CobotAGV - stream data mining for engineering applications

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AGVs and data streams

011010101101 → Stream with device groups statuses

011010101101 → Stream with general statuses and diagnostics

011010101101 → Stream with detailed alarms

011010101101 → Stream with energy measurements data

011010101101 → Streams with navigation data

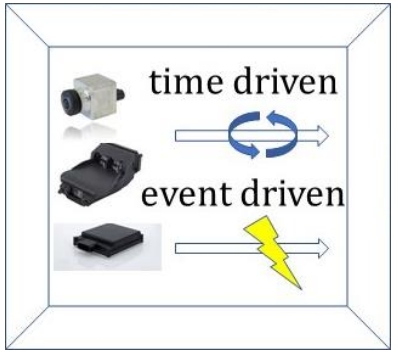
011010101101 → Stream with magnetic tape following data

011010101101 → Stream with RFID data

011010101101 → Stream with control signals

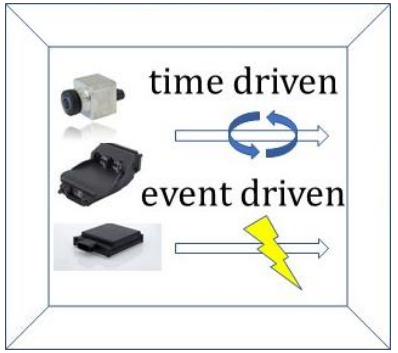
Time- vs event-triggered values

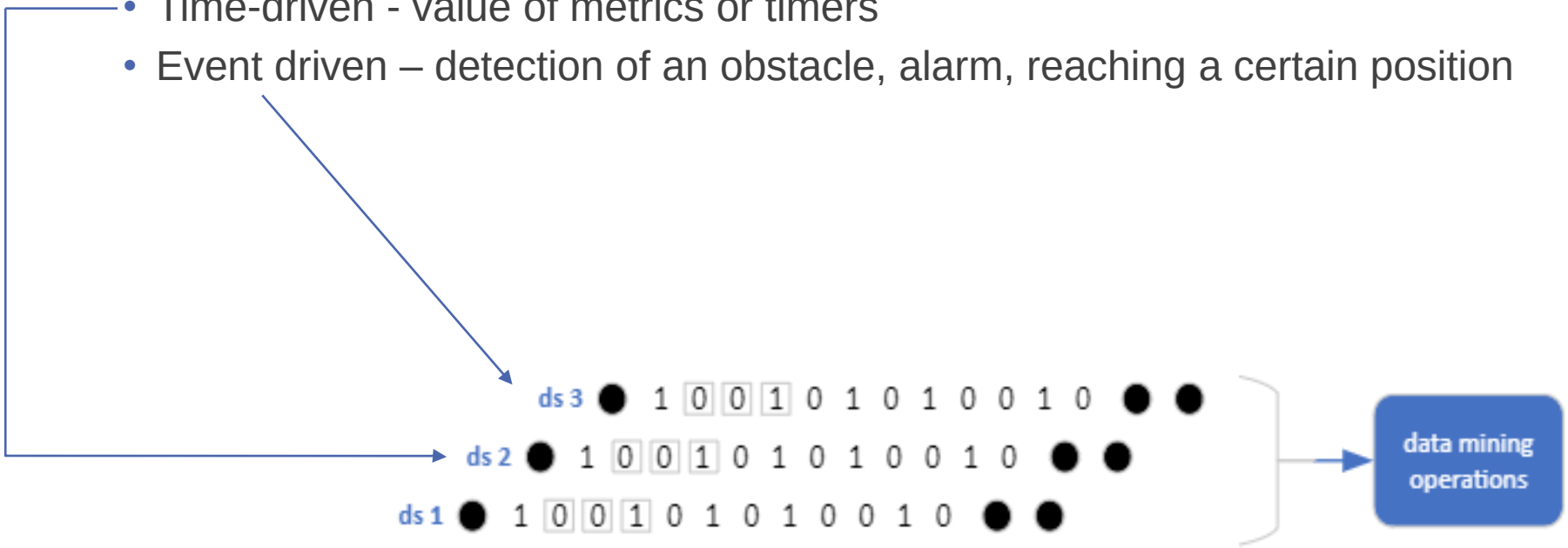
- Time-driven - value of metrics or timers
- Event driven – detection of an obstacle, alarm, reaching a certain position



