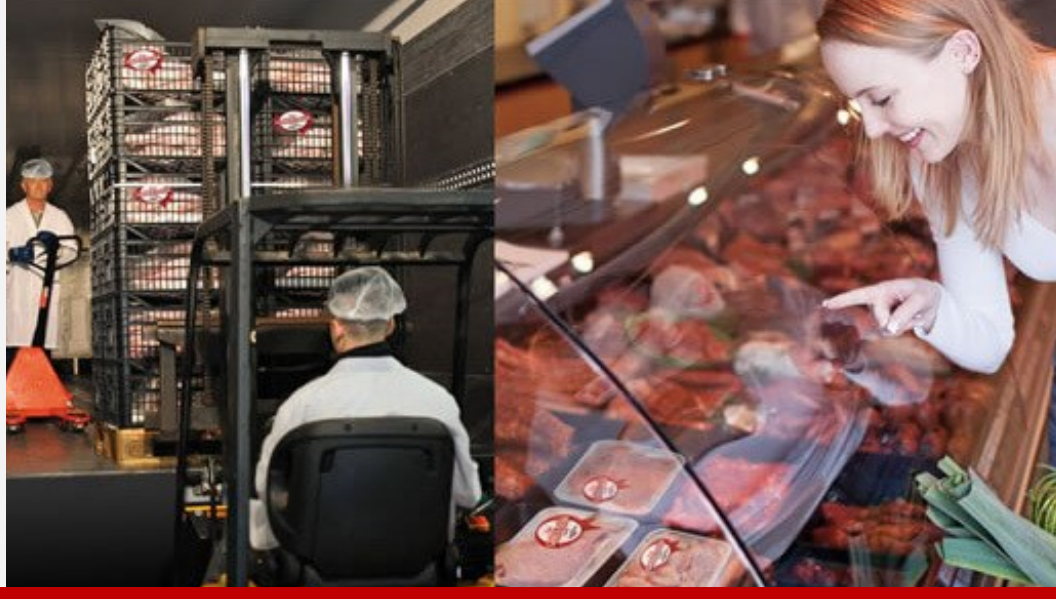
TOOLS for SMART MINDS

Case Study



Real-time monitoring of a turkey processing and packaging plant

Gobbi Frattini

Goals

- Interconnection of all machinery in a new plant
- Continuous plant monitoring
- System for displaying all alarms from each workstation
- Traceability of products
- Display of production temperatures history per day

Solution

The solution provided is able to constantly monitor the entire plant, to display alarms allowing easy management, to allow product traceability and to quickly access the necessary information.

Resources

- iDaq
- Digital Factory 4.0 Kernel and Frontend
- Digital Factory 4.0 Alarms
- Lilium

The Challenge

Gobbi Frattini is a rapidly expanding company that has been operating for many years in the breeding and processing of white meat located in Desenzano del Garda.

Gobbi Frattini's need is to **interconnect the entire plant** and the numerous **electric panels** of a new facility with a surface area of over **11 thousand square meters**, on three levels and with a maximum height of over 10 meters. The structure is used for the **processing** and **packaging** of **turkeys**, which the company itself takes care of along the entire supply chain.

The objective is to be able **to monitor in real-time** the **entire state of the plant** and have **traceability** of **food products** to ensure the **highest quality** to consumers.

The main plant of Gobbi Frattini

The Gobbi Frattini family has been operating for many years in the breeding and processing of white meat. The origin of the activity dates back to 1936 when father Luigi, still a boy, used to ride his bicycle to collect hen eggs from the farmsteads and then sell them at the market. After the war, helped by his wife and his nine children, he expanded the activity in the processing and sale of chickens and turkeys. It is in 1964 that the activity is accelerated thanks to the first semi-automatic meat processing plant. Today, Cavalier Luigi proudly watches the company grow, run by his children and grandchildren.

www.gobbifrattini.com

Gobbi Frattini

Loc. Venga Bertani, 12
25015 Desenzano del Garda (BS) - Italy

The **first challenge**, due to the **food sector** and the **very restrictive standards**, concerns the **maintenance of the cold chain** along the entire product processing line. For this reason temperatures can never fall below a certain threshold, and Gobbi Frattini **needs to receive timely communications** in case of problems and to have a system to **display the alarms of the whole plant from each of the workstations**.

In addition to the data of the machinery and the temperatures of the cold rooms of the processing areas, it is necessary to **check every single switch** of the almost **20 electrical panels**, to know the **energy production** of the installed **photovoltaic system** and the **water flow of the purifier**.

The **second challenge** for TOOLS for SMART MINDS is to optimally **manage the large number of elements to be controlled** and the **large amount of data physically distributed in a large plant,** transforming them into **information** that can be **consulted quickly** and **easily** for **each step** of **production** and **by date**.

Solution

To meet Gobbi Frattini's needs, a solution has been implemented that is able to **constantly monitor the entire plant**, to **show alarms** allowing **easy management**, to **allow product traceability** and to **quickly access** the necessary **information**. The plant has been **fully interconnected** by detecting **all** the available **electrical signals**, with a suitable network system that TOOLS for SMART MINDS helped in the choice of some devices. The solution is mainly composed by ***Digital Factory 4.0 Kernel*** that manages five ***iDaq***, a software developed by TOOLS for SMART MINDS.

