



SmartLED

Multi-sensors integration for the sorting of end-of-life lamps

ACHIEVED RESULTS: RGB SENSOR

RGB IMAGE ANALYSIS FOR ON-LINE MORPHOLOGICAL CHARACTERIZATION

Technology ability: RGB sensor ANALYSIS

RGB image acquisition (directly on-line)

Possibility to analyse objects with different dimensions and characteristics

Possibility to perform an image analysis to catch the morphometric characteristics of the objects

Contribution to processes reconfigurability

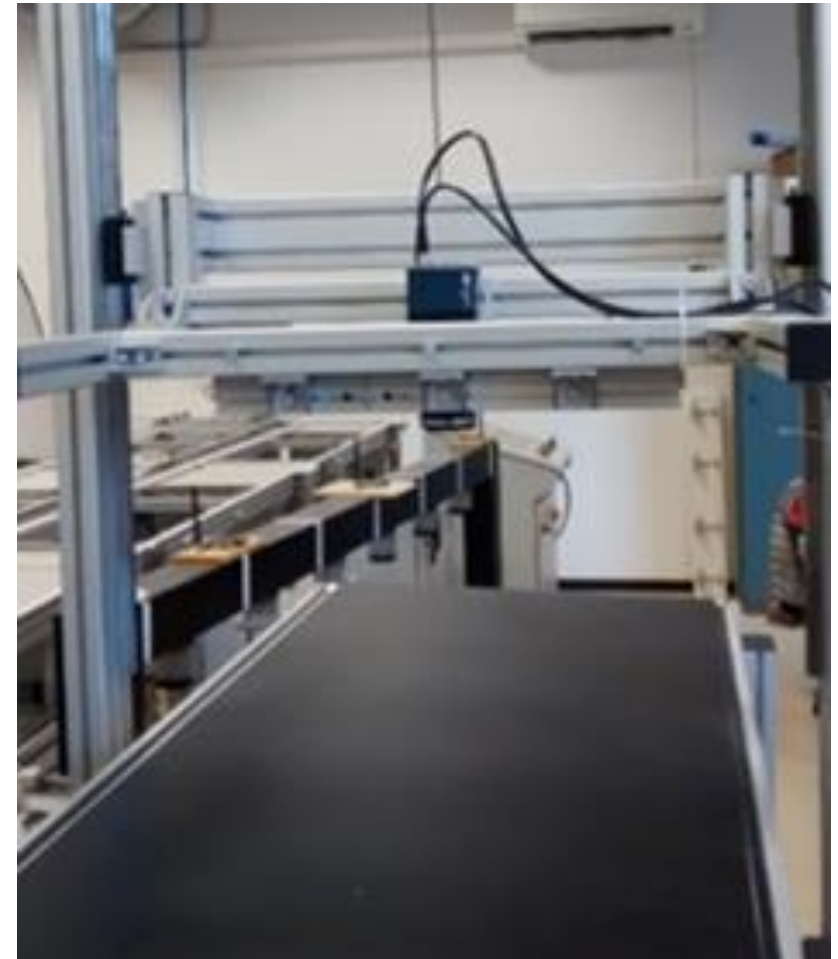
On-line morphometric analysis – objects recognition

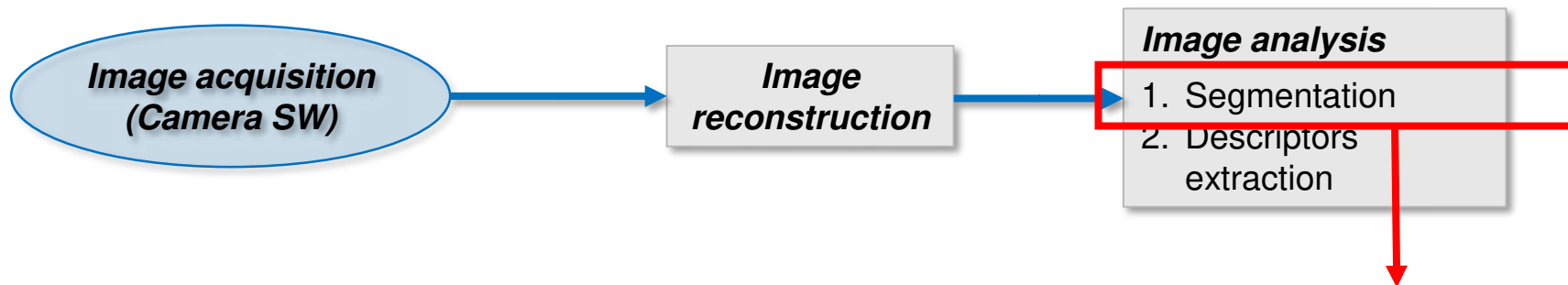
Remote monitoring and control of the process

