

# Smart Factory

Product information



A grayscale image of a modern industrial factory floor. In the foreground, a robotic arm is visible, with a bright light reflecting off its joint. In the background, there are various pieces of machinery and conveyor belts. The overall scene is brightly lit, with some lens flare effects.

# Smart Factory Goals

## Automated Industrial Operations

Provide real-time data analytics and automation capabilities to optimize industrial processes, ensuring increased operational efficiency, reduced downtime, and enhanced productivity through the automation of human tasks.

## Intelligent Data Decision Making

Capture live data from the production floor, offering valuable insights into manufacturing processes, enabling a more informed and agile response that allows manufacturers to stay ahead of the curve and optimize their production strategies for maximum efficiency and profitability.

## Intelligent Visual Quality Control

Build intelligent quality control systems using cutting-edge deep learning technologies, ensuring not only speed and efficiency but also a level of accuracy that surpasses human capabilities through the automation of the inspection process.

## Industrial Anomaly Detection

Detect and classify anomalies in manufacturing lines with maximum accuracy without coding, leveraging advanced machine learning algorithms to identify deviations from normal operations and enabling proactive intervention to prevent issues before they impact production.



# AI Quality Control Toolkit

Reduces the manual labor required to detect quality problems in manufacturing.

The intelligent **Quality Control** solution automates manual visual inspection tasks using a set of AI and computer vision technologies that enable manufacturers to transform quality control processes by automatically detecting product defects.

**Visual inspection** is a highly manual process that can be time-consuming and prone to errors.

Now, rule-based visual inspection machines have emerged, and the market of “**Smart Manufacturing**” (industry 4.0) lives a good momentum for remarkable growth.

**AI Quality Control Toolkit** drastically automates manual inspection operations, accelerates time to value, reduces costs and risks, scales production, and makes the supply chain predictable for better management.

## Potential Use Cases

### Detect Damage

Spot damage to a product’s surface quality, colour, and shape during the manufacturing and assembly process.

### Uncover process issues

Detect and fix defects with repeating patterns that could indicate process issues.

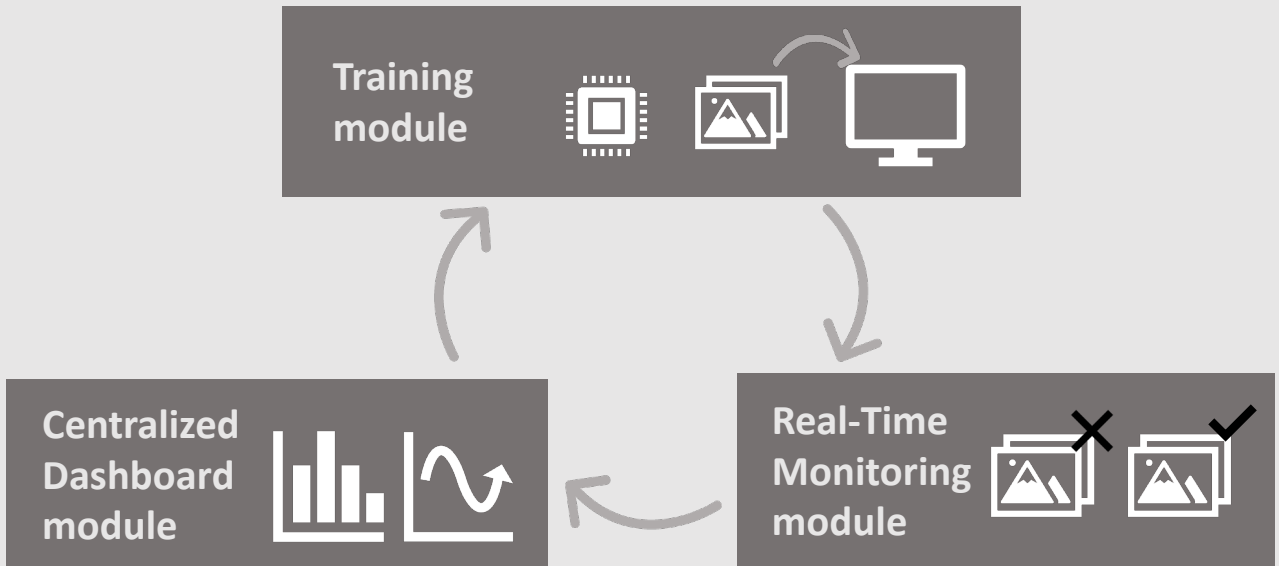
### Identify missing components

Determine and withdraw missing, misplaced, or deformed components from production at the beginning.

