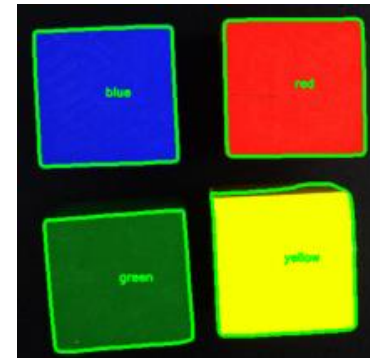
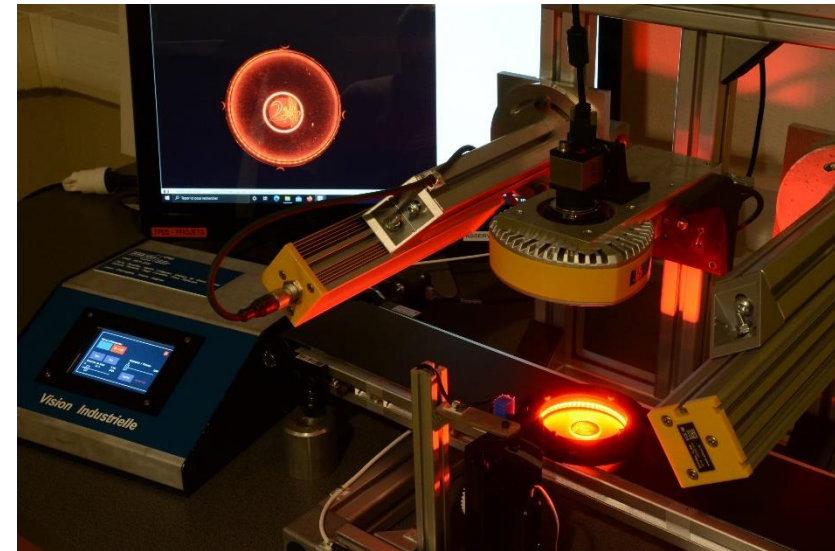
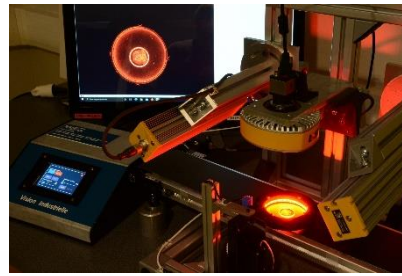


SC 19 – Machine Vision

Machine Vision for inspection applications

Julien VILLEMEJANE





SC19 – Machine Vision

► At the end of this training, the learners will be able to:

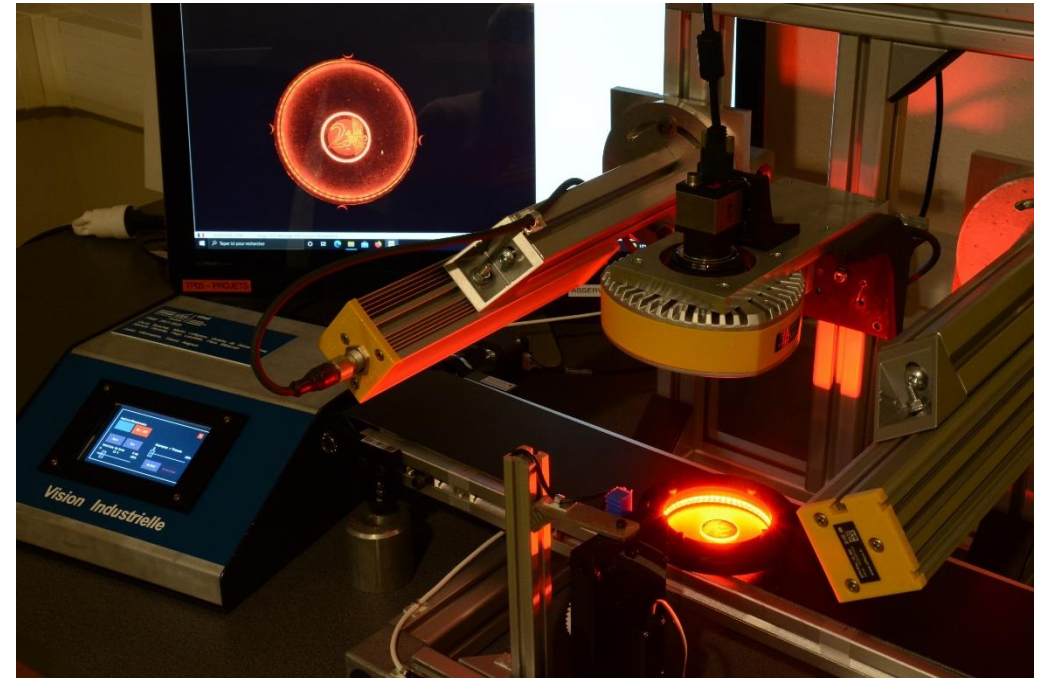
**Describe the goal and the limits of each element
of a machine vision chain**

