4.0 machine to assemble/disassemble turbocompressors for petrol, diesel and electric engines.

R&D project for Industry 4.0 that integrates the connection between physical and digital systems with a complex Big Data analysis using the most advanced technologies: Web Supervisor and Smart-Glass, MachineLearning and Conditional Monitoring applied to predictive maintenance, SensorWear and BigData for dyadic man - cobot).

Client requirement

Innovate the production standards by re-engineering the machine by inserting Industry 4.0 technologies, in order to optimize the cycle time, increase product traceability and interconnect the machine for real-time data exchange.

Project description

The project involves the re-engineering and construction of a turbocharger assembly machine that allows the disassembly of the parts in a second phase. We have used the following technologies:

- A **collaborative robot** for the manipulation of the pieces, able to implement a dyadic interaction with the operator for the operations in the **cycle time of 10 seconds.**
- A **SmartGlass** to manage the status of the desk, the alarms and the devices involved, to send missions to the collaborative robot and to display the most useful information to the operator.
- **Predictive maintenance with IoT System** specifically designed to test the effectiveness of machine learning algorithms dedicated to solving a regression problem and sending data to the cloud.
- **Real-time operator biometry** in order to automatically adjust the line speed to avoid unwanted and dangerous health stresses.
- **Hand kinematics and real-time operator position equipped with Smart-Glove and Infrared Tracker** to allow the component delivery operation in hand by the collaborative robot.
- **Desk equipped with a stereo camera (Microsoft Kinect V2)** to compensate the acquisition of hand positions through the SmartGlove.
- **Web 4.0 supervisor** with a scalable architecture: it allows us to have a distributed interface remotely accessible from different devices to manage the machine and / or display advanced reporting.

SOME PROJECT NUMBERS

2.3 thousand hours in Industrial Research

9 Industry 4.0 enabling technologies used

10% Cycle Time reduction

SERVICES AND TECHNOLOGIES USED

OT | IoT | Predictive Maintenance | Cloud4.0 | SmartGlasses | SensorWear | CoBot | BigData | Horizon2020