SIX Sustainable Industry X

SMART MANUFACTURING

TAU investoinnit TREDIH hankkeessa

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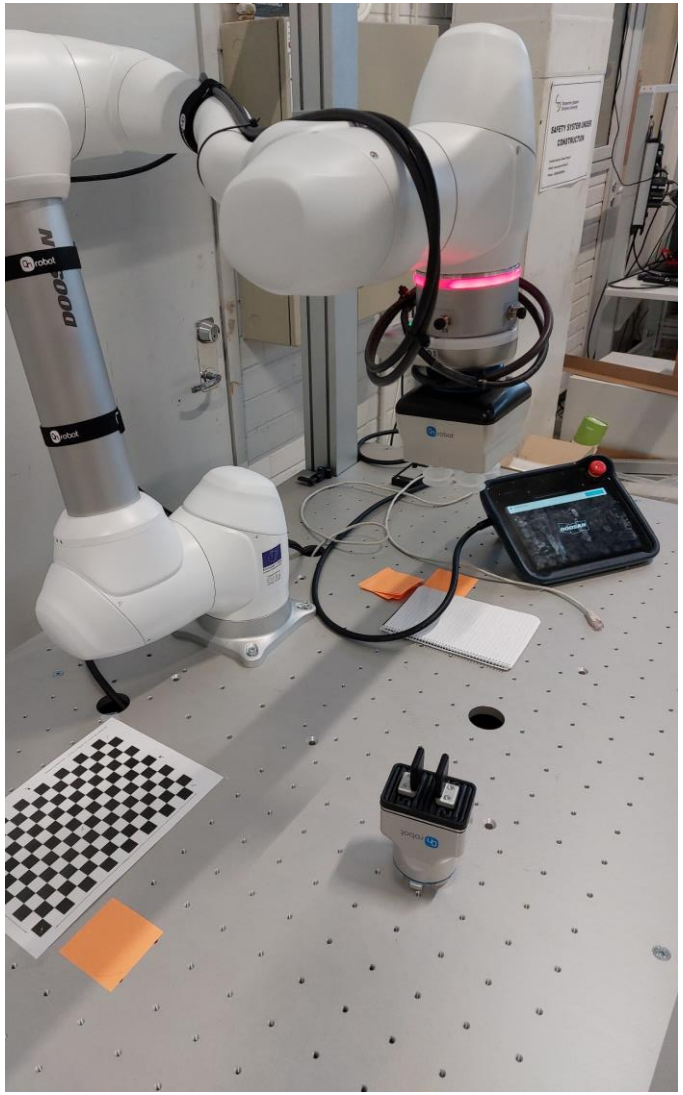
Doosan Cell

- Doosan M1013
  - Payload: 10 kg
  - Reach: 1300 mm
- 2x OnRobot Gripper
  - 2-Finger 2FG7
  - Vacuum VGC10
- Safety scanners
- Conveyor
- 5 cameras
  - 1x wrist
  - 3x 2D area scan
  - 1x 1D line camera
- Illumination



