ADVANCED
ROBOTICS

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# ROBOTICS

# Who we are

- Danilo Verzeletti, president of  Evolut Spa until 2016 and CEO of Evolut China until 2020.
- September 2021 Advanced Robotics, founded in partnership with Edoardo and Francesco Buffoli in September2020
- 30 years of experience in new robotic systems and service thanks to our technicians
- Synergy with several partners of the Blue Tech Hub

# BUFFOLI INDUSTRIES

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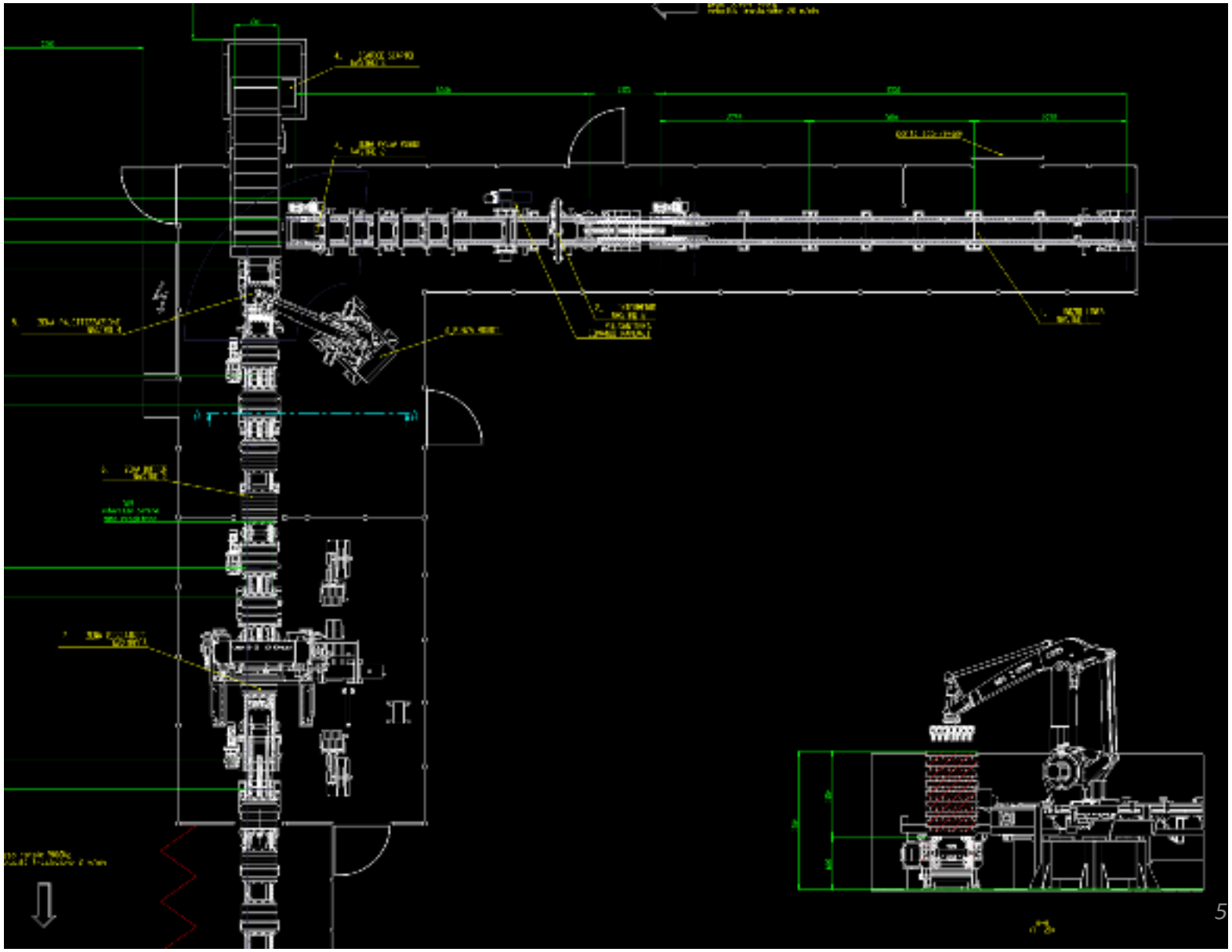
# Typology of robotics cells:

- Foundry
- Handling
- Assembly
- Palletization
- Cutting and deburring
- Robotic applications on machine tools and transfers
- Spot welding
- Quality check
- Special installation

