Myelin Foundry®
Everything AI, Anything Creative

SURFACE QUALITY INSPECTION USING REAL-TIME EDGE AI

FOVEA EDGE CASE STUDY

Leading multinational steel manufacturing company

Transforming industry through intelligence on the edge

SUMMARY

CHALLENGE

A leading steel manufacturing company used high speed cameras on their galvanized and non-galvanized metal manufacturing lines to take images of steel surfaces. These images were then manually inspected by an operator. In case of defects, depending on the type there of, the line had to be stopped and roller serviced. Thus, leading to wastage of material. The company also had cases where the material was rejected by their customer as some defects went undetected by visual inspection. This was mainly due to operator fatigue. The requirement was detection and classification of defects on metal surfaces under production in real-time by precise Surface Vision.

SOLUTION

Myelin Foundry solved the problem with state of art AI-driven Edge Device that detects and classifies defects in real-time at high speeds of 20 FPS and over 99% F1 score*.

BENEFIT

Myelin Foundry's plug-n-play solution is able to detect and classify up to 40 different type of steel surface defect in real time. The solution was able to send real-time alerts when a critical defect type occurred, that reduced costly rejects and facilitated a defect-free, highly efficient processes for the steel manufacturer.

* Results are subject to material, environment and model parameters.

A major challenge for most steel manufacturing units, is to maximize yield and produce the highest quality of product, while limiting cost & resource wastage.

During the rolling process, over twenty tons of metal slabs are heated to **1200°C** and moved at **20m/s** for over half a kilometer before they are rolled into **thin strips less than 2 mm thick**.

Such a high speed can cause errors in gap settings, and defects in steel shape can lead to **pinching and damage to strips and rolls,** in addition to other errors. Therefore, early detection of such defects is crucial.

In all manufacturing units, maximizing yield is the key to minimizing costs and resources, and producing "zero" rejects.

Early detection of defects is crucial for immediate response and thereby preventing scrap, customer rejects and overall safety of operation. AI based vision product can tackle challenging tasks of detecting surface defects automatically.

Surface quality inspection is a quality control process to identify all kinds of damage, including cracks, inclusions, deletions, foreign bodies, and other surface defects across all industries. It is the total process of checking the end-product, to verify that they are defect-free and conform to existing standards.

AI powered edge package to augment existing hardware

BUSINESS PRIORITIES

- Improve time-to-detect quality defects
- Minimize customization to existing processes

MANUFACTURING PRIORITIES

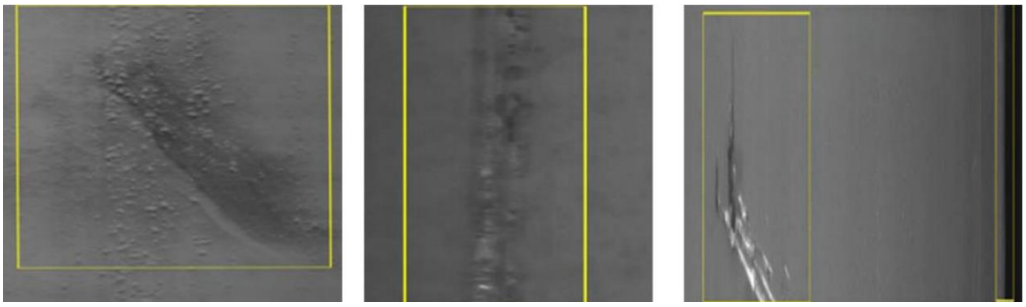
- Reduced occurrence of defects in the quality testing process
- Reduced chances for human-error
- Automate visual inspection process

END-USER EXPERIENCE

- Improved overall part quality
- Increased reliability and accuracy of quality testing

The manufacturer used a set-up of 8MP IP cameras that relayed images to an operator for analysis. This system was prone to erroneous detection & lag due to operator skill and fatigue. The process was inefficient scope for high degree of automation.

Myelin Foundry's offers a plug-n-play edge package that can be installed in a device between camera feed and workstation. This enables the device to handle feed at near real-time basis with maximum latency of less than 5ms. This AI powered software seamlessly integrates with the existing hardware and annotates defects on images making it easier for the operator to intervene only when there is a line stop.



Defects detected and classified by the system

The upgraded system works without any artificial light, diffuser, polarizer, or any optical fiber. State of art machine learning algorithm makes the system offers high resolution noise removal with data formatting making the output format compatible with existing system significantly reducing costs.

Myelin Foundry further made the system efficient and inexpensive by incorporating one 8 MP IP camera per edge device working at an exceptional accuracy of over 99%.

Fovea EDGE successfully processed

8 MP

of data at

20 FPS

classifying and detecting defects as small as

1mm²

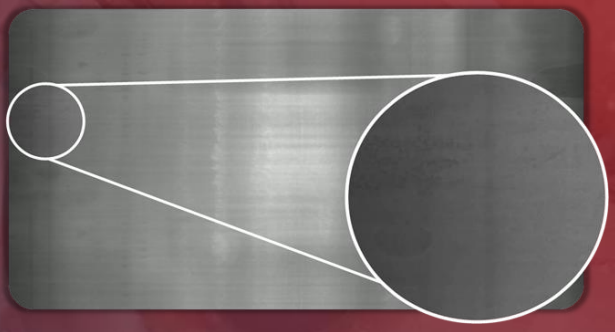
with more than

99%

accuracy in real time with little change in the existing hardware.

OUTCOMES

Myelin Foundry installed the surface vision edge device at each manufacturing line and achieved a high F1 score. Hence, necessitating operator intervention only in case of very rare false positives.



Defect identification

The device processed 8 MP of data at a rate of 20 frames per second and successfully detected and classified defects in real time, reducing the final data to be processed by the plant operator.

System classified defects like slivers, scratches, edge damage, cc patch, coil break etc. with precision of up to 1mm².

The project achieved desired accuracy of 98% in detection and classification of processed data handoff.

About Myelin Foundry

Myelin Foundry is a deep tech product company transforming human experience though Artificial Intelligence on complex unstructured data, in real-time, at the edge. Founded in January 2019, the company has deep expertise in real-time computer vision analytics on edge devices.

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