KONICA MINOLTA

FORXAI

DEFECT DETECTION

Giving Shape to Ideas

HOW MUCH DO YOU CARE ABOUT THE QUALITY OF YOUR PRODUCTS?

All the changes in modern industry forcing factories to rethink their manufacturing strategies. Labour shortage is a challenge that's not going away anytime soon and quality matters like never before. Quality control in manufacturing helps to maintain customer satisfaction and loyalty and reduce the risk and cost of replacing faulty goods. Companies can build a reputation for quality by gaining accreditation with a recognized quality standard. Inspection is called a process that checks whether the product meets assumed, at the designing stage, quality standards. During manufacturing processes, inspection locates anomalies, which otherwise cause problems at the final stage. The cost of quality is an area that many businesses target for improvement. Konica Minolta offers FORXAI, an imaging IoT platform. This platform combines imaging technology, which is Konica Minolta's strength, with cutting-edge IoT and AI technologies. In-house developed solution, Defect Detection as a part of quality control and assurance process that monitors any kind of defects not only visible by the human eye. This solution is also suitable for products travelling on conveyor belts. Defect Detection can detect damage, dirt, leaked liquids or other anomalies on an endless list of objects.

HOW DEFECT DETECTION WORKS?

The Defect Detection application is specifically designed to identify flaws and imperfections of surfaces, objects or production parts and to notify the human operators, when there is any predefined defect detected. This person interacts with the application interface through a web browser dashboard. Defect Detection can also track and record the identity of the inspected products, by reading barcodes. The dashboard displays the detected defect type, highlights the zone with the defect, and optionally snapshots a barcode ID transcript. The operator updates default values for the three basic defect types according to the needs of the business and specific production line. The application detects cracks in the material, the dirtiness of the surface, and foreign objects based on images from a single camera. By implementing the automated Defect Detection we can decrease the number of human operators and improve quality inspection.

REAL-TIME DASHBOARD FOR A TYPICAL DEFECT DETECTION

Detection result
If a defect is identified, its type will be displayed

Detection snapshot
Displays a snapshot of the last detected object on the production line

Barcode (optional)
The UID or barcode number of the product will be displayed on dashboard

Sensitivity settings
Displays the defect sensitivity threshold set by the user

Detection statistics
Displays the defect statistics for the identified products

Total checked objects
Displays the number of products that were checked in total

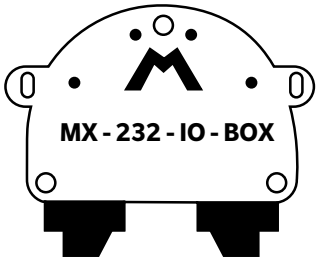
Total defected objects
Displays the number of products where any flaws were identified

Set
You can adjust the sensitivity threshold for defects. The Set function locks in the sensitivity settings values of the DD application

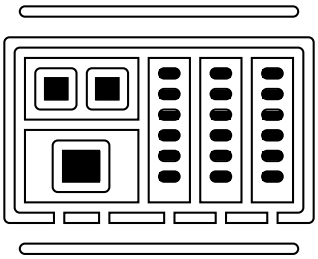
SYSTEM INTEGRATIONS

In parallel to the real-time dashboard for visualization of the detection results, the system can be configured to provide generated data to another application via an integration interface or it's physical outputs. Everything is based on the detection results, or optionally user inputs. The endless range of supported integrations depends on the specific deployment and can also be a subject of custom development if required.

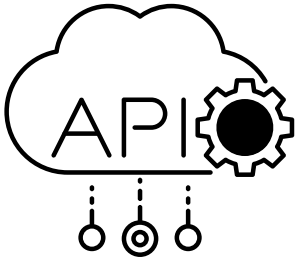
I/O BOX



PLC



API



WHAT ARE YOUR BENEFITS?

- Higher accuracy and reliability compared to manual inspection (e.g. imprecision of eyesight)
- Various types of defects to be inspected at one time (e.g. cracks, scratches, deformations, material cumulation)
- Cost saving by reducing trained inspectors needed for manual inspection
- Intuitive Graphic User Interface available for system administrator
- Higher system performance (it can inspect over 100 parts per minute, repeatedly)
- Flexibility in training model about new defect types
- Limiting the chances of errors
- Ability to refine system performance as new examples (images) are presented
- Reducing costs related to complaints
- Solution can operate 24/7

