D-Cube & Stone Group International

Source / Link: Personal interview & https://www.d-cube.eu/success-story/sgi/

Technology area:	Type of good practice:	Target group:
☒ Artificial Intelligence	☒ Company	☐ Discrete (smart) manufacturing
☐ Big Data	☒ Project	☐ Automotive
☐ Digital Twins	☐ Initiative	☐ Aerospace
☒ IoT and IIoT	☐ Programme	☒ Metal processing
☐ Cybersecurity	☐ Other	☐ Consumer goods
☐ VR/AR		☐ Pharmaceuticals and chemistry
☐ Robotics		☐ Food and agriculture
☒ Automation		☐ Health
☐ System Integration		☐ Textiles
☒ Smart Sensors		☒ Others: Stone and tiles production
☐ Additive Manufacturing		
☐ Other:		

Summary:

Stone Group International (SGI) is one of the largest groups of marble companies in Europe, active in quarrying, processing and trading marble all over the world with a dynamic presence in more than 80 countries. With the technologies, developed by D-Cube, SGI has managed to fully adopt Stone 4.0 in the entire tile production, enabling unquestionable marble tile sorting through novel machine learning algorithms. Smart tile sorting proved to be far more accurate and stable compared to manual sorting. Instant and automated marble tile rejection and classification led to yield optimization, claim reduction and real-time production insights.

Detailed description

Before the implementation of the technology, developed by D-Cube, SGI, just like other stone and tile producing companies, was facing challenges specific to the industy. Some of them were:

- Manual tile sorting, which often had high rate of human error;
- Tile misclassification resulting in faulty palletization;
- Lack of traceability across the plants;
- No real-time production monitoring;
- Accumulated operational and production costs.

Those main issues, in turn, were leading to delays in order delivery, customer claims due to tile misclassification, suboptimal production and lack of insights and production-related data – all of which ultimately was reducing the profitability of the company.

To address this challenge, D-Cube developed an industrial IoT ecosystem, which delivers quality assurance to tile production, palletization and end-to-end tracking. The system uses AI-based machine vision to enable smart tile sorting and defect detection. Augmented reality interfaces are used to support the precise pickup and palletization, and intranet and extranet cloud interfaces enable the real-time production monitoring and feed the business intelligence.

The different activities performed by the system can be summarized into 7 steps:

1. Marble tiles or slabs exit processing machine on a conveyor belt and continue towards packaging.
2. Marble tiles/slabs enter the Machine Vision smart cage, where a laser sensor identifies each tile/slab separately and the tracking process begins.
3. Neural Networks process realistic captures of each tile/slab resulting in autonomous sorting and surficial defect detection (holes, scratches, spots, crystals, etc.) in less than 2 seconds.
4. A virtual mirror imprints sorting information on physical tiles/slabs through augmented reality, allowing for fast and human-error-free packaging.
5. Data are shipped from the industrial floor to a private cloud, providing near-real time production insights (ad-hoc statistics, virtual dry lay).
6. Customers logon to a dedicated extranet, where they can track their orders, explore stock pallets and even browse tiles in a pallet or a box.
7. Retail customers have the opportunity to actually see what is in a box before buying it, through a smartphone app.

As a result, D-Cube's IoT solution blends sensors, people, processes, cyber-physical systems and apps into one whole ecosystem that benefits the industrial processes of Stone Group International and ultimately improves their profitability.

Beneficial Results

The project turned out to be very successful and beneficial for Stone Group International and some of the achievements that were accomplished as a result of D-Cube's technology are:

- The Smart tile sorting became 2x more accurate than human sorting;
- 100% sorting repeatability;
- Easy generalization to new tile types;
- Faster Quality Control;
- Reduced number of customer claims;
- Availability of real-time production insights;
- Online added value to customer services.

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