



Comparison of Machine Vision between CAD and real-world images

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Topic

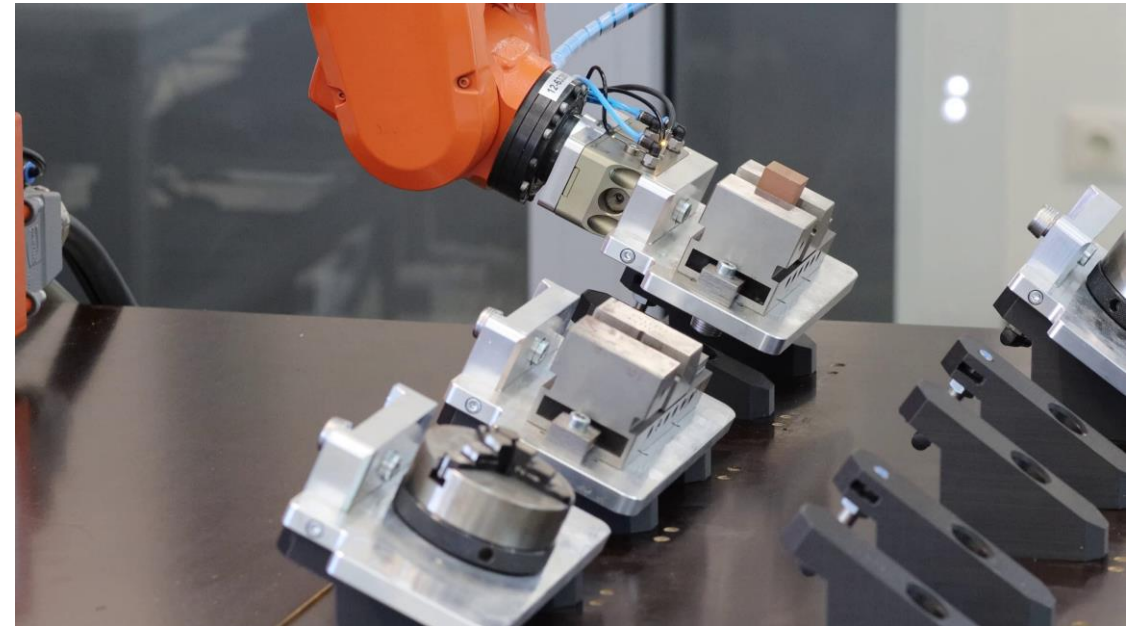
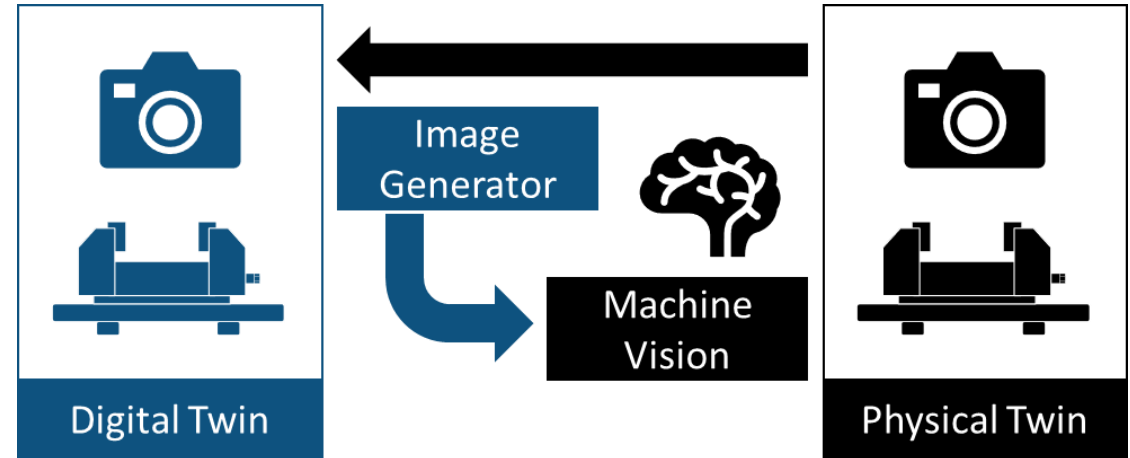
In Manufacturing, various clamping devices are in use. Due to the variety of parts, it is important to validate that the right clamping device is used based on the CAM process. For this purpose, we use Vision Systems.

Machine vision and deep learning depend on training data. Those images usually are taken of a physical object which interrupts production. In this attempt, we want to derive training images from a CAD Software tool in order to train an open-source machine vision application. Also, pre-processing might be applicable.

The second step is testing and verifying the application based on real images and evaluating the results.