Join values from data streams

- Time-driven - value of metrics or timers
- Event driven – detection of an obstacle, alarm, reaching a certain position





Why analyzing streams directly is not enough

Two questions, theoretically about the same thing. And yet a big difference in answer:

- when will the battery discharge

  ↘

  we can estimate directly from the transmitted data

Why analyzing streams directly is not enough

Two questions, theoretically about the same thing. And yet a big difference in answer:

- when will the battery discharge

  ↘

  we can estimate directly from the transmitted data

- how much more work can the AGV do until the battery is discharged

  ↘

  there is a lack of data that tells what work the AGV is doing at any given time

Data aggregation and detection of work done by AGVs

Examples of AGV operation:

- moving from one point to another
- docking at the robot's work site
- waiting for the robot arm to complete a task
- moving to a loading point
- transporting materials between points
- going to the waiting area for the next task

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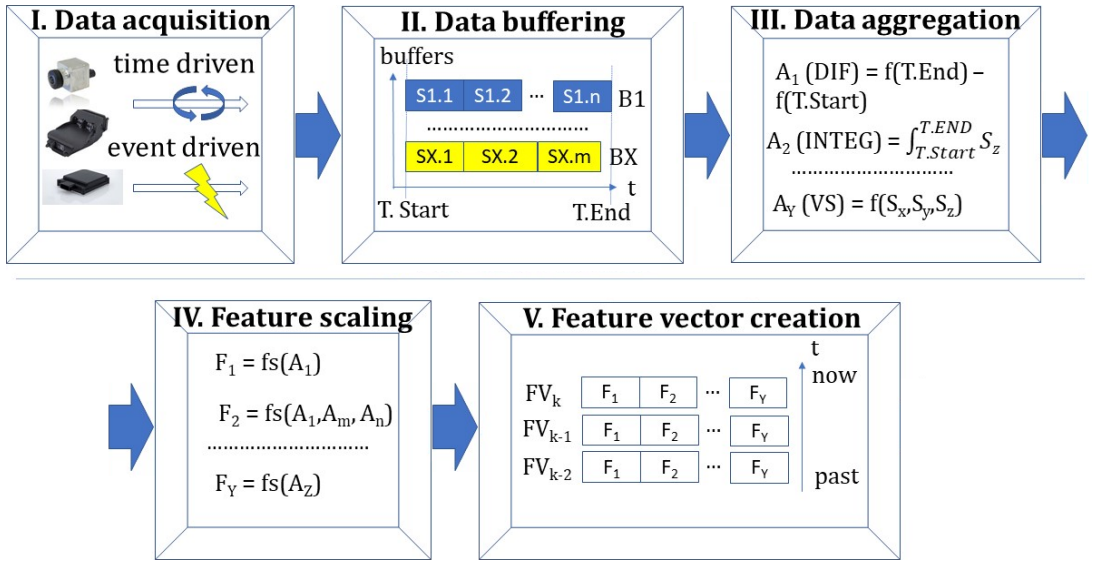
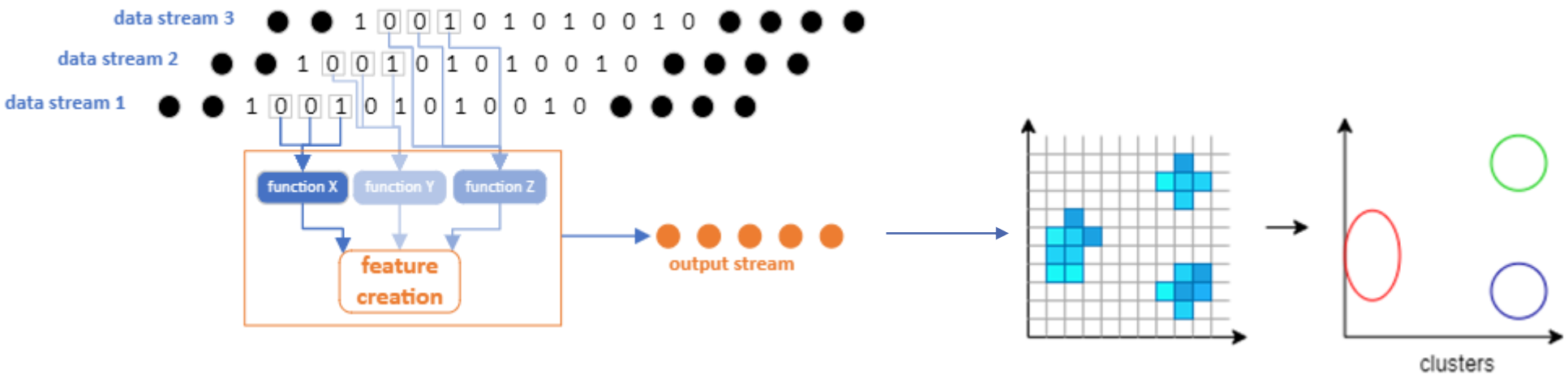
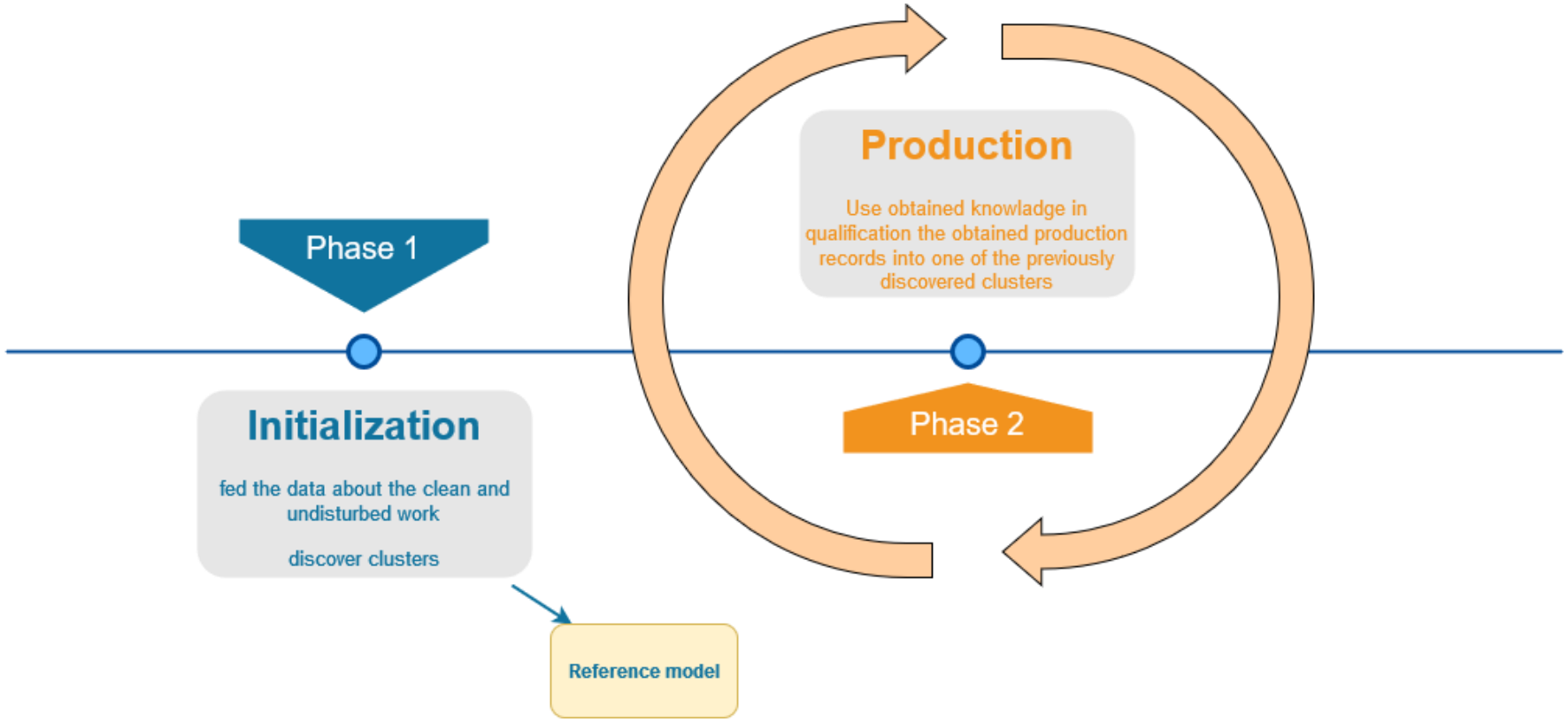


