Myelin Foundry®
Everything AI, Anything Creative

FLOURESCENT PENETRANT INSPECTION USING REAL-TIME EDGE AI

FOVEA EDGE CASE STUDY

Leading global provider of integrated avionics systems

Transforming industry through intelligence on the edge

SUMMARY

CHALLENGE

A skilled individual with rigorous training must manually examine intricate components for defects under fluorescent light, increasing chances of human fatigue and hence errors.

SOLUTION

Myelin Foundry solved the problem with AI-powered Edge Device that detects and classifies defects with more than 90% accuracy* without needing human supervision.

BENEFIT

Myelin Foundry's solution reduces the chances of human error, speeds up the process and provides highly accurate detection at a low cost.

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

Challenges of a major aerospace component manufacturer to reduce the occurrence of defects

Metallic parts specially related to aviation like valves, pipelines, tanks, and structural membranes tend to have small, tight pores and smooth surfaces. Defects such as cracks and porosity are common.

In order to detect defects that may compromise the integrity or quality of the part, Fluorescent Penetrant Inspection method Is used. Here, a fluorescent penetrant that glows under ultraviolet light is applied after recommended surface preparation.

The final inspection is carried out by a skilled person under black light. The skilled person is trained to examine the various classes of defects. The inspector is specialized for a typical metal or part type. Further, long durations of operating under black light causes human fatigue leading to misses in defect detection that could lead to catastrophic failure in the field.

Since there is no room for error, it is common that the process is repeated multiple times.

Fluorescent Penetrant Inspection (FPI) method is largely influenced by human factors due to its nature, introducing several challenges on inspection consistency and reliability making autonomous inspection need of the hour.

Automating the FPI using AI powered edge device

BUSINESS PRIORITIES

- Improved Overall Equipment Efficiency
- Minimize customization to existing processes

MANUFACTURING PRIORITIES

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

END-USER EXPERIENCE

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

Current system for defect detection in metals involves an inspector who analyses a prepared sample multiple times under UV light. This system is inefficient and is prone to erroneous detection, exposure to harmful chemical strains and Ultraviolet light. It has a high scope for automation.

Myelin Foundry's product is a plug n play edge device that can be installed along with a one, two or three-camera setup in workstation with the capability of handling feed at near time basis with near zero latency. This AI powered device seamlessly analyses samples and annotates defects on images making it easier for the inspector to identify and classify defects.

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.

Fovea EDGE successfully reduced inspection speed by

50%

increased detection reliability by

82%

reduced reporting time by

95%

with an overall defect detection accuracy of

90%

in real time with little change in the existing hardware.

OUTCOMES

Myelin Foundry installed ready to use edge device along with a setup of three high quality cameras placed at 60° relaying processed data in real time. State of art AI algorithm was trained with a sizeable dataset of only 20-30 inputs per class and allowed operation in existing setup with little change in workstation.

Defect identification

System classified defects as small 2 mm wide and 0.2 mm deep. Detected defects included cracks, fractures, laps, seams caused by fatigue, impact, quenching, machining, grinding, forging or overload with precision.

The deployment achieved desired accuracy of 90% in detection and classification of defects in inspected components. The system along with its automated reporting module reduced the skilled manpower required for visual inspection.

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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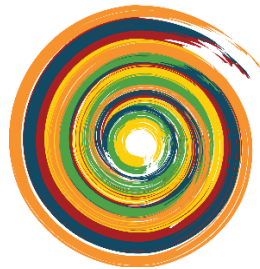2nd Floor, Siddapura, Whitefield,

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