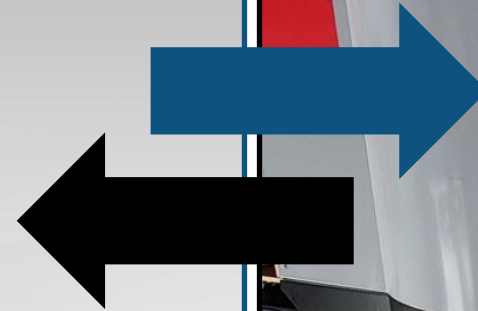
Task

- Analyse synthetical images of the CAD-Setup
- Pre-process the images and train the machine vision framework
- Test and verify the application based on real images
- (optional) develop a (semi-) automatic toolchain

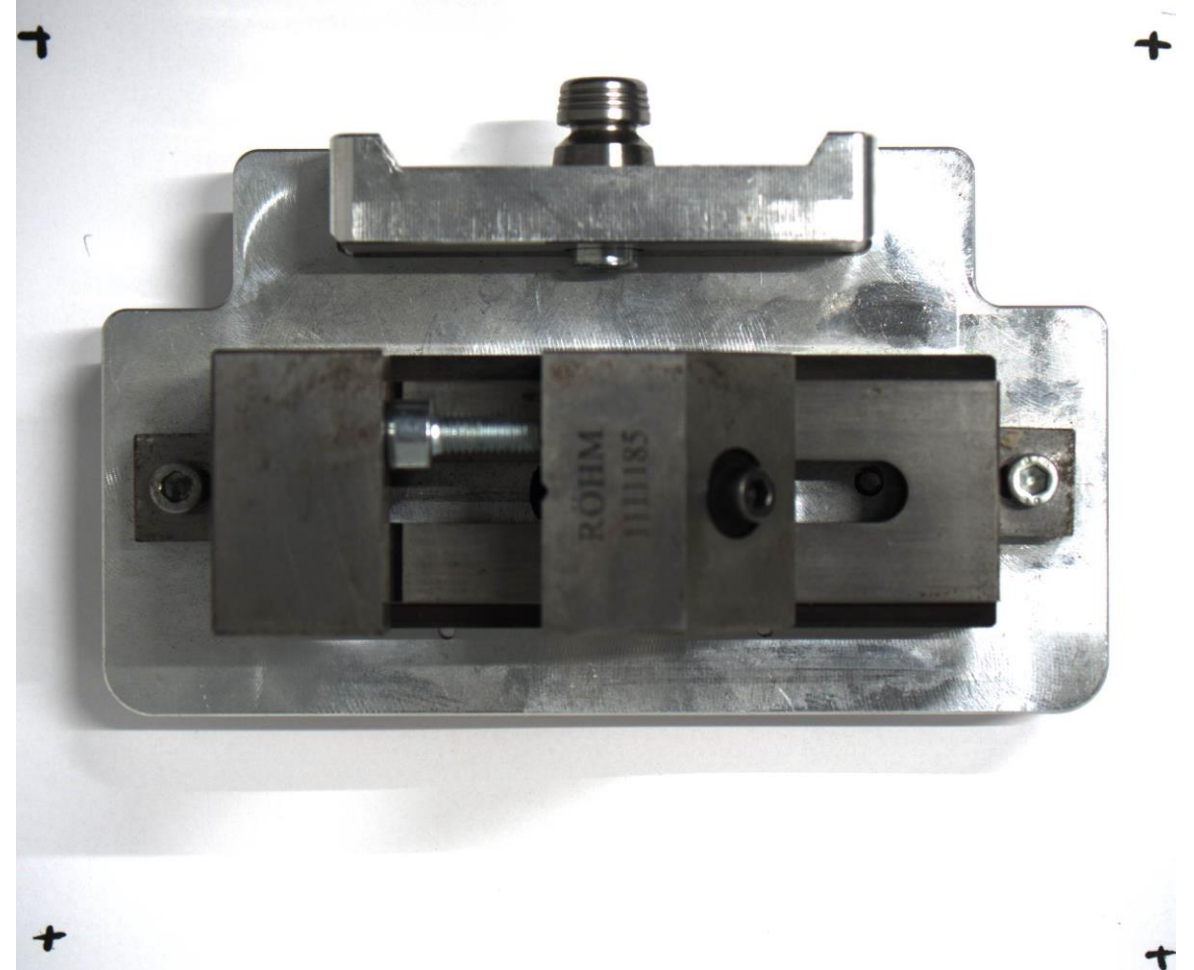
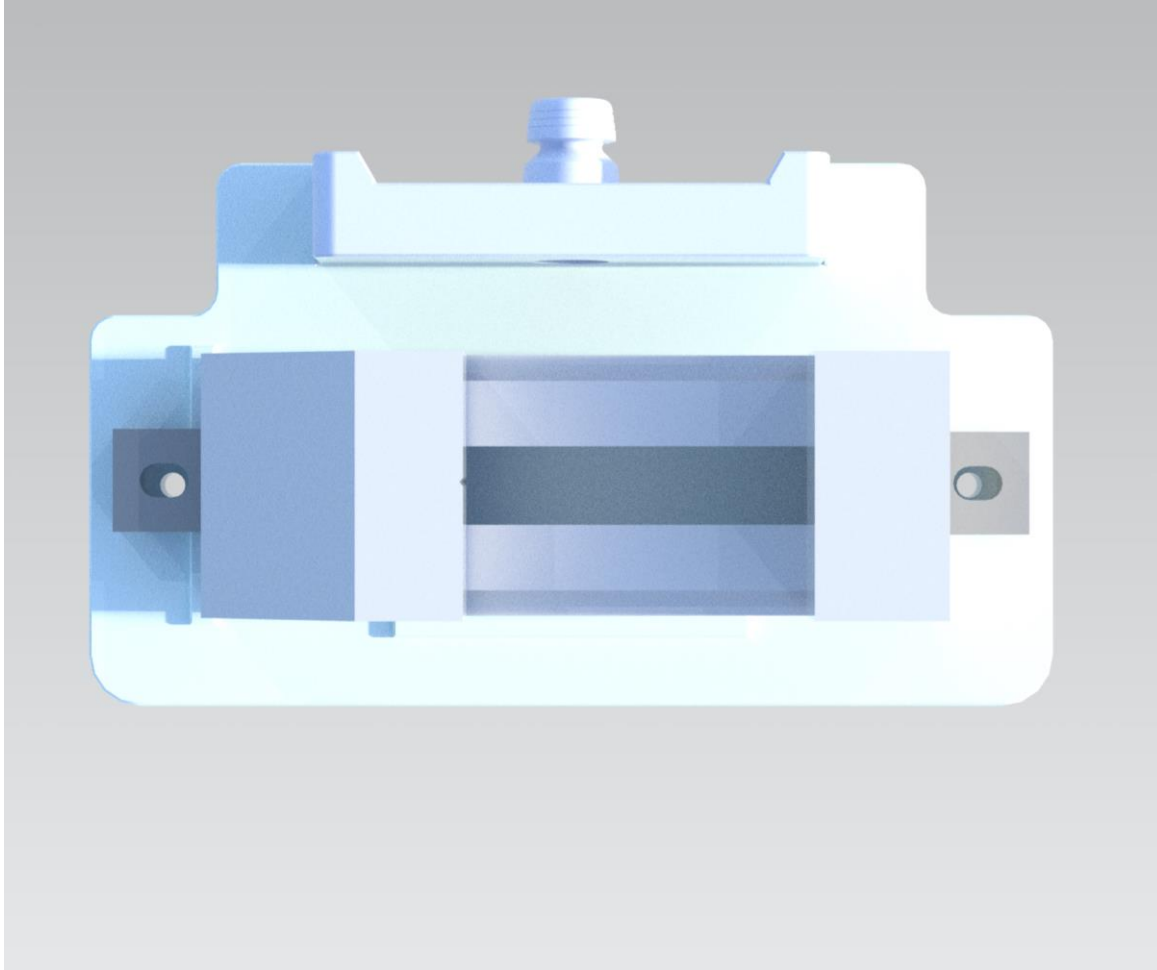