Digital Factory 4.0 Kernel is the core of the ***Digital Factory 4.0 Suite***, a set of tools for SMEs that want to use process and production data, drawing useful information to improve productivity and product quality.

It allows to reach the necessary **standards** to remain competitive and have a solid base for implementations of **machine learning** and **Artificial Intelligence** algorithms.

iDaq is the solution able to collect data from very **heterogeneous machines** and to manage them in a similar way, in order **to be displayed in the same interface** of *Digital Factory 4.0*.

The monitored systems and the main data collected are the following.

- **Two thermoforming packaging machines:** the main alarms are acquired through Siemens protocol.
- **Conveyor belts inside the plant:** data on belt movement are acquired through Siemens protocol.
- **Cutting line:** the alarms are mainly acquired.
- **Central refrigeration system:** the temperatures are monitored and saved, the data are collected through Siemens protocol.
- **Photovoltaic system:** the quantity of energy produced by the panels is acquired and used by the system itself through Modbus protocol.
- **Central fire detection unit:** the status of all the fire sensors of the system is read through Modbus protocol.
- **Pair of fire-fighting motor pumps:** the status and all the anomalies reported by the control unit on the two pumps as well as any operating activity - via Modbus protocol - are checked.
- **Purifier:** the quantity of water filtered by Siemens protocol is measured and read.
- **Ossobuchi machine:** the machine alarms are read via Siemens protocol.
- **Approximately 20 electric panels:** the position of each individual switch is read: if it is closed, opened manually or triggered automatically - via Modbus protocol.
- **Electrical generator set of emergency generators:** the status and operation information as well as any generated power and fuel level status are acquired - via Modbus protocol.

Digital Factory 4.0 Kernel has two main tasks. The first is to save on a database the **temperatures** to ensure through the **historical archive** that **food products** have always been stored at the right temperature.

The **data** are easily **retrievable** and **viewable** by day from the ***Digital Factory 4.0 Frontend***, allowing to have a **traceability** and a **guarantee** for health checks and for the final consumer.

The second task of *Digital Factory 4.0 Kernel* is the continuous **monitoring of all signals** to **verify** that the value remains within the norm. If this is not the case, such as a tripped switch or a temperature out of range, **Kernel immediately notifies the anomalies via email** to the **production managers** and **activates an automatic phone dialer** to make automatic calls.

In addition, several ***Digital Factory 4.0 Alarms*** panels have been installed that allow to **see all the alarms of the system from each workstation** showing the relevant information.

Thanks to ***Digital Factory 4.0 Alarms***, the staff in charge of resolving alarms can **mark notes** and comments on ongoing alarms **to keep a company's knowledge**, as well as **mark the taking charge of alarms** by improving **coordination** and **optimizing** their management.

The solution permits to **configure the alarms autonomously**, inserting new ones or modifying the existing ones, **setting the** anomalous **values** and the **notification mode** in *Digital Factory 4.0* for each one.

