A Professional Benchmark for Decision-Making Tools

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COVESA

Accelerating the future of connected vehicles

Presenters

Daniel Alvarez-Coello

Haonan Qiu

Emil Dautovic

remotiveLabs

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Introduction

Call for participation to address

- lack of publicly available datasets utilizing VSS
- absence of benchmark for decision-making tools suitable for streaming scenarios in automotive

Goals

- solutions that support COVESA artifacts

Possible outcomes

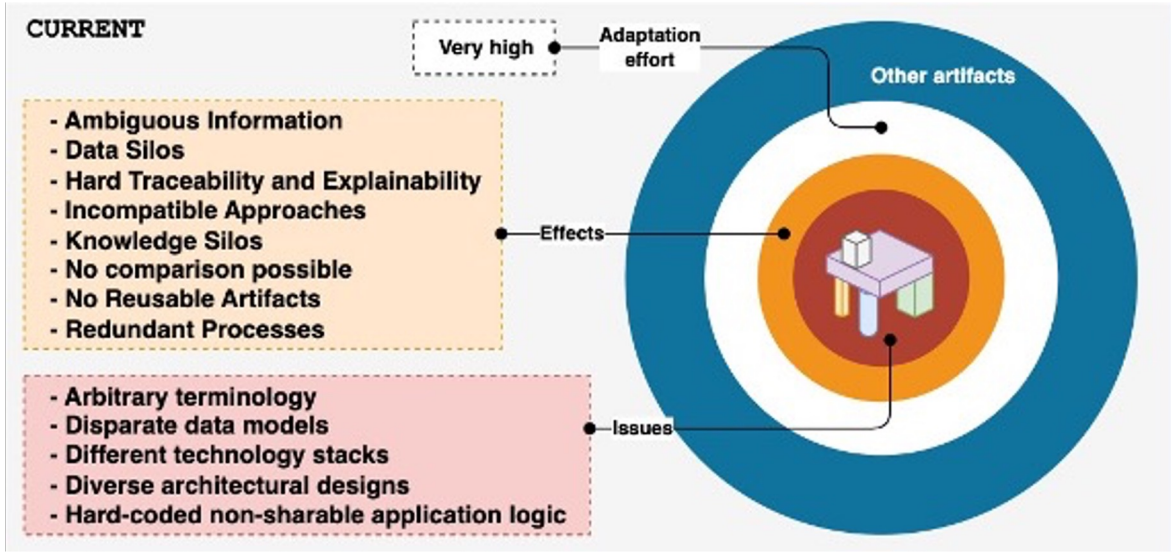
- web application with a modern-looking front-end
- curated time series VSS datasets
- data stream simulation
- list of KPIs and metrics -> a leaderboard
- etc.

Join us to make it a reality

Current vs. desired situation

Challenges

Issues and effects limit the incorporation of new artifacts because of a (very high) adaptation effort.



Our position

Minimizing the adaptation effort with the development and adoption of standard building blocks.

Artifacts' examples

- Decision making tools (e.g., frameworks, libraries, applications, databases, etc.)
- Stream reasoners (i.e., continuous inferences)

[1] D. Alvarez-Coello, C. Muehlbauer, and Haonan Qiu, "***On the role of stream reasoning for a data-centric architecture in automotive.***" Stream Reasoning Workshop. Lyon, france, Dec. 2023. doi: 10.13140/RG.2.2.26526.55366.

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Idea

Low

Effort (i.e., possible stages)

High

Public datasets

Adapting existing datasets to match COVESA artifacts.

Self-collected data

Individual collections according to tasks, and desired characteristics.

Simulated data

Configuring open-source simulators with specific scenarios.

Self-collected fleet data

Multiple cars within the same area and at the same time.

Cloud collaboration framework

Collaborative environment to share data, configure streams, submit solutions, etc. (e.g., RemotiveCloud*)

Example features

- Decision-making tasks
- Metrics & KPIs
- Configurations
- Dashboard
- Leaderboard
- etc.

Configurable (VSS-compatible) data streams.

External artifacts

Decision-making tools solving a predefined set of decision-making tasks.

Submission of results.

* https://remotivelabs.com/remotivecloud/

Idea adapted from [2] P. Schneider, D. Alvarez-Coello, A. Le-Tuan, M. Nguyen-Duc, and D. Le-Phuoc, "***Stream Reasoning Playground,***" presented at the European Semantic Web Conference (ESWC), 2022. doi: 10.1007/978-3-031-06981-9_24.

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Example decision-making tasks (vehicle's perspective)

Real time?

NON-

- Can the headlights be turned on based on current lighting conditions?
- Is an adjustment needed based on the current weather forecast at destination?
- Can I keep the planned route to be on time?
- **Is there another media content available that better matches my preferences?**

SOFT-

- Is the vehicle's engine functioning properly based on real-time sensor data?
- Is the vehicle's tire pressure within safe limits based on sensor readings?
- What is the best time to charge an EV based on energy prices and availability?
- **What is the best speed to maintain for optimal fuel efficiency?**

HARD-

- Can the vehicle safely make a left turn at the upcoming intersection?
- Can the vehicle safely navigate through this construction zone?
- Should the vehicle's brakes be applied to avoid a potential collision?
- **Is it safe to change lanes given the current conditions?**

Note: This is a non-comprehensive informative-only list of possible tasks.The actual tasks might be different and are to be defined by the working group and the data at hand.

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Summary

- Compatibility
- Integration complexity
- Maintenance complexity
- Security
- Etc.

- Latency & Throughput
- Accuracy
- Memory & CPU usage
- Scalability
- Etc.

Who is in?

Industry

- BMW Group
- RemotiveLabs
- **You?**

Academia

- TU Berlin
- INSA Lyon

Funding opportunities

- Via EU projects, for example:
  - FEDERATE https://federate-sdv.eu/
    - Goals
      - Accelerate the development of an SDV Ecosystem
      - Orchestrate the SDV Research, Development and Innovation activities

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Thank you for listening

More info at

https://cloud.remotivelabs.com/

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