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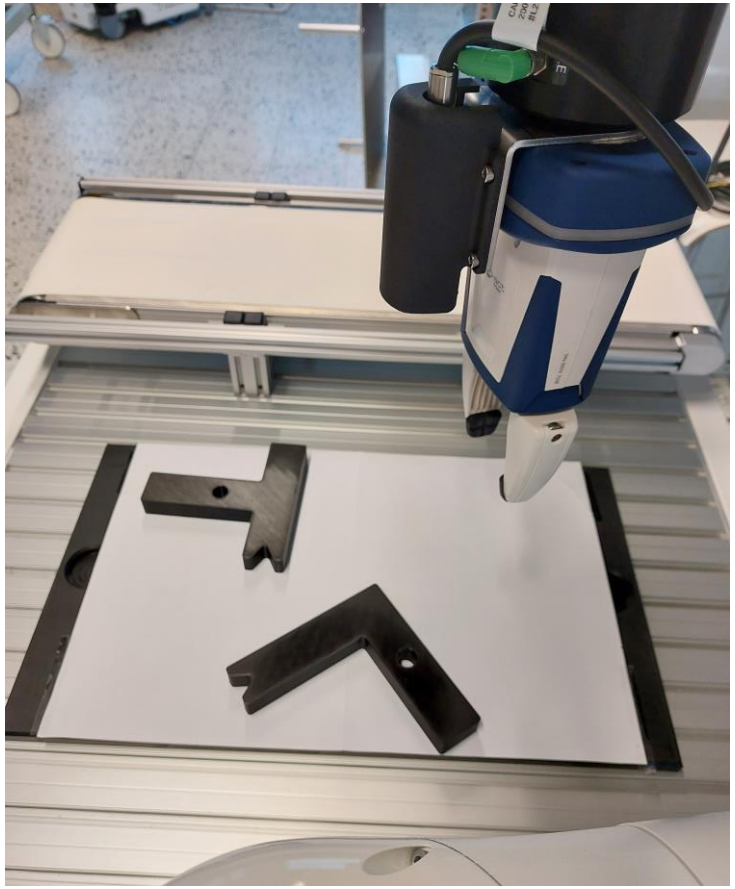
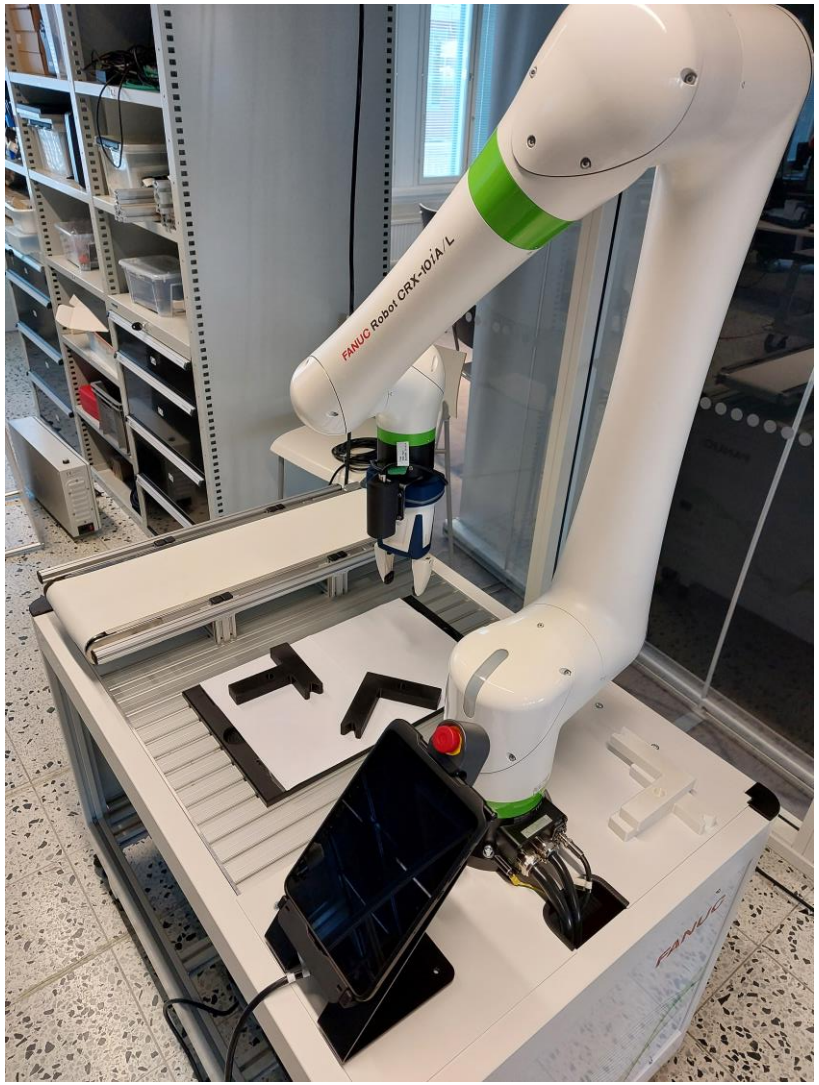
FANUC CRX Edu Cell