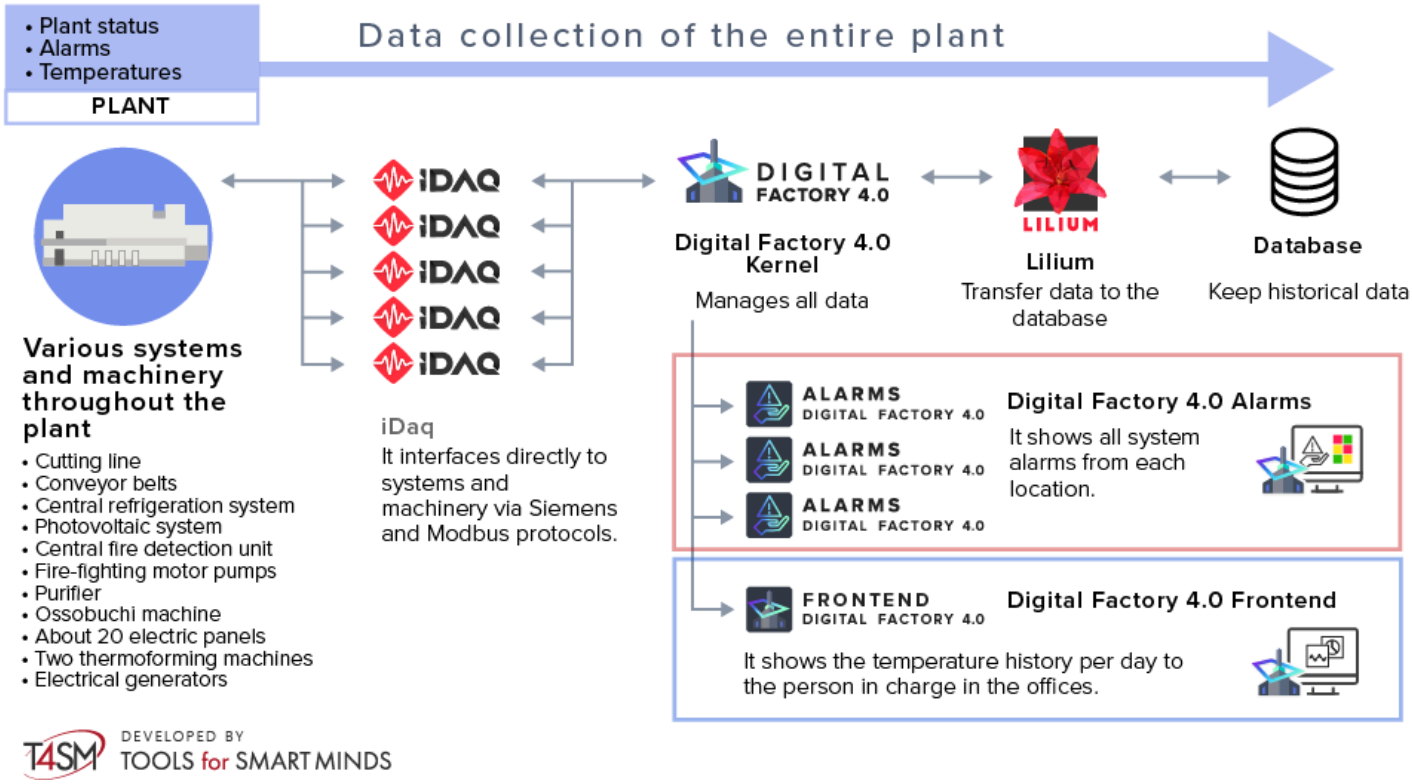


Diagram of the Industry 4.0 software solution for the digitalization of the new Gobbi Frattini factory

Benefits and Results

Thanks to the solution provided all the objectives have been achieved, and Gobbi Frattini has obtained the following benefits:

- **Interconnection of the entire plant and company digitization:** all available data is collected automatically, allowing it to obtain all the benefits associated with digitization: time savings, process optimization and increased productivity.
- **Real-time monitoring:** all values are constantly monitored to ensure that they remain within set ranges.
- **Optimal display and management of alarms:** alarms throughout the plant can be seen from each workstation and for each one it is possible to mark their taking charge, resolution, mark notes and add documents or multimedia files in order to have a history of them and company knowledge. The solution allows to solve in a timely manner any problem that may arise, an important need in the food sector to ensure the quality of products.
- **Traceability of the products:** thanks to the collection of temperatures it is possible to guarantee for each package that the production requirements have been met.
- **Information recovery in a simple and fast way:** information can be recovered in a few clicks for each day.
- **Reduction of paper documentation and human errors:** data is transferred automatically avoiding errors due to manual transcriptions and reducing printing costs.

T4SM
TOOLS for SMART MINDS

TOOLS for SMART MINDS (T4SM) è integratore tecnologico che realizza soluzioni software per aziende manifatturiere.

T4SM è Alliance Partner di National Instruments e il team di sviluppo è formato da Certified LabVIEW Architects (CLA) di lunga esperienza nella programmazione LV-Real Time e LV-FPGA.

T4SM progetta da zero soluzioni di alta qualità facilmente integrabili con prodotti di terze parti, che aiutano i clienti ad accorciare il time-to-market dei loro sistemi.

T4SM utilizza la metodologia AGILE per lo sviluppo dei progetti software ed il co-design delle applicazioni con benefici immediati per i clienti, aiutandoli ad ottenere un vantaggio competitivo rispetto ai concorrenti.

Per il supporto tecnico e informazioni sui prodotti:

www.toolsforsmartminds.com

TOOLS for SMART MINDS
Sede aziendale
Via Padania, 16
25030 Castel Mella
Brescia (Italia)

T4SM
TOOLS for SMART MINDS

TOOLS for SMART MINDS (T4SM) is a system integrator that develops software solutions for manufacturing companies.

T4SM is Alliance Partner of National Instruments and the development team consists of Certified LabVIEW Architects (CLA) who have long experience in LV Real-Time Programming and LV-FPGA.

T4SM designs from scratch to high-quality solutions easily integrable with third-party products, which help customers to shorten time-to-market of their systems.

T4SM uses the AGILE methodology for the development of software projects and the co-design of applications with immediate benefits for customers, helping them to gain a competitive advantage over competitors.

For technical support and product information:

www.toolsforsmartminds.com

TOOLS for SMART MINDS
Corporate headquarter
Via Padania, 16
25030 Castel Mella
Brescia (Italy)

Potentiality

The solution provided is **extremely flexible**, allowing Gobbi Frattini **to change machining operations** and to **connect new machinery** as the plant is expanded.

Among the future developments, **a siren fully managed** by ***Digital Factory 4.0 Kernel*** can be **connected** to warn about certain types of alarms.

The solution provided also **allows to implement** in the future **machine learning algorithms** and **Artificial Intelligence** for **preventive maintenance.**

Client Comment

"T4SM has been an indispensable collaborator in the execution of this project of multiple complexities. It demonstrated an analytical approach and a clear, flexible and rigorous working method and a highly appreciated speed of intervention."

Andrea Gobbi Frattini
Sales
Gobbi Frattini