# Palletizing of aluminum ingots

Palletizing ingots from continuous casting

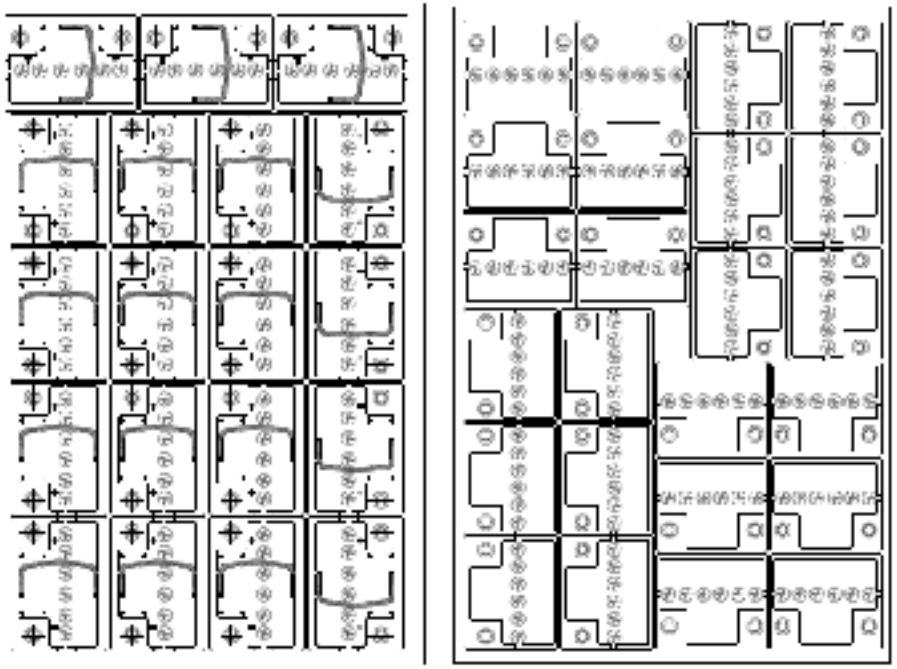
Ingots orientation control system

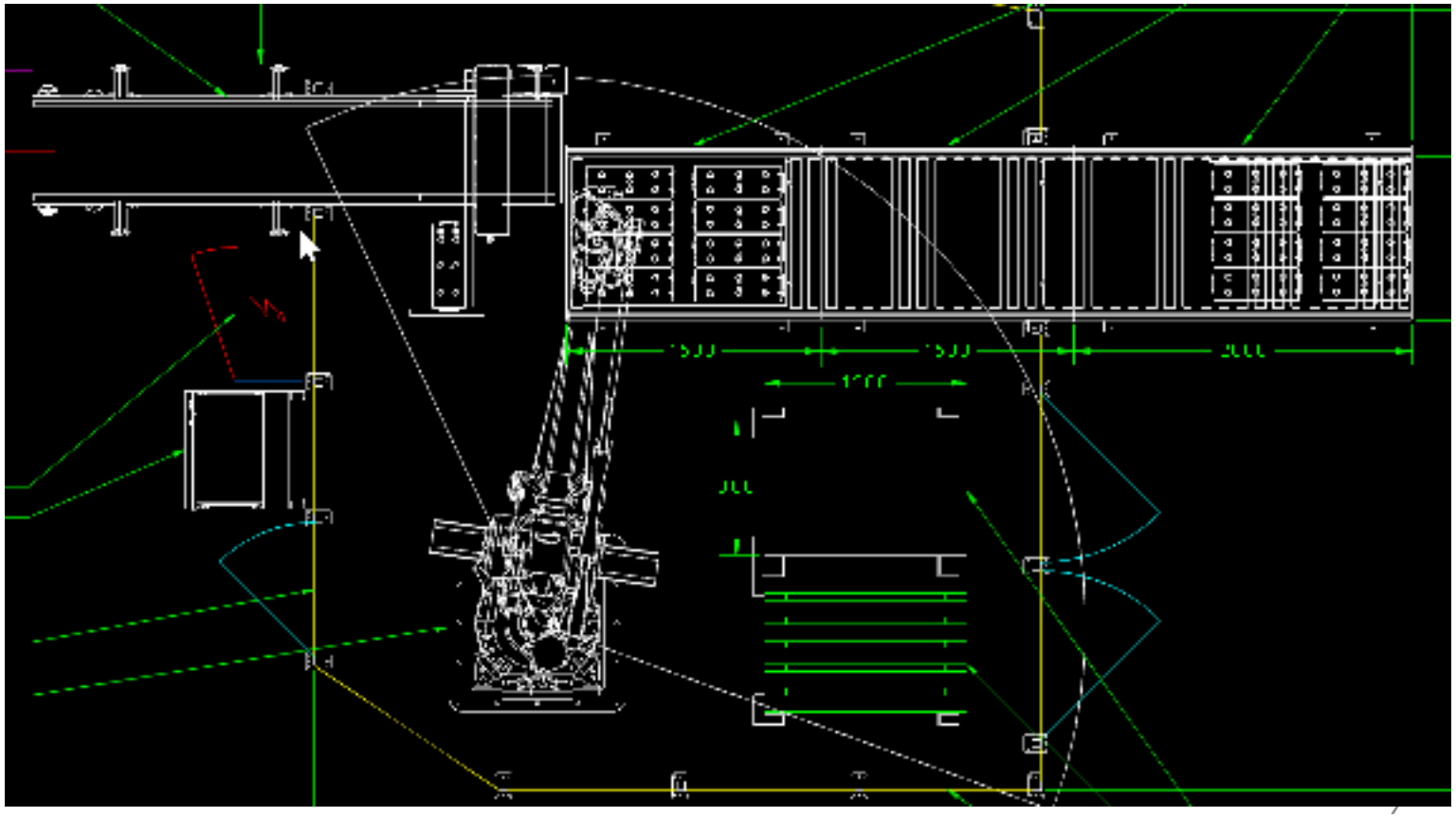


# Palletizing of aluminum ingots

# Palletizing batteries

- Multiple pallet configurations
- Palletizing software
- Management of different types of batteries
- Interlayer management





# Robotic applications for CNC machines

Management of multiple codes

48 pieces for an autonomy of

4 hours

No experienced operators required

Pallet with laser cut sheets.

# Transfer

Transfer loading and unloading

Grip with vision systems
for transfer loading

Marking of the finished
piece

# Transfer

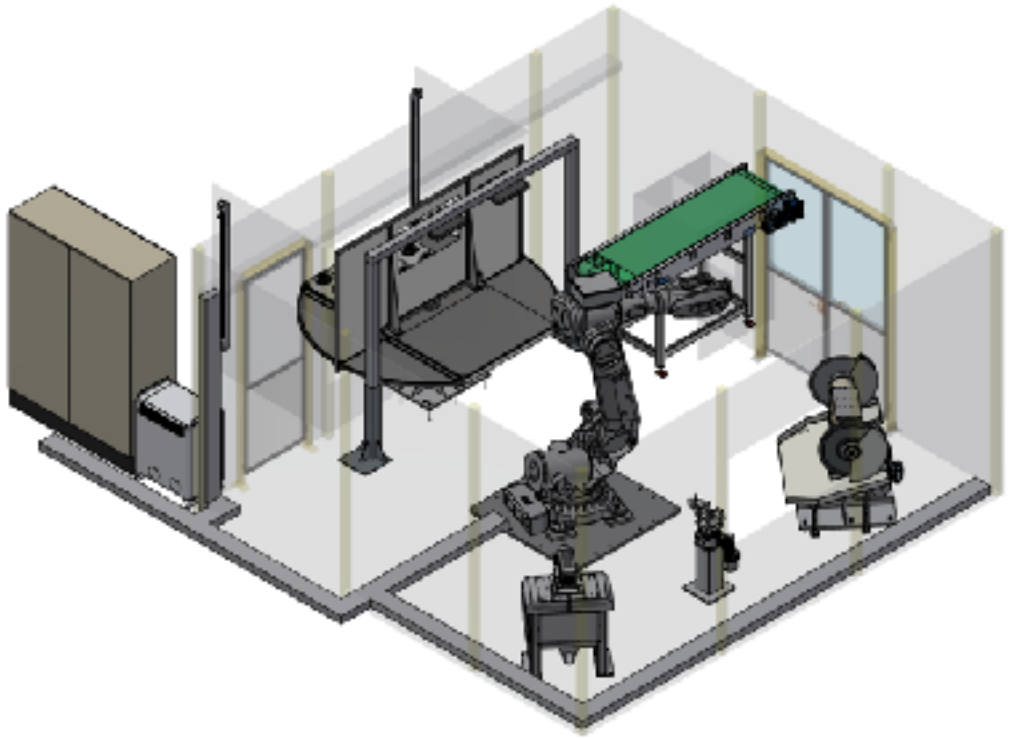
Cycle time: 2 seconds

Input:  Foundry crude

Output: Pallets ready for assembly

# Cast iron deburring

- Rotary table and Foresight vision system for workpiece pick-up.
- Diamond grinding wheel and tip for the deburring phase
- Compensated tools and robot feedback to avoid collisions



# **Special Installations:** Franciacorta Bottles

Handling from the refining baskets to the remuage baskets.