### Predict failures

Enable predictive equipment maintenance by detecting impending failures that could never be detected by the human eye.

## Key features



### Training module

- Easy to create and train UI-based AI models for different components.
- Active Learning capabilities facilitate labeling work.

### Real-Time Monitoring module

- Real-time prediction of components keeps track of model accuracy.
- Prevents the stopping of production lines.

### Centralized Dashboard module

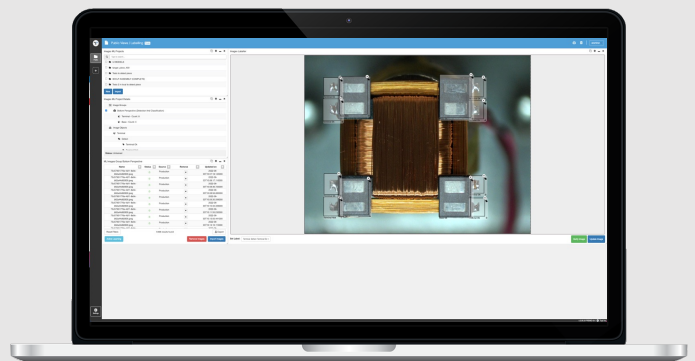
- Quick overview of the company's performance (at production line, factory, country, or company level).
- Possibility to add other metrics to monitor performance and perform Root Cause Analysis of problems.

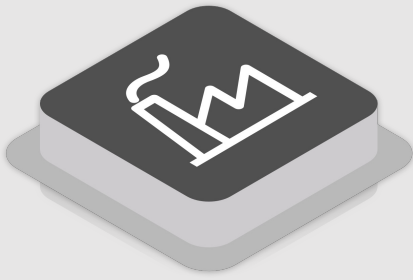
## Key benefits

- **95% detection accuracy**, compared to 85% during manual inspection.
- **Easy to create AI models** for different parts.
- **Active Learning capabilities** to facilitate labelling work.
- **A centralized solution**, works with any type of camera.
- **Real-time prediction** of parts (under 6s).
- **Model retraining** in case of model regression.
- **Predictive solution**: prevents stopping of production lines.
- **Individual and aggregated statistics** at different levels (production line, factory, country, company).
- **Root Cause Analysis**: monitors the performance of the problem.
- **Integration with a real-time MES** (Manufacturing Execution System).

## Business impact

- **Accelerate time to value with AI-powered operations**: Streamline operational processes to shortcut time to market from months down to several weeks.
- **Reduced costs with 90% less manual labor**: Reduce time for manual scanning up to 90% while increasing the accuracy.
- **Reduced risks with unplanned downtime prevention**: Quickly identify potential failures of the problem and prevent the stopping of production lines.
- **Scale business when scaling the ML model**: Scale-up any trained model to production – scale up the manufacturing.





# AI Factory Toolkit

Automating manufacturing processes with real-time intelligence and control

The **AI Factory Toolkit** solution captures real-time data from the production floor, providing visibility into key manufacturing processes, such as work order management, scheduling, inventory tracking, quality control, and performance monitoring.

It is based on **TupIOS**, Tupl's MLOPs framework that enables Subject Matter Experts to develop hyperautomation applications.

As the manufacturing industry evolves toward Industry 4.0., there is a growing need for an advanced **MES** (Management Execution System) solution that supports real-time data analysis and decision-making.

**AI Factory Toolkit is more than a MES** since it drastically automates data analytics and actions, accelerates time to value, reduces costs and risks, scales production, and makes the supply chain predictable for better management.

## Key Features

### Centralized automated analytics and actions

- Centralized solution, works with any data source.
- Real-time prediction of abnormal behaviors.
- High-value dashboarding to monitor KPIs and relevant features.
- Automated actions based on AI prediction algorithms.