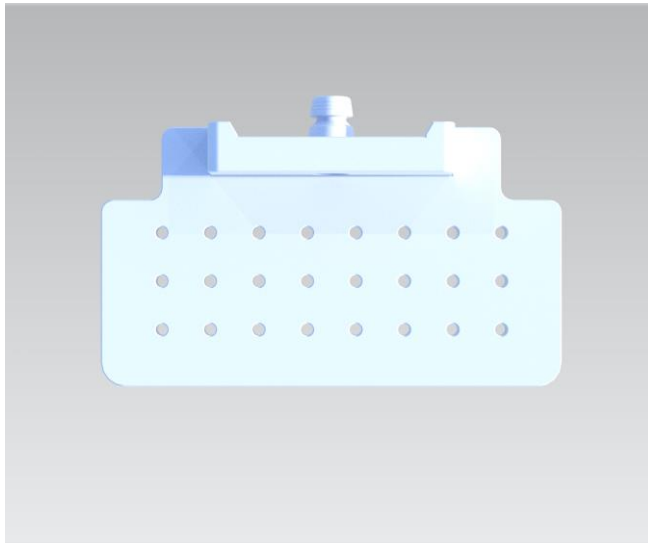
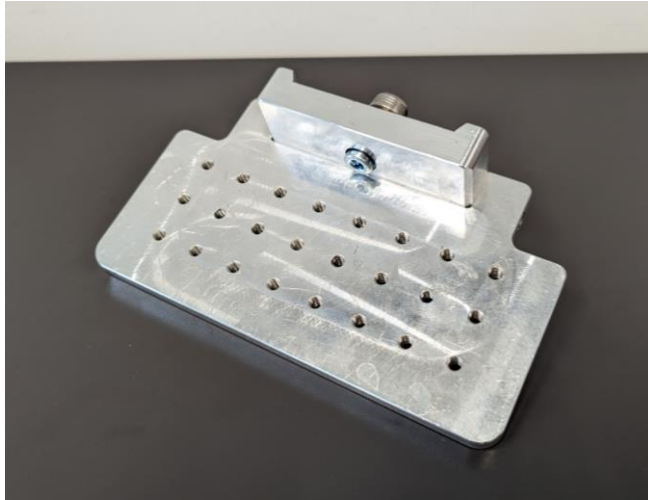
Digital Twin