24 bottles per grip

7 bar of pressure in a bottle

Precision handling without stirring the deposited yeasts.

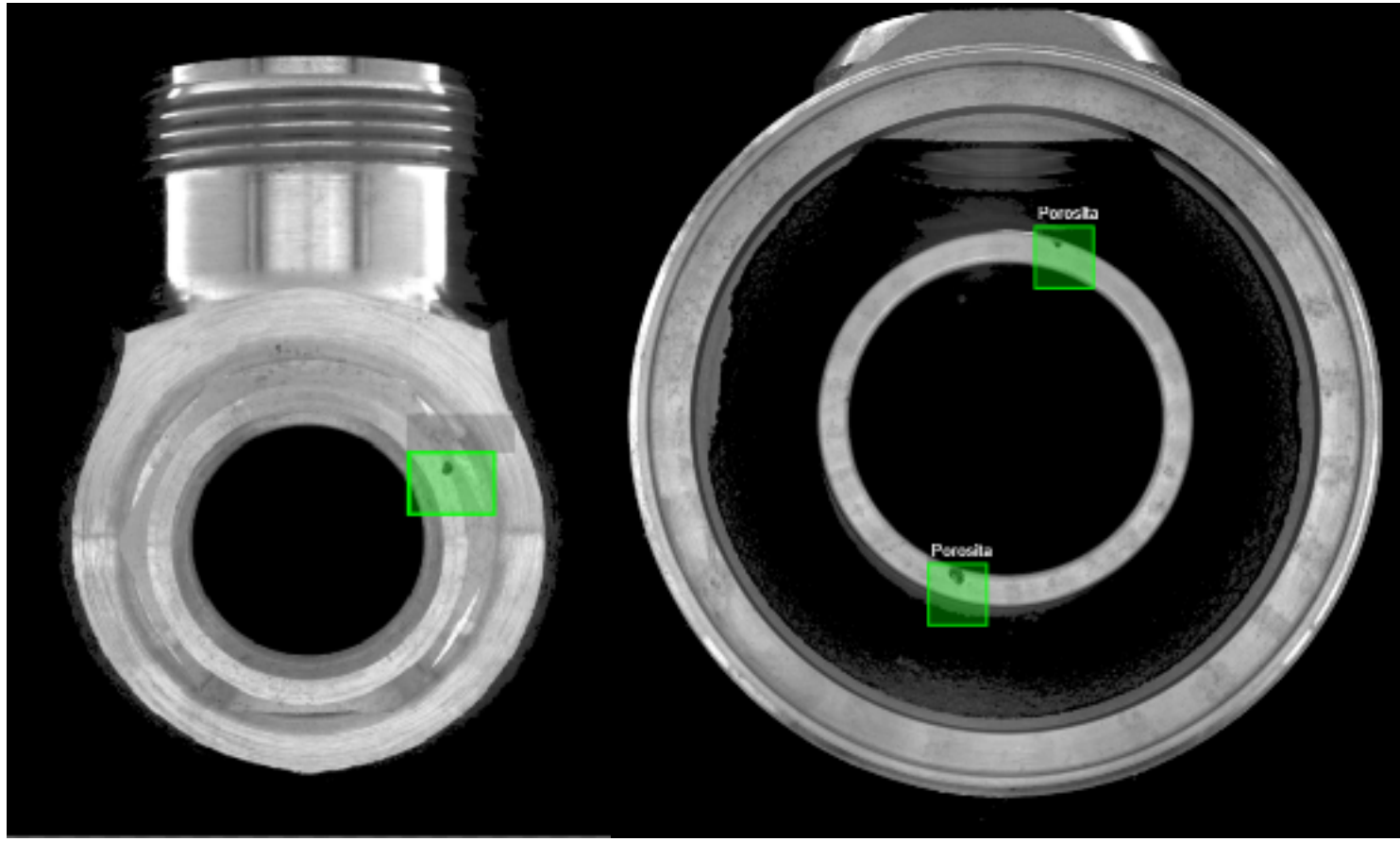
Soft touch process to recognize the status of both the loading basket and the unloading basket

# **Special Installations:** quality check with Artificial Intelligence

Quality check of both raw components and processed products.

Types of details controlled:

- Porosity
- Cracks
- Lack of materials
- Dents
- Burrs
- Scratches
- Vibration due to machining



# Quality Robocell

*Robotic cell for quality control with Artificial Intelligence*:

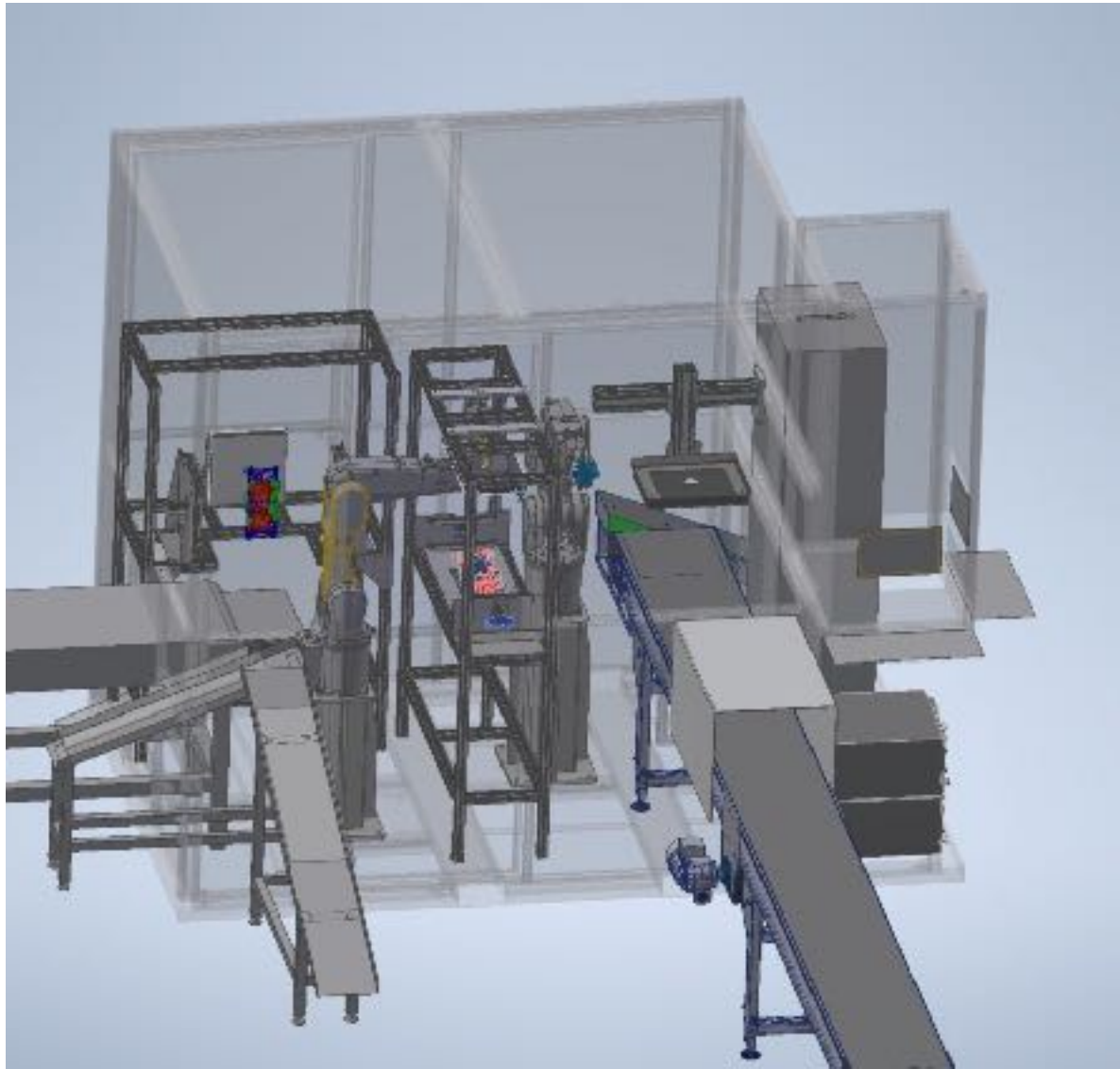
- Objective - Fast
- Repeatable - Accurate
- Track - Safe

**Cloud platform or Local server** for AI training

- AI training with few samples ( about 50)
- Validation of models before putting them into production

Runtime

- Performance from industrial production



# Defects:

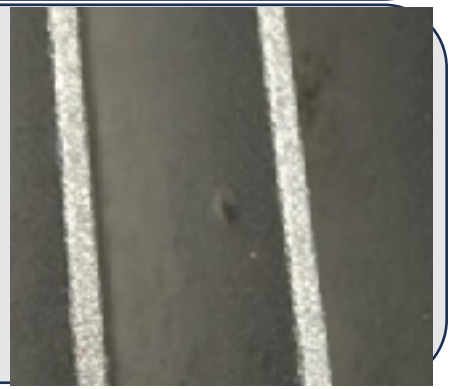
*Aluminium Flakes*

*Missing Material*

*Burrs*

*Porosities*

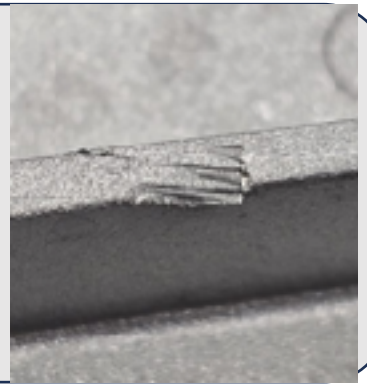
*Bubbles*



*Spots*

*Broken Pins*

*Dents*



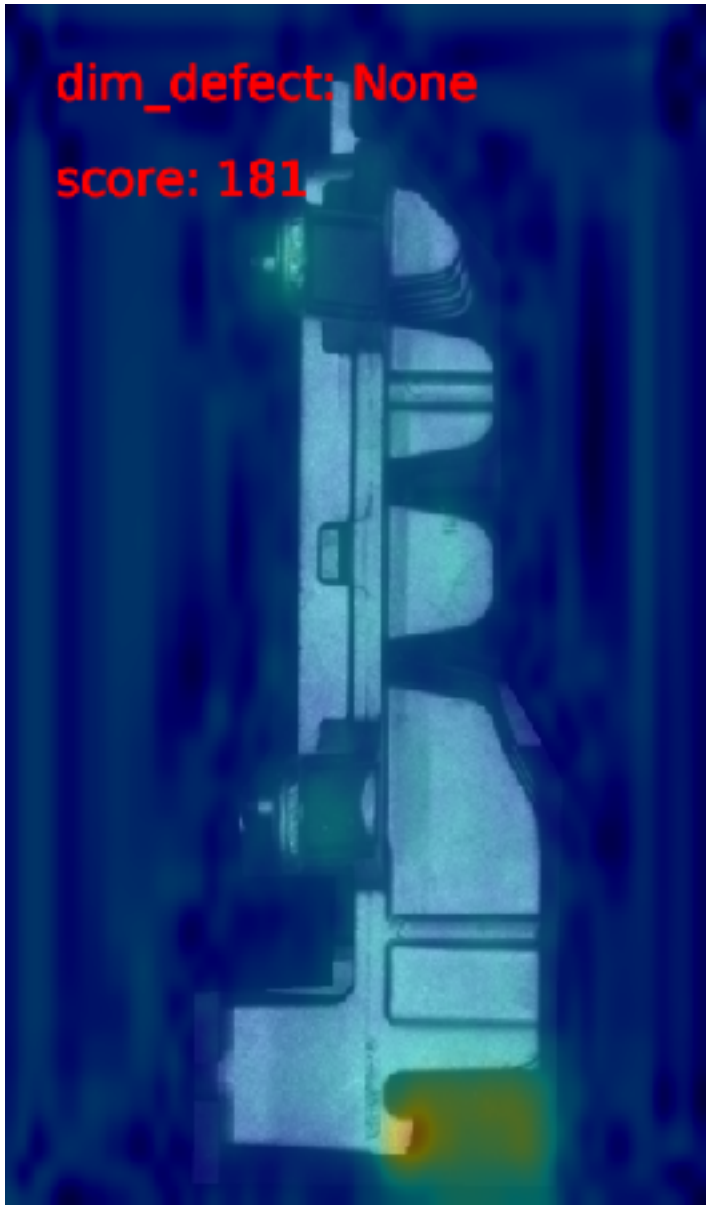
# Examples of analysis

The anomaly detection model outputs a **heatmap** of the inspected part.