- Robot Fanuc CRX-10iA/L
  - Payload: 10 kg
  - Reach: 1418 mm
- Grippers
  - 2-Finger Schunk Co-Act EGP-C 64
  - Vacuum OnRobot VGC10
- Safety scanners
- Conveyor
- 5 cameras
  - 1x wrist
  - 1x 2D area scan
  - 1x 3D line camera
- Illumination





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3D Bin-Picking laitteisto (UR-5 robottiin asennettuna)

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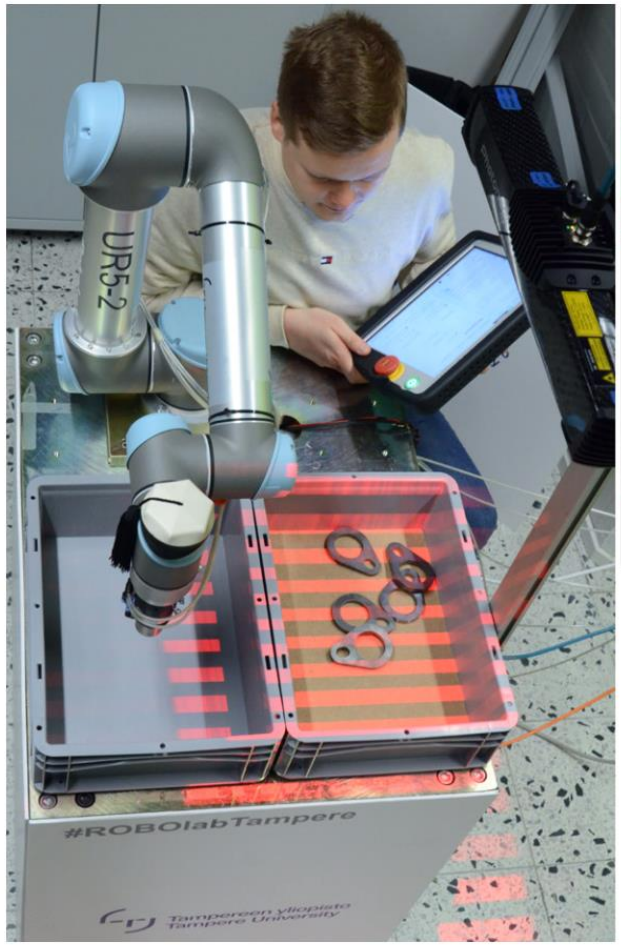
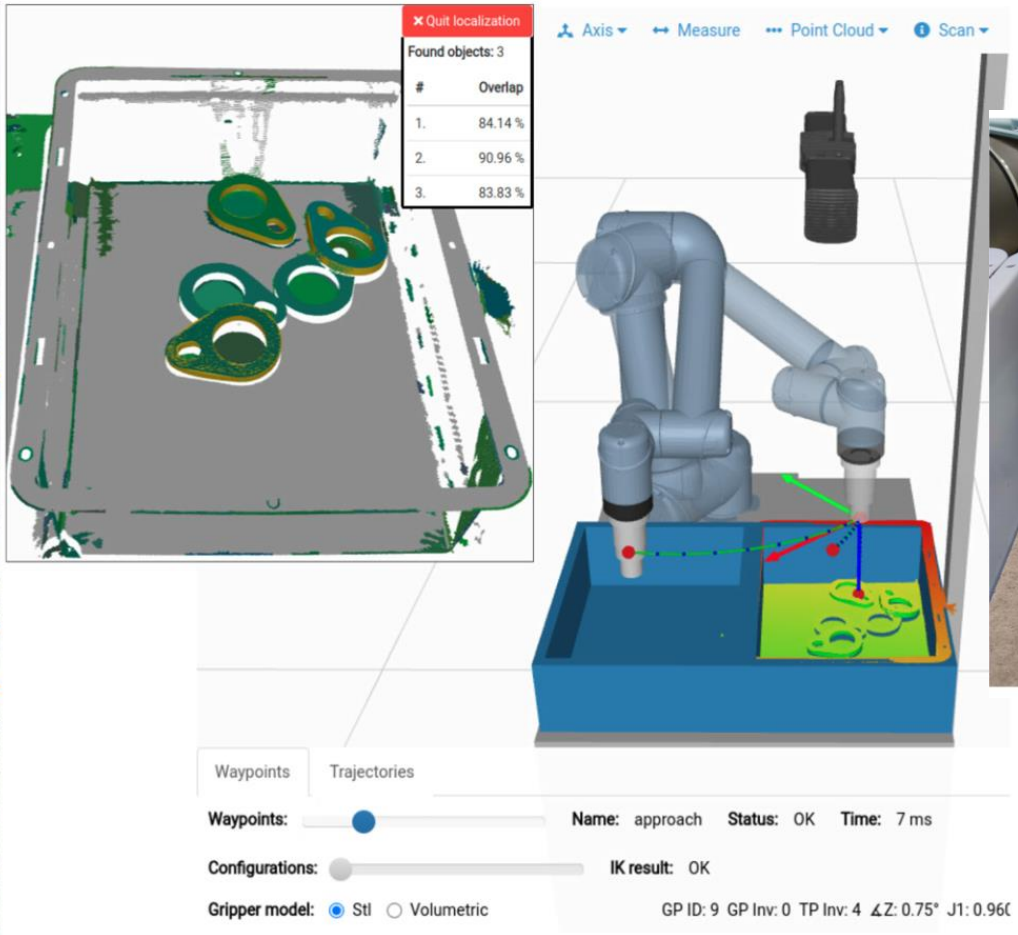
Devices: Photoneo:

- Phoxi M (3D camera)
- Bin-Picking Studio (BPS)





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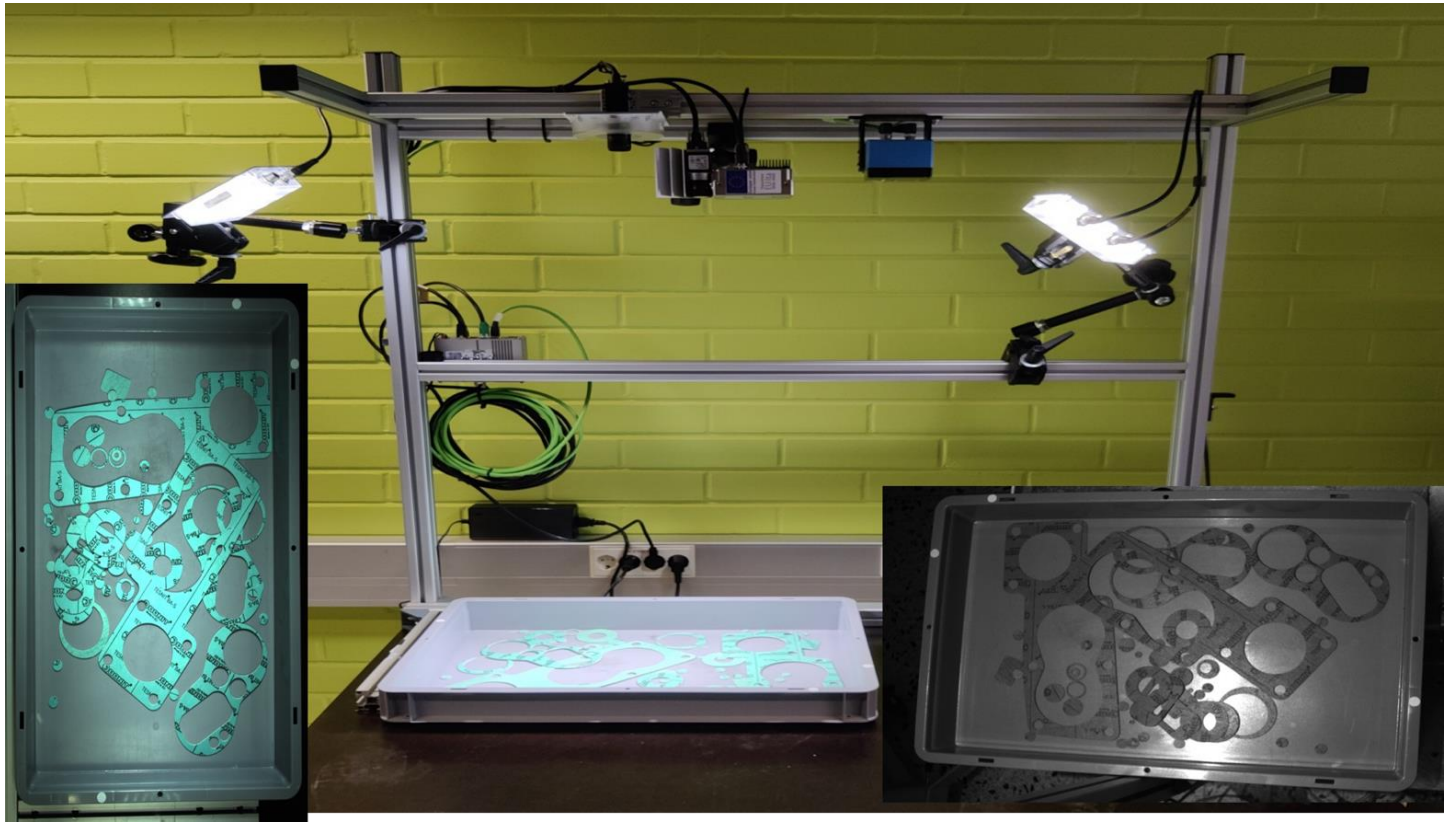
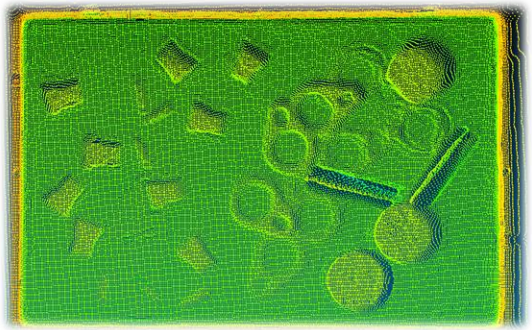
Vision systems test & dataset