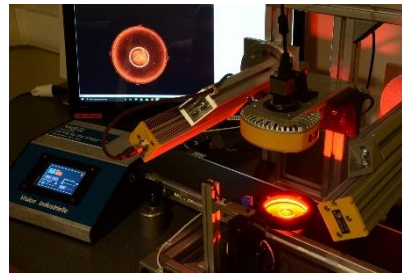
Lighting

Optics

Camera

Image processing





SC19 – Machine Vision

Goal of a machine vision chain

Automating the **process of inspecting products** or materials in order to ensure **quality**, consistency, and accuracy in manufacturing or production environments

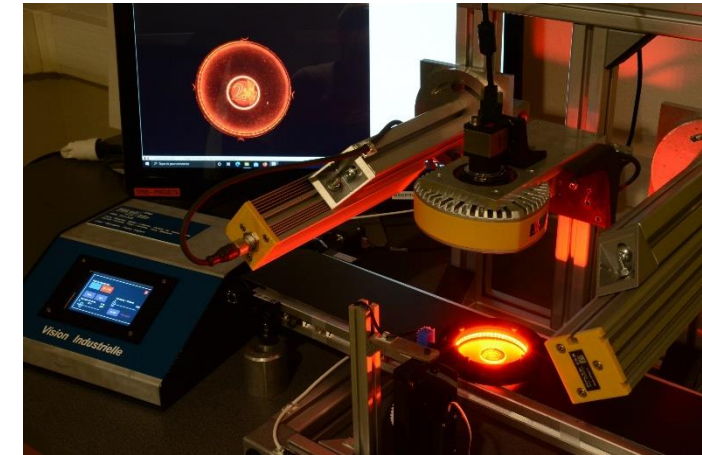
Quality Control / Sorting products

- Detect defects or irregularities
- Ensure product consistency
- Count and sort products