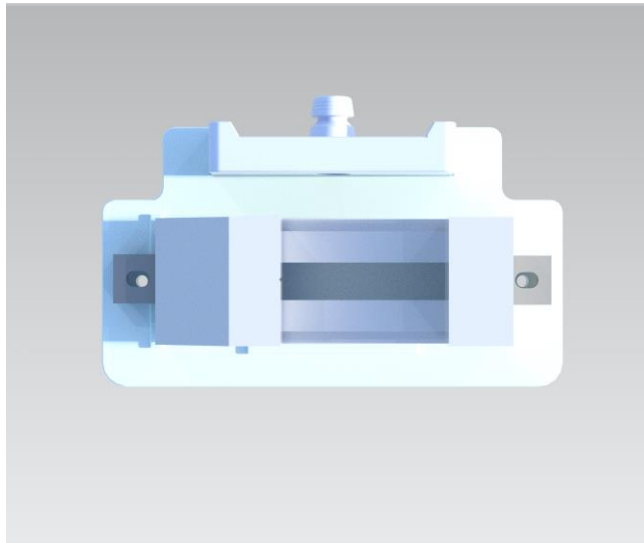
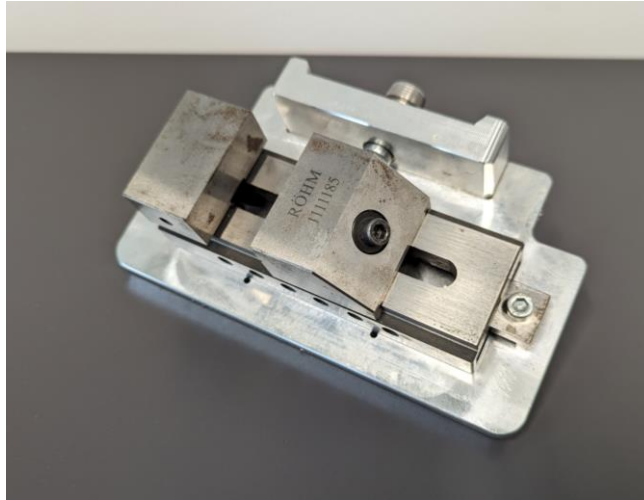
Physical Twin



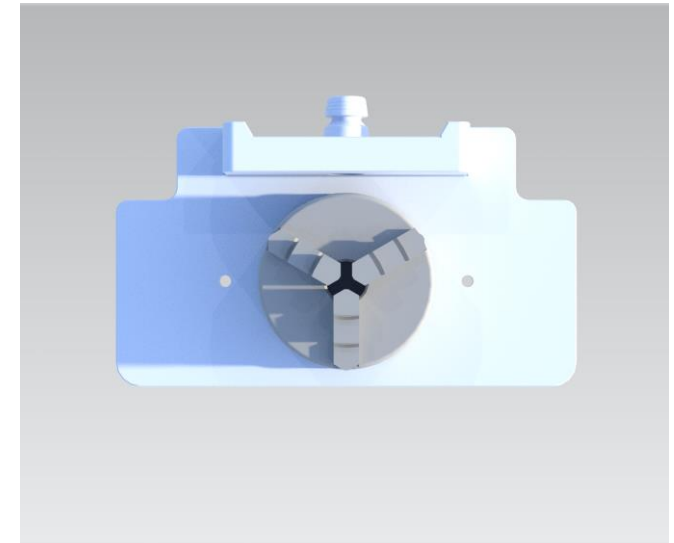
Empty Pallet



Vice



Jaw Chuck



- Train algorithm on synthetic images and use it on real image data.

- How good or bad have synthetic images to be in order to train a machine vision application?
 - ☐ Light conditions,
 - ☐ Camera Angles,
 - ☐ Realistic reflections, etc.

- How many images are needed to train the model?

- What boundaries does the approach have?

- Find main supervisor
- Write proposal
- Coordinate with co-supervisor (→ us)
- Refine proposal & upload
- Do the project
- ...