Machine Data Analytics

Build your
data management
platform fast

T-Systems

T-Systems keeps an eye on the entire data journey of the sensor/signal data of your machinery

Devices, machines, sensors	Edges	IoT	Analytics backend
• Analytics on devices • Enable real-time analytics • Integrate different protocols and data formats	• Analytics on edges • Enable real-time analytics • Federate data analytics globally	• Manage streaming data from multiple devices • Visualize data • Integrate with different IoT solutions	• Enable advanced analytics on cloud and/or on-prem clusters • Control cost with open-source technology and FinOps

Ready-to-use components developed by T-Systems are available to build new advanced analytics features fast

Challenges

- Large, ever-growing volumes of data must be analyzed quickly
- Data analysis must be available like raw data itself
- Structured, high-performance data formats are required
- Support different industries' OT-specific raw data formats
- Easy access of decentralized data

Solutions

- Integration of IoT solution
- Ready scalable platform for managing and analyzing streaming data
- Ready analytics use cases for OT system availability and AI based anomaly detection
- Conversion of measurement data to data product
- Visualization of analysis results

Benefits

- The availability of information based on continuous data analysis enables new improved services
- Data visualization for statistics and performance monitoring
- Seamless centralized access to globally distributed data
- The open-source software stack makes the solution cloud-agnostic and helps avoid vendor lock-in

The BEAM components help to implement concrete industry use cases and scalable data analytics platforms

- App for data collection on devices
- Availability model
- IoT data & device management
- Edge federation
- Measurement data product
- Conversion of measurement data
- Flink kubernetes cluster
- Stream analytics core component
- Anomaly detection powered by AI

A short description of T-Systems' BEAM components

Stream analytics core component

Component for developing Apache Flink jobs that are processing and analyzing the streaming data by integrating different models via standardized interface (ONNX)

Anomaly detection powered by AI

A parameterized autoencoder model was used for anomaly detection; alternatively, a PCA model and a custom feature engineering model were also evaluated

IoT data & device management

Deployable IoT platform for accessing raw data

Flink Kubernetes cluster

Analytics backend for streaming data

App for data collection on devices

Android app for generating and simulating test data of sensors to prepare analytical models for real-life use cases

Availability model

Calculation of a standardized availability model for industrial systems and subsystems

Edge federation

Blueprint and reference implementations of API for starting and managing federated data jobs

Measurement data product

Data mart in columnar data format based on mf4 standard for measurement data

Conversion of measurement data

High scalable application for converting mf4 binary measurement data to columnar big data format (parquet)

Use case: Using BEAM components for sensor data to improve the quality of ADAS service

Challenge

- Large volumes of test drive events and even more measurement data, especially video data
- Intensive manual efforts to identify the relevant video data
- High efforts for the creation and management of many triggers, generated by combinations of different signal

Solution: Big data signal processing & ADAS labeling

- Scalable big data platform to evaluate triggers
- Identification of relevant video sections by automatic triggers
- Increased speed by parallel computing of measurement data
- Cloud agnostic and based on Spark (Open Source)

Customer benefits

- Less efforts to label video data due to automatic identification of relevant video sections
- Concentration of relevant data instead of reviewing entire video streams
- Fast evaluation of autonomous driving algorithms based on labeled data

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