Detection of the types of work done by AGVs



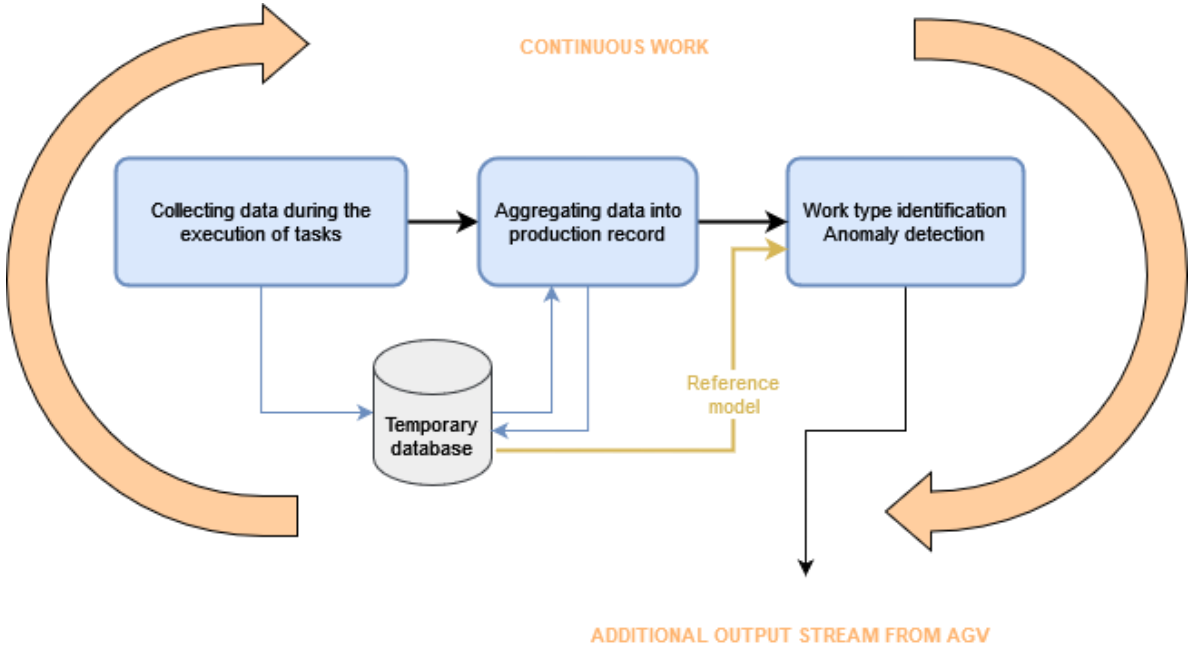
How to use such grouping - reference model