Technology innovation & challenges

Challenges:

- Algorithms customization (image analysis – objects detection)



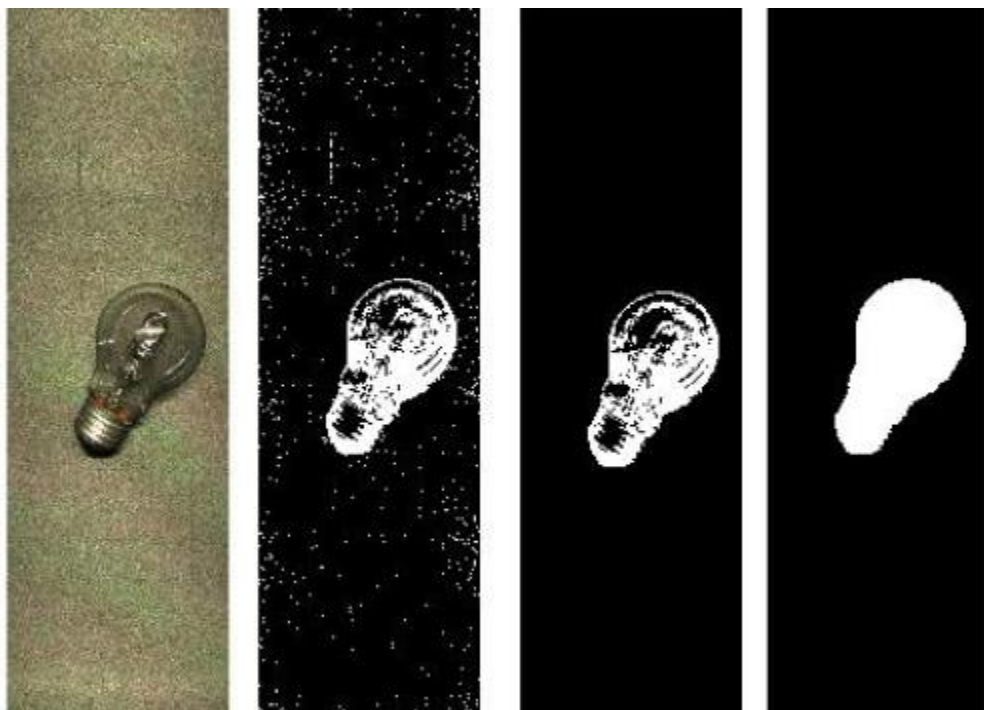


SEGMENTATION

It allows the extraction of the object from the background.

A typical criticality is the presence of **transparent materials** (e.g. glass) that could be associated to the background and not to the product.