If the heatmap appears entirely **blue**, the part is within standard quality parameters.

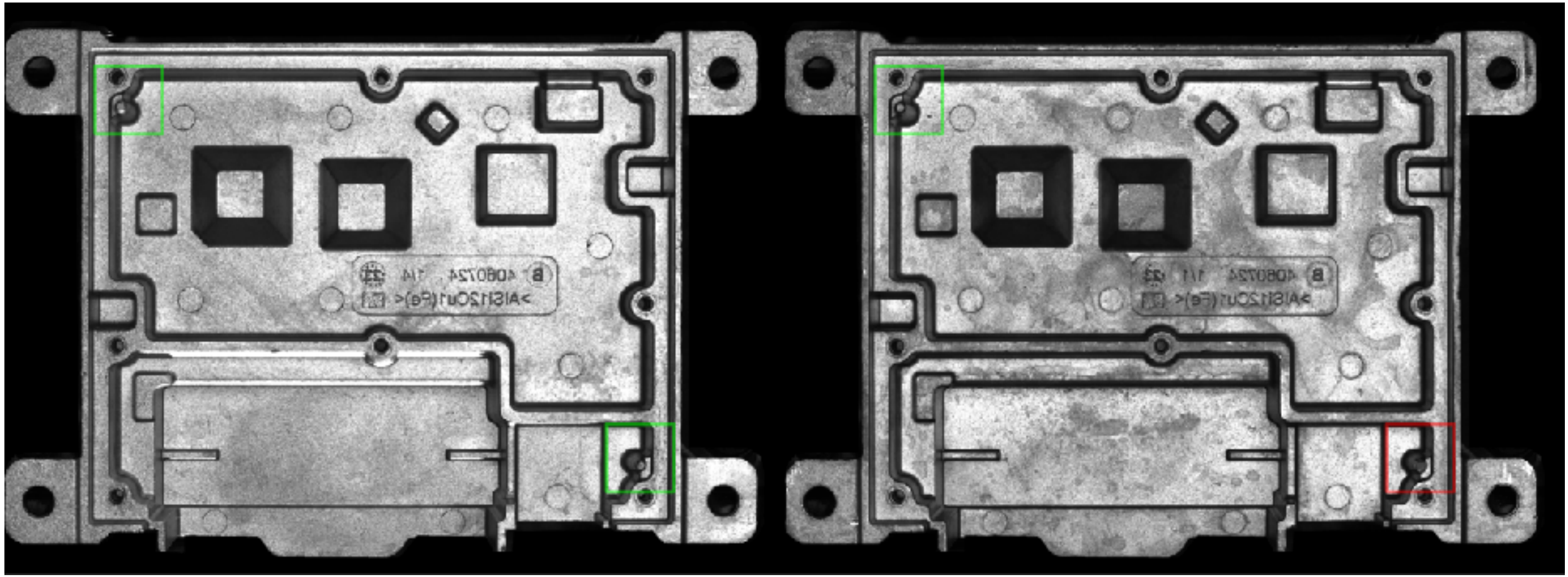
**Red-highlighted areas** indicate detected anomalies.

This model is particularly effective in identifying **material shortages and macroscopic defects**.



# Pin inspections

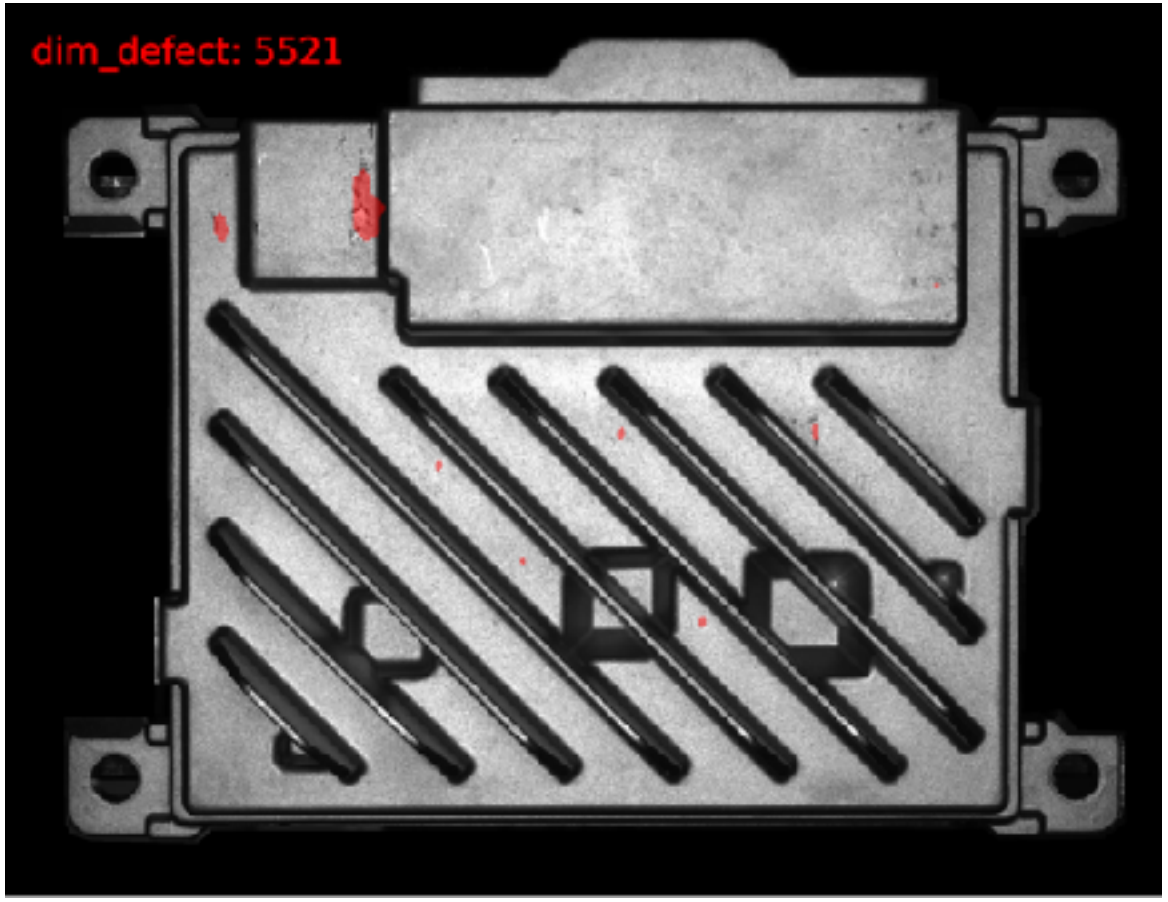
- Check for **pin presence** and **integrity**.
- **Green boxes** indicate intact pins, while red boxes highlight damaged ones.