AGV operation vs. reference model

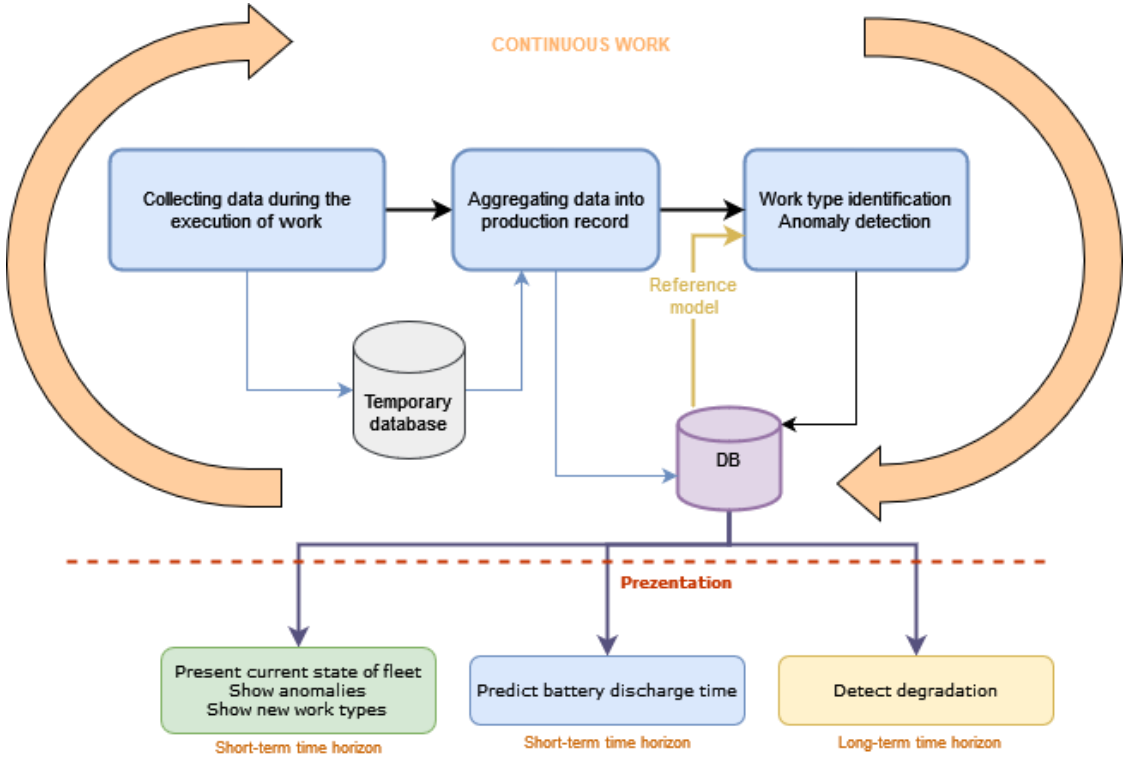
Additional data stream from AGVs:

- Aggregated data on work performed
- Discovered type of work it performed (according to AGV)

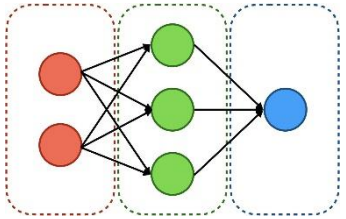


Access to additional information

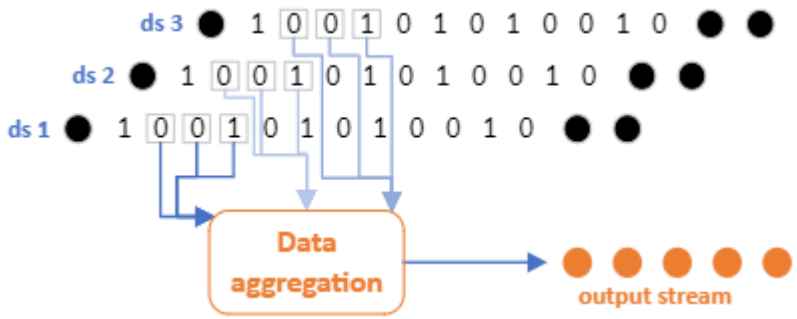
- comparing the performance of the same work by different AGVs
- monitoring the progress of degradation of AGV components (e.g., by requiring more Energy or longer time to complete the same type of work)
- detecting anomalies in the execution of work
- detecting new types of work under the assumption that anomalies are not removed



Battery discharge prediction one more time



versus



Prediction

When is the best time to send AGVs for charging to make the efficiency of vehicle use in the environment as high as possible?

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THANK YOU

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