EXAMPLE SCENARIO

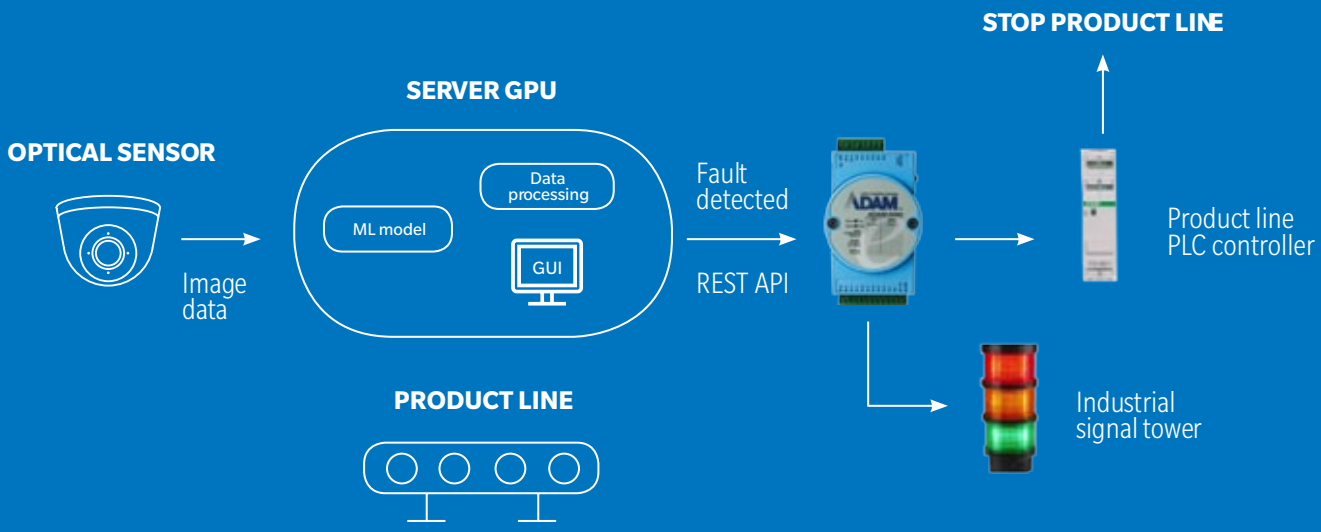
PAVING BLOCKS MANUFACTURE

A paving block manufacturer had a big issue in their production site, where paving materials were produced. The injury risk of quality control employees in a heavy-machinery production environment, manual visual inspection errors range from 20% to 30% and loss of reputation due to warranty claims from end customers. The company goal was to eliminate all these negative factors and speed up the production processes.

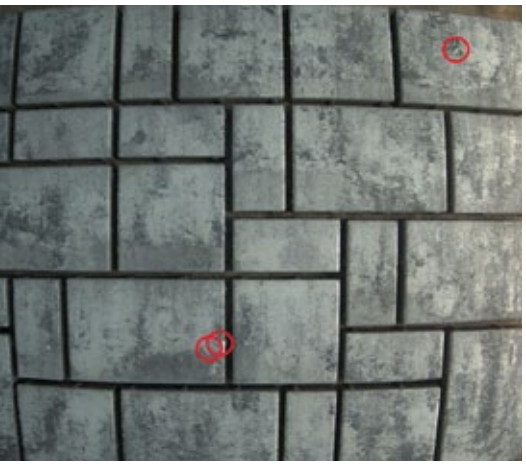
The installation of MOBOTIX IoT camera with FORXAI Defect Detection solution solved the issues. In this case, Defect Detection results in the discovery of various defects in pawing blocks. The system would immediately detect defective items and act according to a predefined scenario. This setup eliminated possible injuries, decreased human errors, decreased the need of human labour and overall, speeded up the whole production.

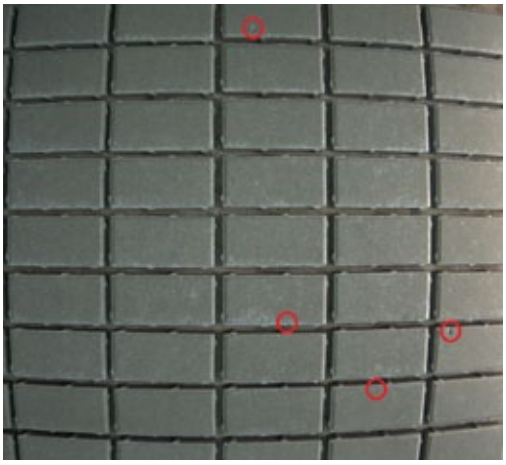
HOW DOES IT WORK?

The optical sensor from S74 camera is located above the production line for high resolution and image quality. All to enable real time image acquisition. Algorithms trained on historical data run on the dedicated on-site, high resource server with GPU and perform real time defect detection tasks. If a defect occurs (e.g. cracks, scratches, material accumulation, pigment dots) the system activates a dedicated industrial signal tower light and/or send STOP signal to the production line PLC controller. The graphic User Interface shows the exact location of every defective paving stone. After getting rid of defective products the procedure is restarted.



DEFECT DETECTION PICTURES FROM PRODUCTION





PRICING EXAMPLE

DEFECT DETECTION	
Defect Detection annual licences	
Camera and components	
Server GPU and 3rd party integration solutions	
SW, Implementation, ML models	
TOTAL COST + 1 YEAR LICENCES INCLUDED	17.000 – 20.000 EUR

BENEFITS EXPRESSIBLE IN NUMBERS	
Manual inspection costs cut	
Manual sorting due to errors	
Increased production speed	
TOTAL SAVINGS PER 1 YEAR	12.000 – 15.000 EUR

BENEFITS NON-EXPRESSIBLE IN NUMBERS
Reduced risk of injuries
More reliable products output
Better reputation due to increased quality

FOR MORE INFORMATION, PLEASE VISIT OUR WEBSITES OR CONTACT YOUR LOCAL KONICA MINOLTA SALES OUTLET.