A Professional Benchmark for Decision-Making Tools

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Presenters

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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)

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Idea

Public datasets
Adapting existing datasets to match COVESIA 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.

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

Submission of results.

Data sources

Configurable (VSS-compatible) data streams.

Example decision-making tasks (vehicle’s perspective)

- 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?
- 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?
- 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?

Possible solution areas:
- Machine Learning on streams
- Data Stream Processing
- Stream Reasoning
- Complex Event Processing
- Other?

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.
Summary

Professional benchmark framework

- 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/](https://federate-sdv.eu/)
    - **Goals**
      - Accelerate the development of an SDV Ecosystem
      - Orchestrate the SDV Research, Development and Innovation activities
Thank you for listening

More info at
https://cloud.remotivelabs.com/
doi: 10.13140/RG.2.2.26526.55366
doi: 10.1007/978-3-031-06981-9_24
https://federate-sdv.eu