- Uses 5 cameras
  - 1x 3D pattern light – Photoneo Phoxi M
  - 2x 3D ToF – Basler & SICK
  - 2x 2D – Basler & Omron
- Illumination lights
- Image dataset generation
  - 5x 370 images

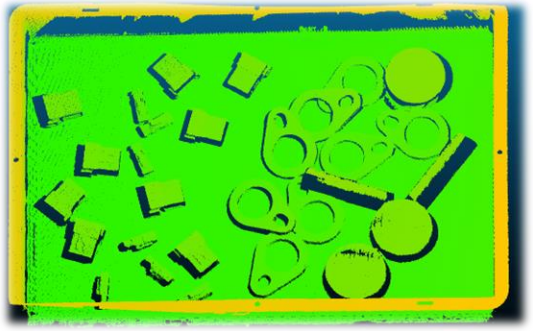


Vision Systems / 3D

- 3D- depth camera : Time-of-Flight
  - Basler Blaze 101 : 0,31 MPx
  - SICK Visionary- T Mini CX : 0,22 MPx



- 3D- depth camera : Structured Light
  - Photoneo Phoxi Scanner M : 3,2 MPx
  - + Bin-Picking Studio



- 3D- depth camera : 1D Line Scan
  - SICK Ruler 3020 :

Vision Systems / 2D

Camera information				
Quantity	Manufacturer	Type	Resolution (MPx)	Framerate (fps)
3	Basler	Mono	1.3 … 9.0	12 … 60
2	Basler	Colour	1.3 … 9.0	12 … 88
2	Omron	Mono	5 MP	21
2	Omron	Colour	5 MP	21
1	Omron	Mono, 1D line	2048 x 2 Px	

