Laboratory Course n° 3
–
Lens & Lighting

Objective

Taking into account the scene you have to image and features to be detected, you have to choose:

- Lens
- Lighting configuration to implement.

Equipment

- PC Computer
- Frame Grabber : National Instruments PCI-1428
- JAI CV M4+ CL Digital Camera
- 12V Power Supply
- Video Cables
- Industrial Lenses
- Extension Rings
- Lighting Devices
- Industrial Parts

Software

National Instruments "Measurement & Automation Explorer" Software

Documentation

- User Manual - National Instruments PCI-1428 Frame Grabber
- User Manual - JAI CV M4+ CL
- Lectures on Machine Vision

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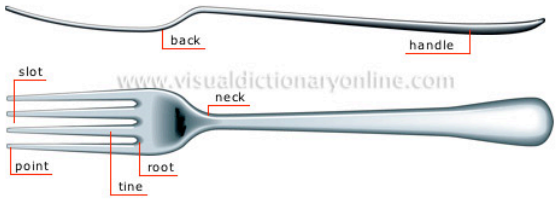
Lens

In order to carry out this step, consult the following documentation:

- Camera Brochure
- Lectures on Machine Vision

You have to observe the fork in order to perform surface inspection with the following specifications:

- Working Distance : 500 mm



Choose the right lens.

Mount the selected lens on the camera and check that the computation is OK:

1. Connect Camera cables.
2. Start National Instruments "Measurement & Automation Explorer" software.
3. Select camera in "Périphériques & Interfaces => IMAQ PCI 1428" menu
4. Start Grabbing images.

Ask professor to validate once everything is OK.

Compute the obtained "Spatial Resolution"

Select different settings and study performances w/r to full or partial frame acquisition => Select "Properties" and navigate in tabs.

Give your conclusions on the Camera Link Standard

Extension Rings

Mount different extension rings and observe the influence on the acquisition.

Give your conclusions on the use of extension rings

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Lighting

In order to carry out this step, consult the following documentation:

- Lectures on Machine Vision

Part N°1 – Silhouette Analysis

Setup your system in order to observe the contours of the fork

Part N°2 – Defect Detection on Shiny Surface

Setup your system in order to observe holes & scratches on the surface of the object

For each part, select lens and lighting configuration.

Implement and test your choices

Start grabbing images and ask professor to validate each configuration once everything is OK.

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Lab Bonus - Surface Inspection

Machine Vision Configuration

Use LEDs lighting sources to perform the following parts:

1. Center of Oil Filter
2. Magnet
3. Coin detection

For each solution estimate the budget with the online catalogue of Edmund Optics.

Ask professor to validate once your solution is configured.

Give your conclusions on the lighting techniques.

For each solution estimate the budget with the online catalogue of Edmund Optics:

http://www.edmundoptics.com (choose Poland Country for € cotation)

End of Lab Course

- Disconnect Cables
- Uninstall every lighting devices