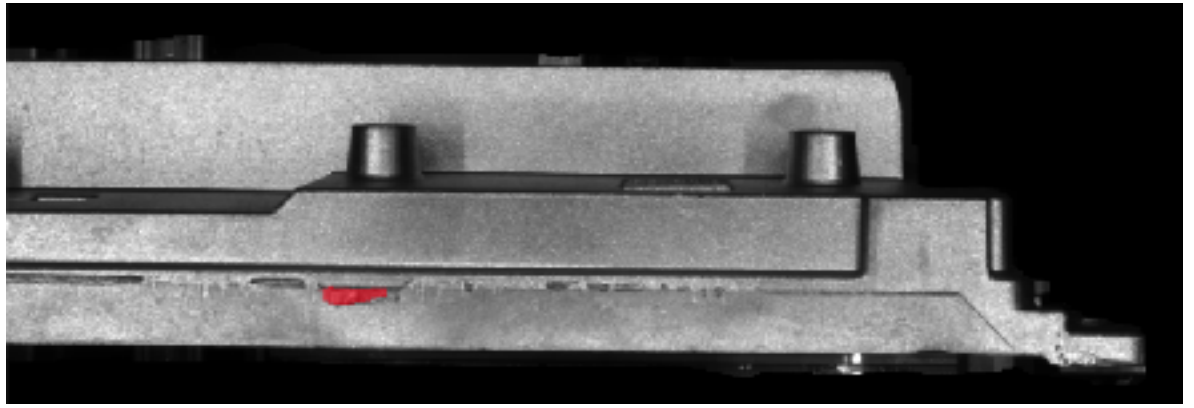


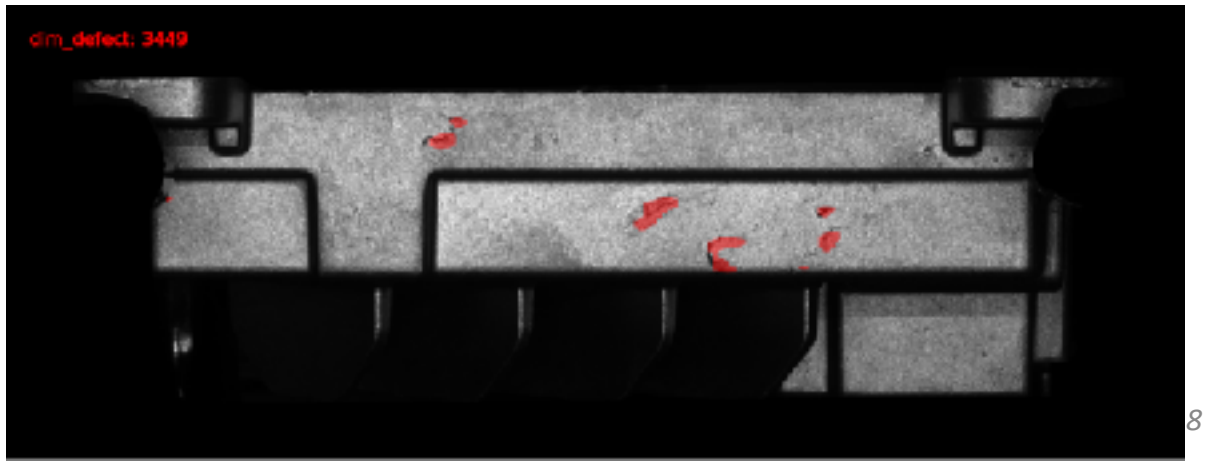
# Defect identification

Identification of specific defects as burrs and foils

The segmation highlights pixel per pixel the defects.





# **Use Cases**: Internal inspection of raw foundry pieces

Internal inspection of raw foundry pieces.

Two type of boroscopes:

- 0° degrees
- 90° degrees

Defects:

- Ridge inside the holes

# **Use Cases**: Internal inspection of raw foundry pieces

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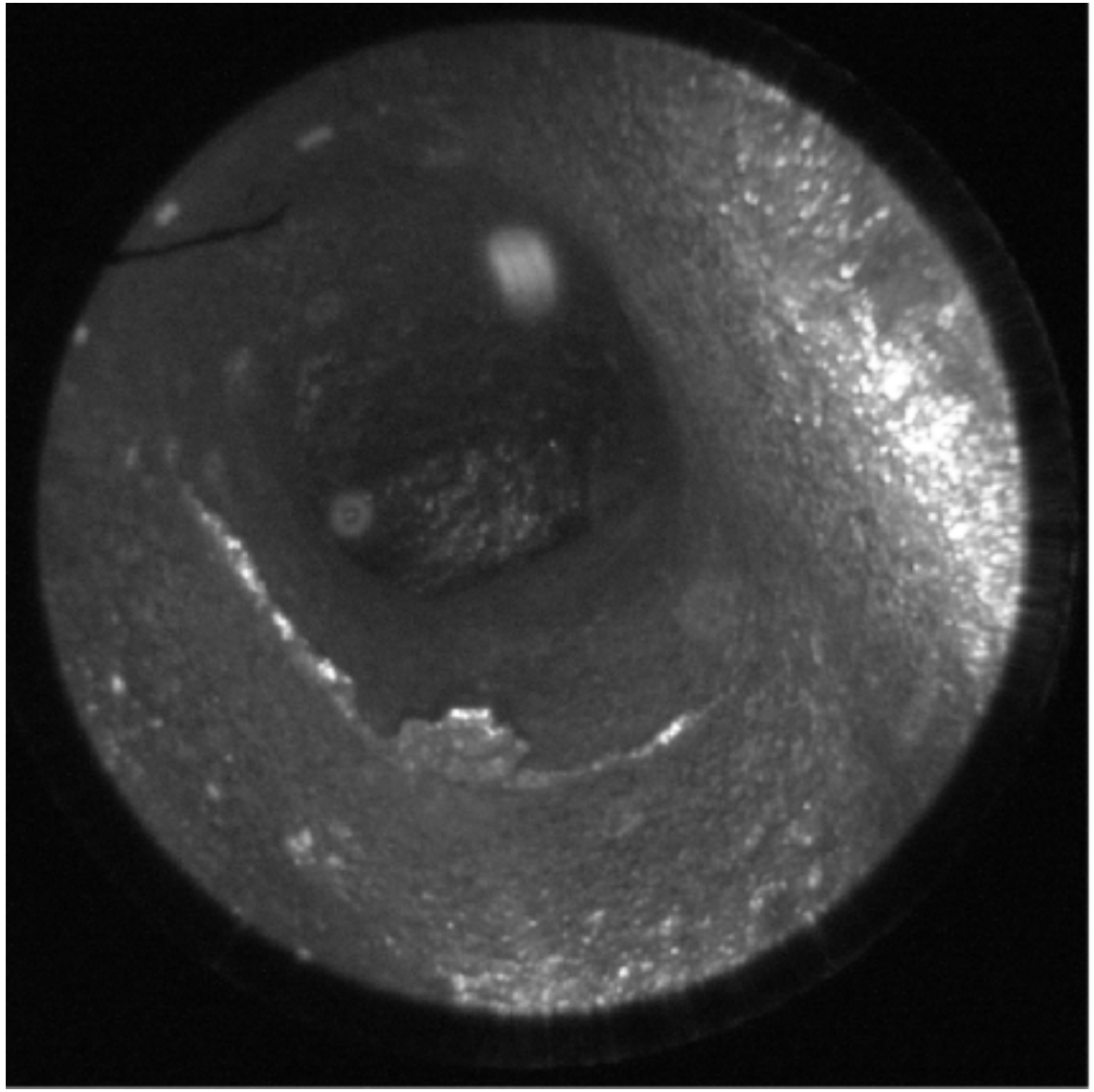
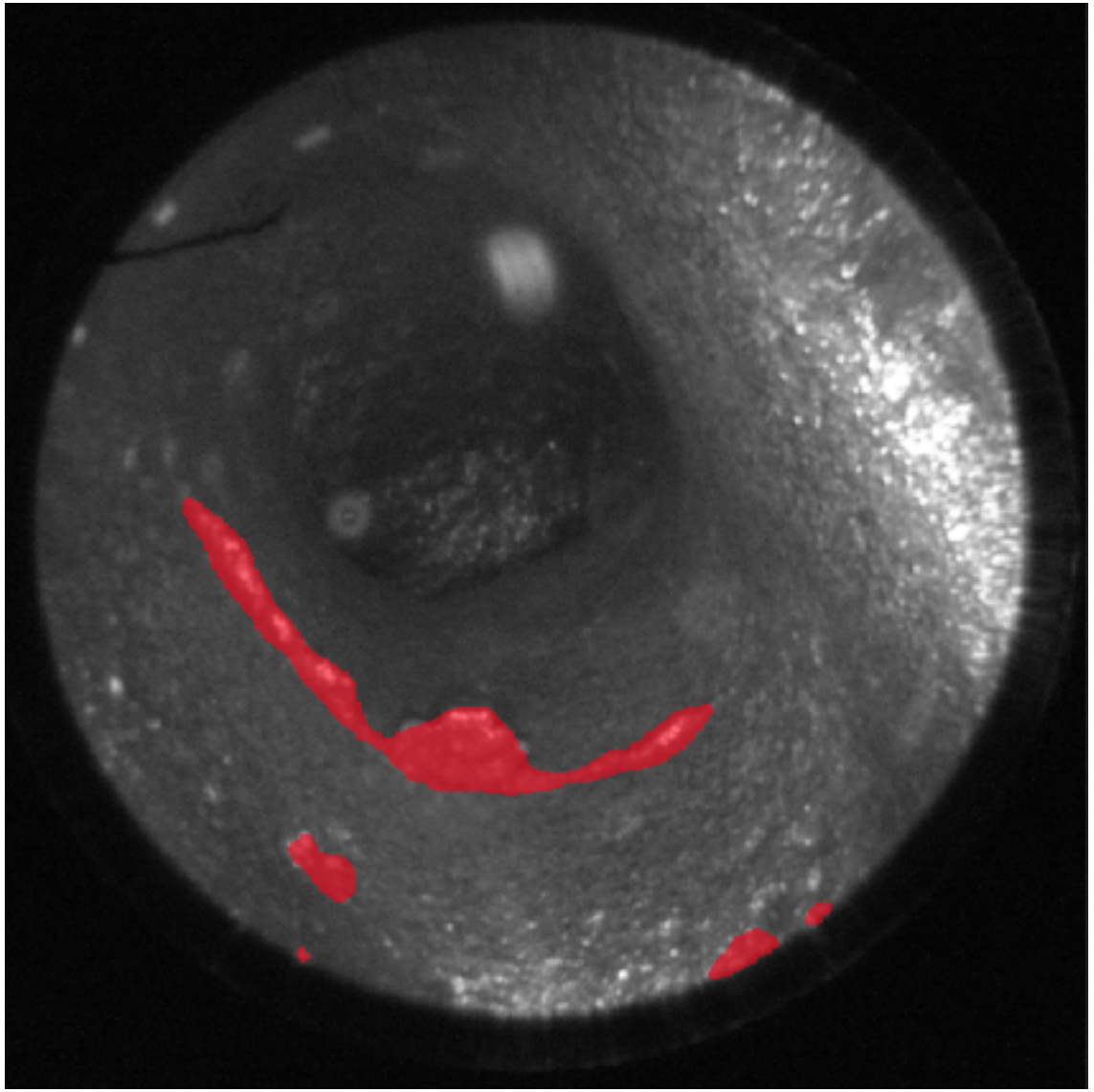
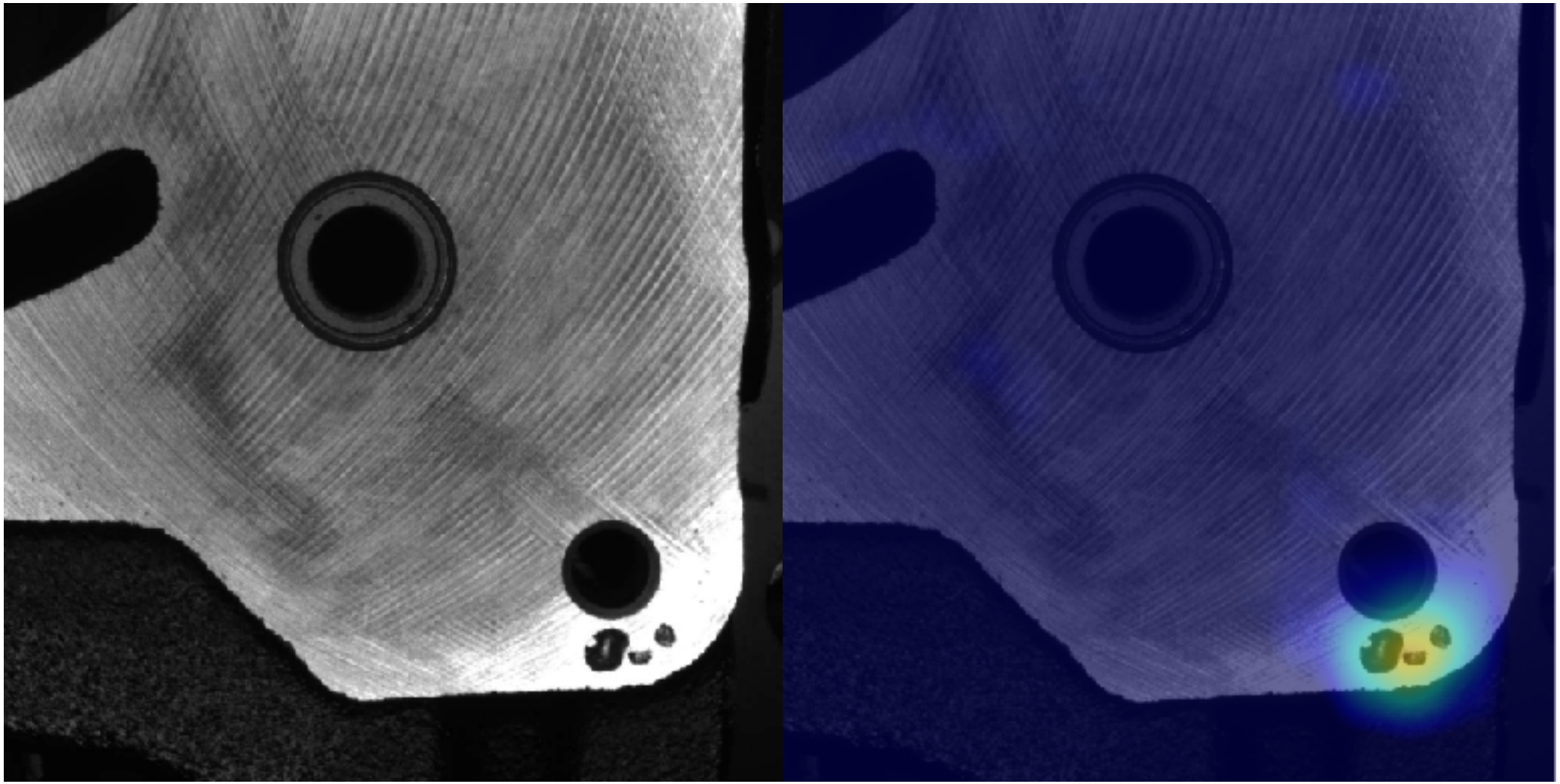