### TupIOS - the all-in-one MLOps suite for hyperautomation

- **Data Engineering:** UI-based data management and transformation. Tupl Streams; low-code KPI formulas.
- **Feature Engineering:** UI-based feature formula generation, with types: Range, Time, and SQL features.
- **ML Toolkit:** Creation of ML algorithms selected simply by clicking on available options; including training and usage of the models.
- **Dashboard:** More than 100 widgets available and highly customizable views to analyze data trends.
- **Automation Engine:** UI-based automation template for open and closed loop real-time actions enabling hyperautomation powered by AI models.

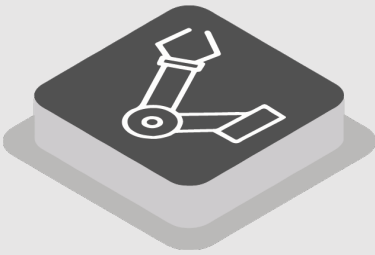
## Key benefits

- **Accelerates factories' digital transformation.**
- **100% consistency** – reducing dependence on the different levels of experience and skills within engineering teams.
- **Real-time data-driven factory management.**
- **Empowers factory operators with AI.**
- **Centralized solution** – integrate any data source and visualize the information on any company level.
- **Predictive maintenance** – prevents unplanned stopping of production lines.
- **Root Cause Analysis** – using continuous process monitoring and analysis of performance data.
- **Energy management** – optimize energy usage and reduce costs.
- **Supply chain management** – reduce lead times and improve delivery performance.

## Business Impact

- **Accelerate time to value with AI-powered operations:** Streamline operational processes to shortcut value generation, from months down to several days or weeks.
- **Increase Operational Efficiency:** Automate complex processes to lower costs and increase output.
- **Better decision making:** Access to real-time data and insights for more informed decision-making.
- **Identify potential failures:** Predictive maintenance helps you avoid unplanned downtime.





# AI Machine Control Toolkit

Providing control and efficiency to your new industrial machines

The **AI Machine Control Toolkit** transforms the way companies manage and maintain their machinery. At its core, it empowers users to create predictive models capable of monitoring every aspect of their machines. It works by continuously collecting data on various machine parts, detecting issues as they arise, and logging them for analysis.

It is based on **TupIOS**, Tupl's MLOPs framework that enables Subject Matter Experts to develop hyperautomation applications.

The real power of **AI Machine Control Toolkit** lies in its ability to provide predictive insights. As data flows in, the toolkit leverages this information to analyze the performance of machine models. It then uses these insights to retrain the models, ensuring they remain accurate and up-to-date.

By harnessing the power of predictive analytics and providing a user-friendly centralized dashboard, it ensures companies can run smooth operations, minimize downtime, and save both time and money.

## Key Benefits

- **3 to 10 times faster development of end-to-end applications.**
- **100% consistency** – reducing dependence on the different levels of experience and skills of the engineering teams.
- **80% Operational Expenses (OPEX) reduction.**
- **Empowers factory operators with AI.**
- **Predictive insights** – this proactive approach can help prevent unexpected machine failures and costly downtime.
- **Centralized Dashboard** – provides a comprehensive view of the company's metrics and performance that allows real-time monitoring of operations, enabling quick responses to any changes in production rates.
- **No-code/User-friendly UI** – designed to be easy to use, making it accessible for all users regardless of their technical expertise.



## Key Features

### Cordis SUITE - Low-Code Machine Control Platform

- **Design Level Thinking:** Low-code is a visual approach towards software development. With it, software & mechatronics engineers can seamlessly work together.
- **Code generation:** The low-code models are automatically translated, bug-free, into executable software that works on hardware platforms from multiple vendors.
- **Commissioning:** It enables engineers to control and visualize machine control data graphically, including all operational and sensor data.
- **Data platform:** An extremely rich data set is generated automatically so that data scientists can improve OEE.

### TuplOS - AI Machine Control Toolkit

- **Data Engineering:** UI-based data management and transformation. Tupl Streams; low-code KPI formulas.
- **Feature Engineering:** UI-based feature formula generation, with types: Range, Time, and SQL features.
- **ML Toolkit:** Creation of ML algorithms selected by simply clicking on available options; including training and usage of the models.
- **Dashboarding:** More than 100 widgets available and highly customizable views to analyze data trends.
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