Lamps use-case: inner reflections ensure the segmentation

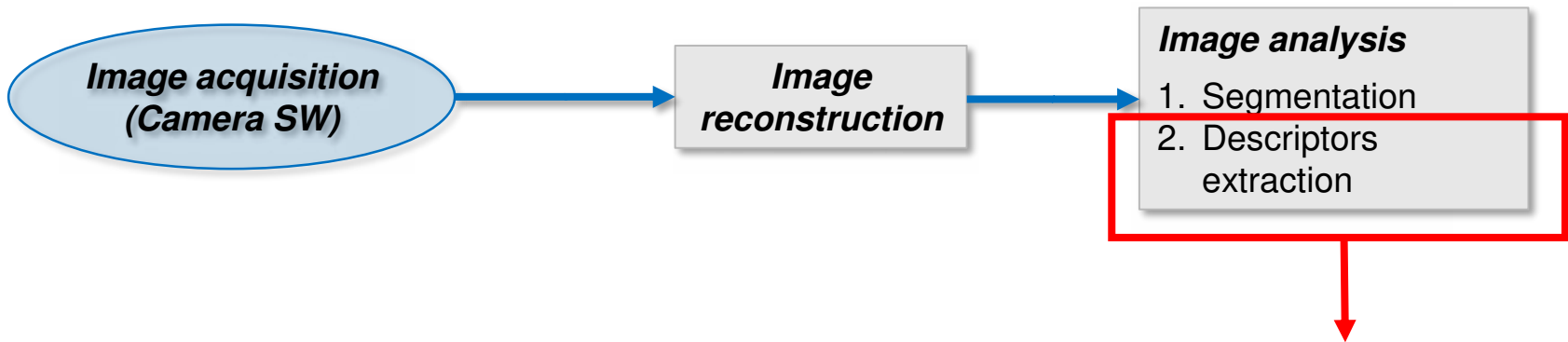


TRANSPARENT

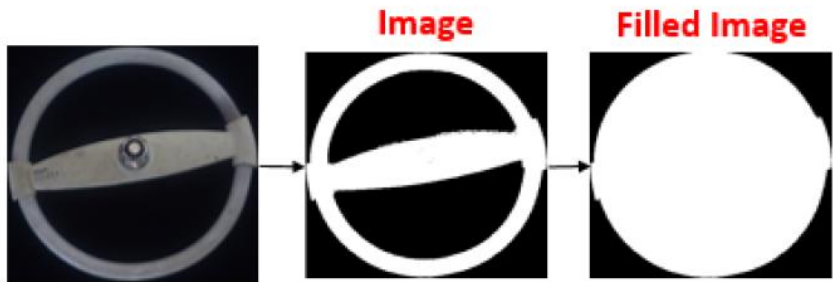


OPAQUE





LAMPS CLASSIFICATIONS: EXAMPLES OF MORPHOLOGICAL DESCRIPTORS



CIRCULARITY

Customized descriptor for lamp use-case: it is the ratio between the area of lamp and the total internal area.

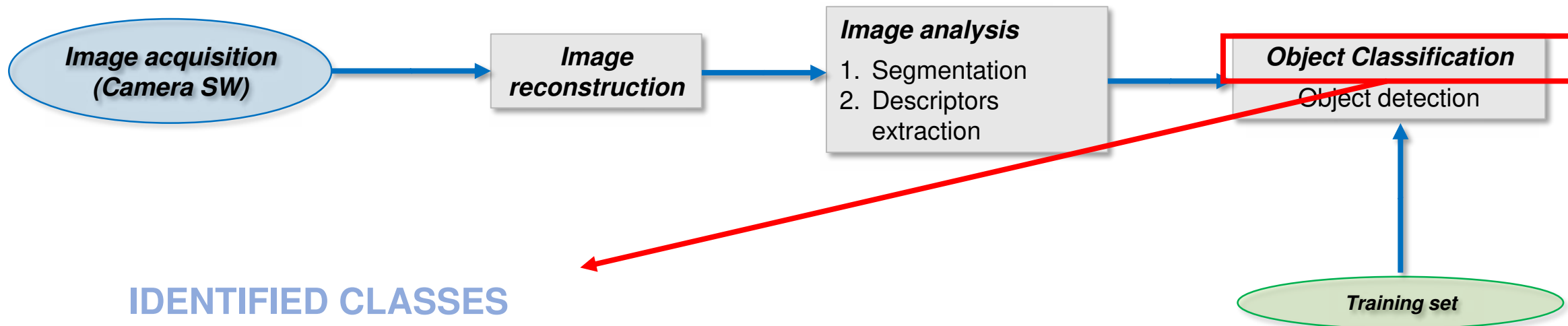
ECCENTRICITY

Descriptor defining how much the shape could be compared with a circle.



DIMENSIONAL DESCRIPTORS

An example is the ratio between the maximum width and its distance from the top border.



IDENTIFIED CLASSES

RGB IMAGES	
HID	
FLURESCENCE CIRCULAR LAMPS	
FLURESCENCE TUBE LAMPS	

SmartLED identify the proper set of descriptor, the ones needed to identify the three typology of lamps.





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PROJECT OVERVIEW