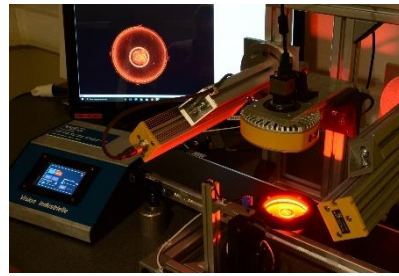
Increased Efficiency and Repeatability

- High-speed inspection
- Continuous operation

Machine Vision System

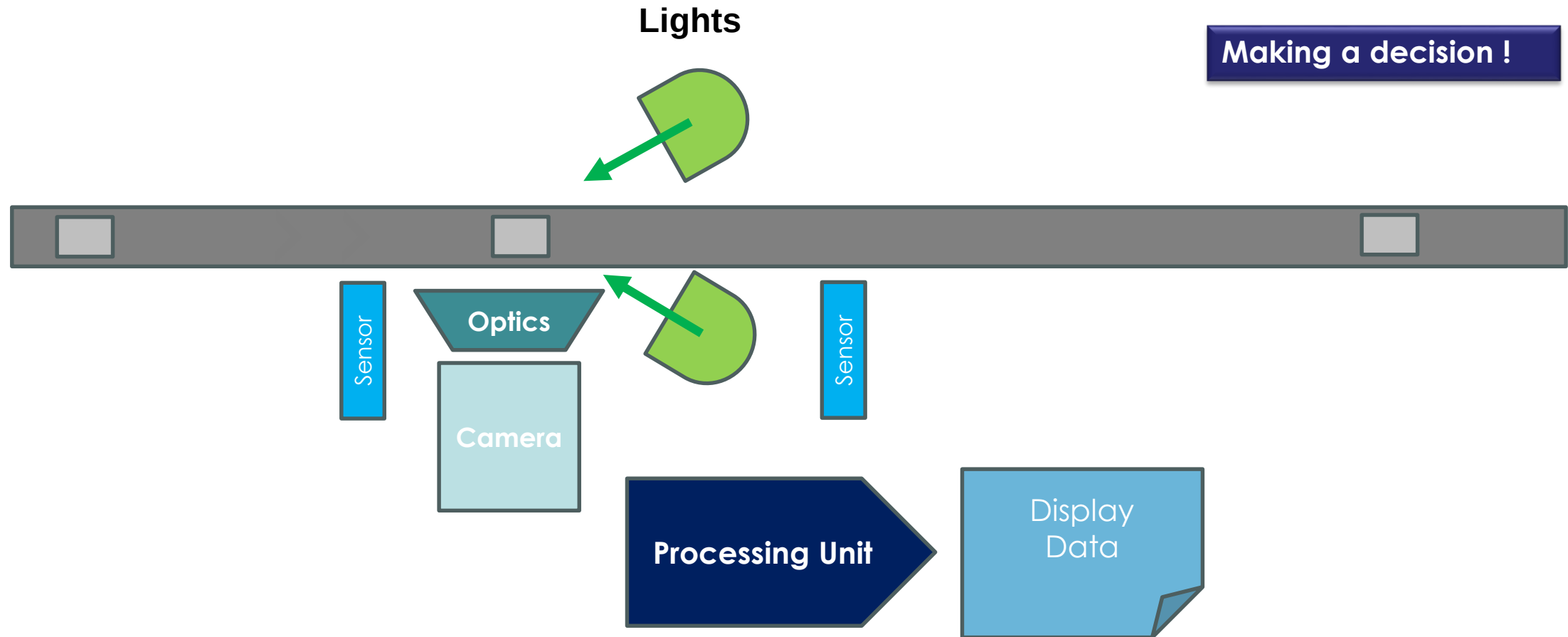


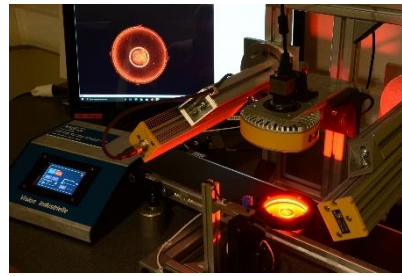
Making a decision !



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Elements of a Machine Vision chain





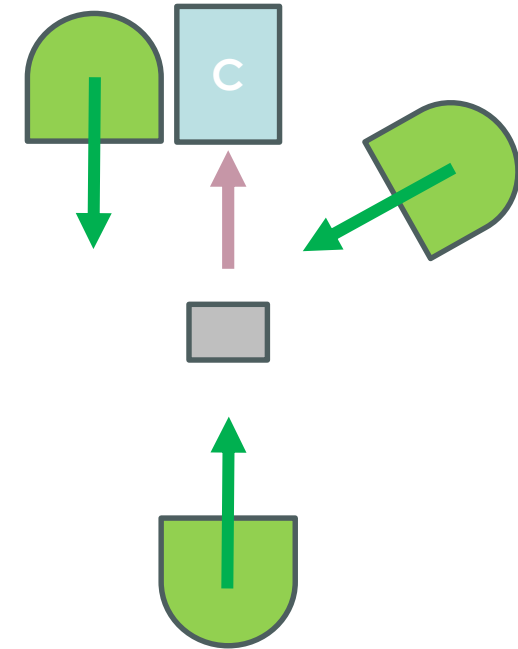
Lighting

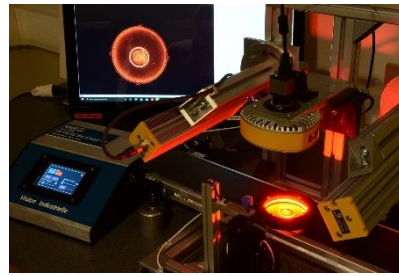
Ensuring consistent and accurate image capture,
helping highlight defects or features

- White, RGB, UV, IR ?
- Transmitted, reflected light ?
- Off-axis low angle, direct ?
- Uniformity ?

SC19 – Machine Vision

Step by step





SC19 – Machine Vision

Step by step

Lighting

Ensuring consistent and accurate image capture, helping highlight defects or features

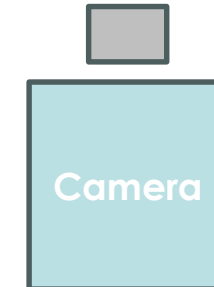
Optics

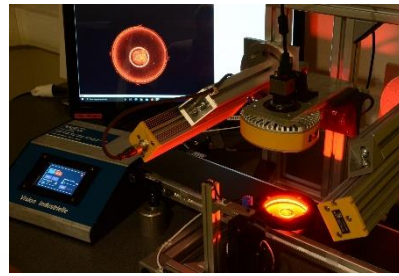
Ensuring that the camera can acquire high-quality images that accurately represent the objects being inspected on the sensor surface

- Focal length, aperture...
- Depth of field
- Field of view
- Magnification



Optics





SC19 – Machine Vision

Step by step

Lighting

Ensuring consistent and accurate image capture,
helping highlight defects or features

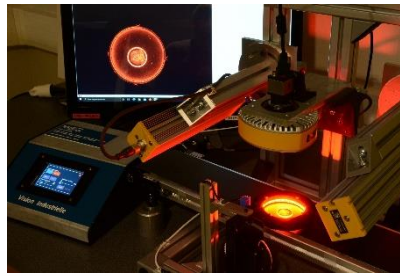
Optics

Ensuring that the camera can acquire high-quality images that
accurately represent the objects being inspected on the sensor
surface

Camera

- Color ? Resolution ?
- Matrix or linear ?
- Framerate ? Exposure time ? Black Level ?

Camera



SC19 – Machine Vision

Step by step

Lighting

Ensuring consistent and accurate image capture, helping highlight defects or features

Optics

Ensuring that the camera can acquire high-quality images that accurately represent the objects being inspected on the sensor surface

Camera

Image processing

- Reducing noise and enhancing image
- Object detection

Camera

Processing
Unit

Display
Data