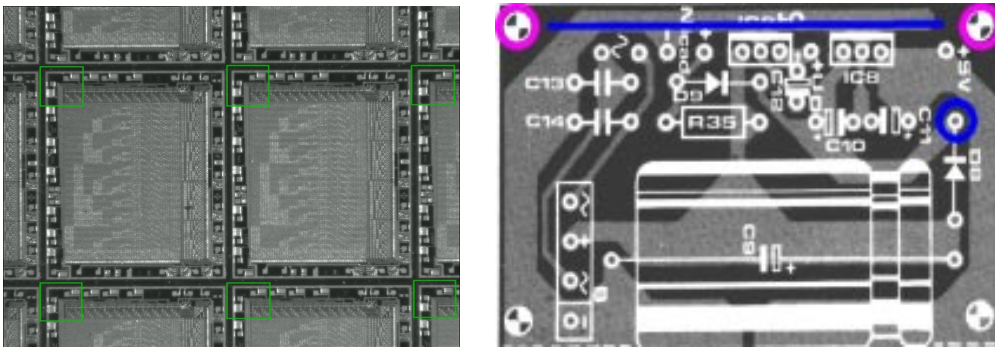


mvIMPACT Match

Finding reference features in an image is an essential step in inspection and quality control. In frequent situations, ensuring that the parts are always presented to the imaging device exactly in the same position is not feasible. On the opposite, some amount of mechanical play is always allowed by the fixturing, or objects can be handled in bulk.

Pattern matching is a general purpose tool to find arbitrary shapes in an image and measure their position with high accuracy, allowing to adequately move regions of interest for further visual inspection. Pattern matching is also used for precise robot guidance.



Frame type identification and alignment check



Score-based recognition

In addition to location and registration, pattern matching can also be used for counting, absence/presence check and even recognition: a returned matching score allows assessing the resemblance of an occurrence with the original model.

Main features

Learning

The training phase allows showing a sample image of the item to be matched. For convenience, the sample is usually taken from a rectangular region of interest. Anyway, any pixel can be assigned a "don't care" attribute, meaning that the shape and contents of the pattern can be arbitrary. The pattern center can be freely specified, too.

Searching

The search takes place in a rectangular window. An arbitrary number of matching occurrences can be requested. After the search, the positions and scores can be queried.

Accuracy, robustness and speed

The pattern matcher is exploiting all the gray-level information available. This means that interpolation techniques allow measuring positions with sub-pixel accuracy, possibly lowering the resolution requirement of the camera sensor.

The pattern matching algorithm uses the well-known normalized correlation technique. Changes in contrast or lightness will not influence the search at all, relieving from the need of strict illumination control.

When the pattern can be confused with other features in the scene, false matches can be discriminated by means of the search score.

For time performance optimization, a few relevant technical parameters are exposed to allow fine tuning and provide better control on the coarse-to-fine searching process.