Optics, C-mount			
Quantity	Manufacturer	Focal length (mm)	Max Resolution (MPx)
1	Basler	8	2
4	Basler	4, 12, 16	5
5	Omron	12, 16, 50	5
8	HIK	16, 25, 35, 50	5
1	HIK	16	12
1	Omron	50	1D line

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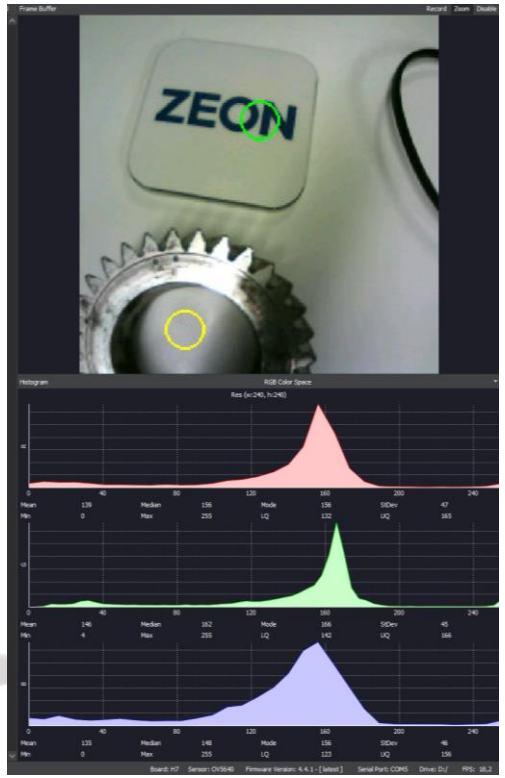
Vision Systems / DIY

Camera information				
Quantity	Manufacturer	Type	Resolution (MPx)	Framerate (fps)
2	OpenMV Cam H7 PLus	Colour	5 MP	1 … 150
2	Pixy2 Vision Sensor	Colour	1.2 MP	60
2	Google AIY Vision Full Kit	Mono	1.2 MP	45



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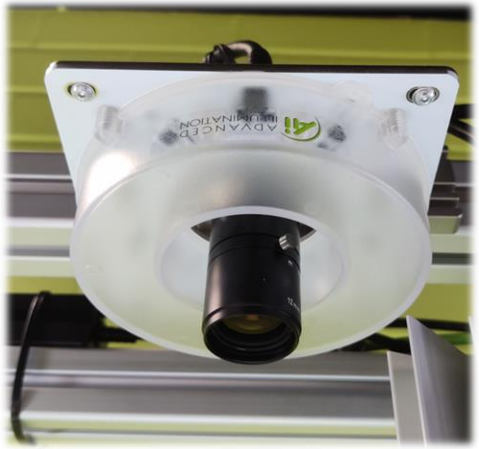
Vision Systems / Illumination



#	Manufacturer	Model	Type	Colour
2	Sangel	LED SL 560 S-PMMAd-M8D-57	Bar light	White
8	Sangel	280 S-PMMAd-M8D-57	Bar light	White
2	Advanced Illumination	RL-S052120M-WHI	Ring light	White
1	Advanced Illumination	RL-S052120M-625	Ring light	Red
1+2	Advanced Illumination	BL-S100150-625	Backlight	Red
2	Advanced Illumination	AL-S025300M-WHI	Bar light	White
2	Advanced Illumination	SL-S100150M-WHI	Spot light	White
1	TPL	LowAngleII-80-630	Ring light, Dark field	Red

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Linkkejä

- MPD 2023 demo (Doosan solu)
  - Tekniikka&Talous artikkeli: 3d-skannerin avulla robotti ohjelmoidaan lennossa – Näin robotti poimii satunnaisesta kasasta (video) https://www.tekniikkatalous.fi/uutiset/3d-skannerin-avulla-robotti-ohjelmoidaan-lennossa-nain-robotti-poimii-satunnaisesta-kasasta-video/f93d1410-fedb-41d5-834f-102b6d905db1
- Pilotointeja, demoja ja testejä: https://youtube.com/playlist?list=PLYfbB5tw2ByBItRIQWEym_Y7HoAAw3YLs