



Industrial IoT & Anomaly Detection

Internet of Things (IoT) is one of the main technological trends in the recent years. It allows real-time machine-to-machine communication over the internet. Its application in the industrial domain – the so-called Industry 4.0 and Smart Manufacturing – is at the core of the innovation agenda for those who are committed to redesign the organizational processes of the industry of tomorrow. For these reasons, doolytic roadmap and features are designed to support the needed transformation throughout the entire data life cycle, from the ingestion of the data to the predictive analytics. One of the major goals of the Industrial IoT is the automatic monitoring and detection of abnormal events, changes and drifts on the collected data. Anomaly detection includes all the techniques aimed at the identification of data patterns who deviate from the expected behaviour (the norm). There are several approaches and they are typically linked to specific domains. They are the natural counterparts of the traditional dashboarding feature.

Anomaly Detection in Doolytic

Anomaly detection features are **pre-packaged** and can be invoked in an **interactive** manner. Alternatively, they can be set up to monitor hundreds of metrics (sensors, systems, processes) and to react to each detected anomaly.

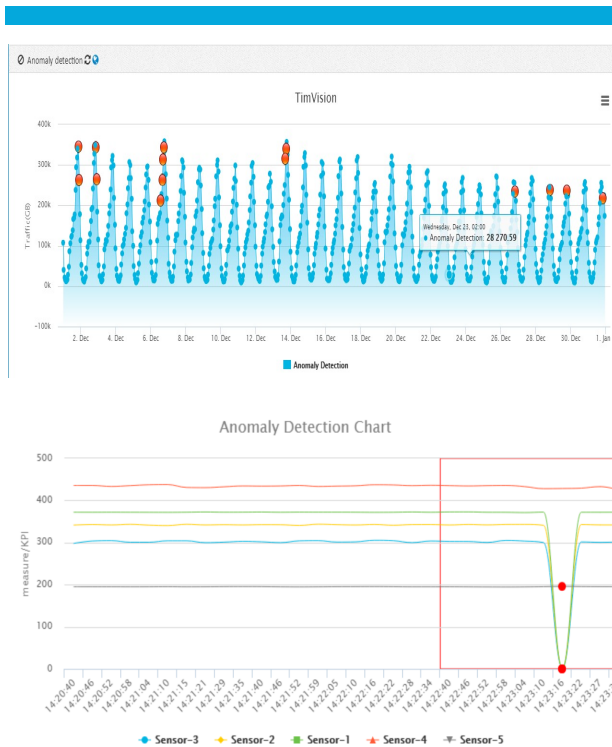
To reduce the number of singleton, **doolytic** use **supervised machine learning** techniques. Analysis pipeline and models who are able to classify true anomalies thanks to the joint observations of all the relevant process-related metrics.



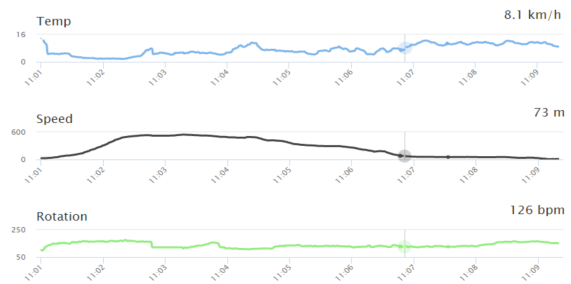
Applications

- Asset and inventory management
- Capacity and performance monitoring
- Safety and compliance
- Quality analytics
- Real-time alerts
- Predictive maintenance
- Utility and energy optimization





The real-time Anomaly Detection algorithm is able to detect anomalies in the monitored process analysing all the time series at the same time. If necessary, it can activate some triggers when thresholds are exceeded.



Predictive vs preventive maintenance

doolytic allows for the implementation of **predictive maintenance** instead of the more traditional preventive maintenance. More specifically, predictive maintenance includes the data-driven analysis of registered equipment failures and the definition of a model who takes into account the deviations from the baseline. The preventive maintenance instead focuses on equipments' life time based on the functioning time or the obsolescence.

Use case: Power consumption

It is possible to detect abnormal power consumption in housing estates, defining consumers' profiles based on consumption habits/behaviours. Using these information and supervised techniques, an **anomaly score** is associated to each consumer.

Use case: Fraud detection

The use of supervised classification models, obtained combining several models trained on labelled data on registered transactions, allows for the detection of abnormal financial transactions or illegal use of credit cards.