# **Use Case**: Anomaly Detecion on engine blocks

Artificial Intelligence model trained only on GOOD images. It highlights all the anomalies/defects in the image



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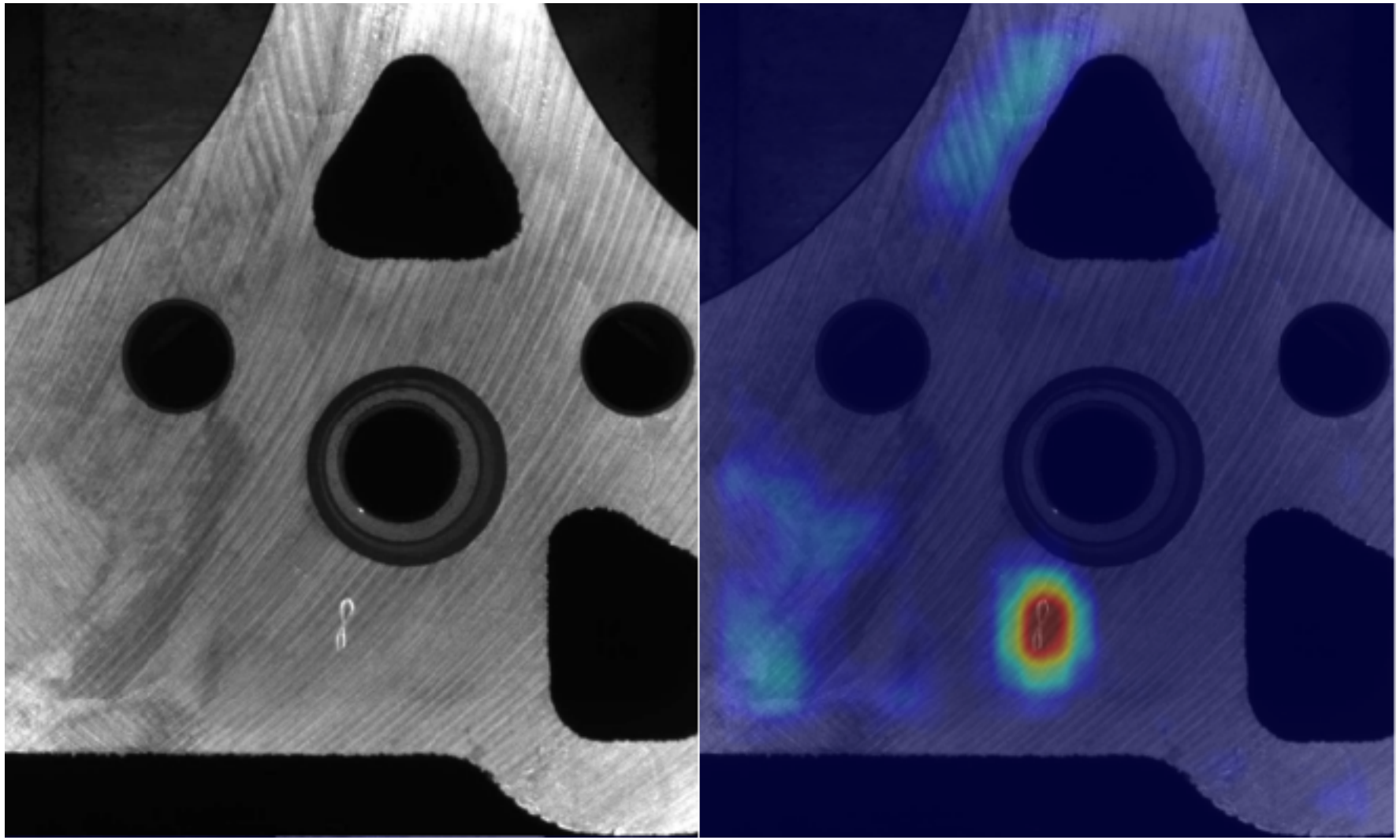

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