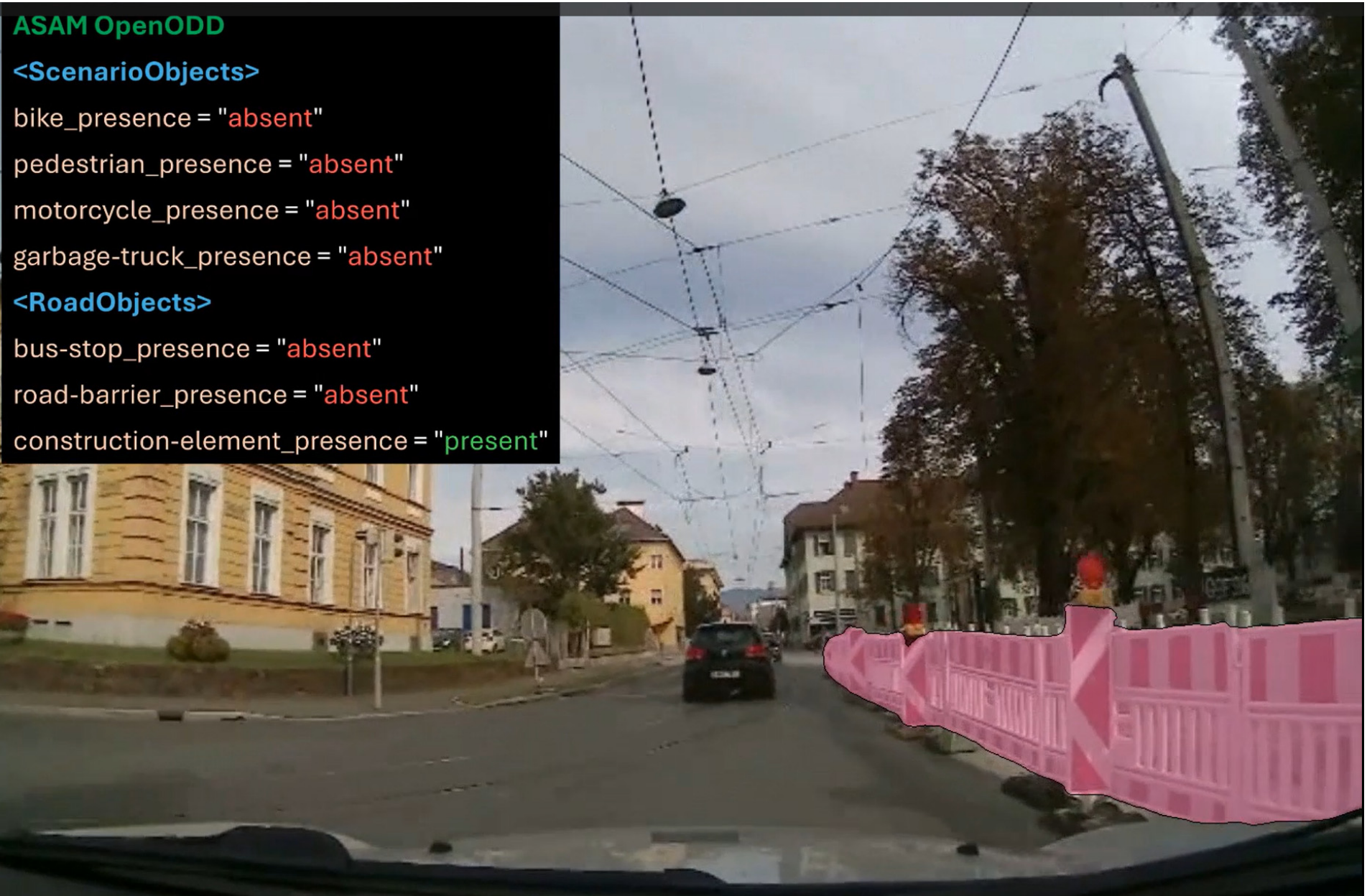
- Detection of Operational Design Domain (ODD) Scenarios
- VLM/LLM-Interpretation of Scenarios in Real-Time
- Dashboard Readings with Needle and Symbol Detection
- Real-Time In-Traffic Tracking of Important Road Users (Vehicles, Persons, Bicycles, ...)

RESULTS

- Advanced Event Detection Models** capable of recognizing critical driving scenarios and anomalies in real time.
- Scalable AI Toolchains** for real-time event detection and scenario generation on edge devices.
- Robust, Safe & Secure AI Models** validated through adversarial testing and safety benchmarks.
- Multimodal Sensor Fusion** enabling context-aware vehicle behavior.
- Human-centered Interfaces** with real-time driver attention and behavior monitoring.
- Prototype Integration** into Software-Defined Vehicle (SDV) systems, including key use cases like automated parking and charging.



Method	RPM	Speed (km/h)
Ellipse	1944	18.56
FCN	1692	18.44
1DoF-ICP	1957	14.24
PCA	1945	18.99
Regression	1901	19.58
Houghline	1833	18.02
Resnet	1678	21.58



Contact: DI Daniel Kraus, Pro2Future GmbH, daniel.kraus@pro2future.at, +43 316 873 - 9158
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