# mViz comprehensive Machine Vision software



### Image Processing

The processing functions are used to prepare the image by reducing unwanted nuisances such as noise or blur, or enhance some properties such as connexity of characters, contrast... They usually turn images into other images.

This function set comprises point-to-point operations such as pixel arithmetic, lookup table transforms or shading correction. It also handles geometric transforms like deskewing or size normalization.



## Image Analysis



The analysis functions extract condensed information from images or regions in order to characterize and classify 1D or 2D features.

They encompass histogram analysis, straight or curved profile extraction, and blob analysis. When numerical values are obtained, they can be used to compare objects to known references and discriminate between them.

#### Image Calibration

An image is said to be calibrated when a mapping has been esta-blished between the pixel coordinates and some real-world coordinate system established on the observed surface.

The image calibration set provides support to accurately compute the direct and inverse matching from a number of "anchor points", and to deal with perspective distortion as well as optical deformations.



# Edge Gauging



The edges of objects usually correspond to sharp transitions in the intensities in the image.

Gauging enables very accurate measurements of edges in order to determine positions, distances, sizes, angles... This function set is specialized in profile analysis (peak detection) and fitting of straight / circular lines. It performs robust selection of the relevant edge points.

#### Pattern Matching

Pattern matching, also called template matching, is an excellent approach to locate known objects in an image. It works by providing a sample image of the item to be located and then searching for similar shapes in the target image.

The pattern matching tool of mViz supports translation, rotation and scaling and tolerates linear changes in light intensity. It is based on the well-known normalized correlation score.



#### Geometric Matching



By contrast to standard pattern matching, the geometric finder uses edge information rather than area information. This provides better robustness to occlusion, clutter, blur, non-linear intensity changes.

The geometric and standard pattern matching tools share a common API and can easily be traded for one another.

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# Machine Vision applications



#### Character Reading

TMany industrial applications require part identification. One of the ways to distinguish object is by printing a human-readable serial number on the surface or on a stickled label.

The character reading set serves two purposes: either to be able to read the content of the marking (OCR), or to verify that a given content has been properly printed (OCV). mViz uses user pre-trained fonts for the most accurate recognition. A priori information on the text layout can be used to further increase reliability.



Ready to add to infusion solution

# Bar Code Reading & Verification



TA well-known alternative to printed characters are the barcodes. They come in numerous flavors and allow storing a number of digits and/or alphabetic characters. Depending on the type, the payload ranges from a few digits to a few tens of characters.

Verification is made according to ISO standards.

#### Dot Code Reading & Verification

Verification is made according to ISO standards.

Another alternative to printed characters appeared more recently and is known as dot codes or 2D codes. They encode more information in the same space by allowing variations in two dimensions rather than one. To ensure data integrity, they also embed error detection and correction mean.



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Shape Inspection

Many part inspection tasks work by comparing the part under scrutiny to a reference shape. Deviations from it form protrusions or intrusions which you want to detect.

The "Snake" device allows you to define shapes of arbitrary complexity and perform comparisons over the image.

### Inspection by Comparison

Describing a geometric shape can be tedious. In many cases you can work in a simpler way by taking a representative picture as a model, also called a Golden Template.

The Comparator device allows you to perform direct point-to-point comparison of the gray-levels and detect discrepancies between the reference and next images.

01234567892 ABCDEFGHIJKLM NOPQRSTUVWXYZ . ....

#### **3D** Inspection



3D cameras open a new world of possibilities by adding the Z dimensions to describe the shapes. Different technologies are available to obtain point clouds or depth maps that capture the spatial geometry of the objects.

This allows to detect anomalies otherwise invisible, and to locate the objects with a 3D pose, for guidance or position control.

#### Utilities

mViz uses the programming paradigm, which means that you integrate function calls in your own application program, using your favorite framework and programming language, among C++, C++/CLI, C# and Visual Basic.

mViz supplies a rapid prototyping tool named mViz+, that lets you try the functions in a very interactive way, and build processing chains without any programming. Next, mViz+ will deliver the required source code in the desired language, ready for plugging to your application.