FALCON
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FalCon eXtra MovXact

Marker Types + Algorithms

MXT

Marker type: 5-/6-spot markers (FhG-IOSB)

Definition: Marker diameter / spot diagonal = 1.6
Single spot size = spot diagonal / 4
Spot angle = 90 deg (MXT-5) or 72 deg (MXT-6)
Minimum size ca. 12 pixel

Set-up: Automatic detection in search area

Tracking: Marker based MarkerXtrackT algorithm (FhG IOSB)
Model with affined transformation: incl. Rotation and zoom.
Unambiguous detection of close neighboring markers possible applying different relative orientations

Feature: „Crash proven“: Extremely robust with regard to variations of illumination and geometrical changes (rotation, shearing).
Additionally to the position you gain the measurement value MXT angle. Measurement accuracy < 0.2 pixel

DOT

Marker type: 1-spot marker

Definition: Ratio marker diameter / inner diameter = 1:1
Minimum size ca. 7 pixel

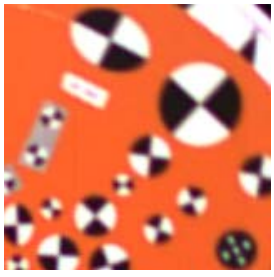
Set-up: Automatic centering in search area

Tracking: Marker based DOT algorithm
Model = bright circular area with high contrast to dark background

Feature: Fast automatic measuring of quite small markers
Measurement accuracy < 0.2 pixel

DOT-I
Marker type: 1-spot marker inverse

QUAD



Marker type: Quadrant marker (4 segments)

Definition: High contrast between the segments
(attention using yellow-black markers!)
Recommended size > 15 pixel

Set-up: Automatic centering in search area

Tracking: Marker based QUAD algorithm
Model = circular symmetrical pattern

Feature: Measurement accuracy > 0.2 pixel.
Tip: avoid practical use for image analysis!

CODE

Marker type: 1-spot marker with code ring (AICON license required)

Definition: Center marker like DOT, additional ring with thickness = DOT inner diameter, Code = number of marker
Recommended size > 15 pixel

Set-up: Automatic centering and code detection with free search in image

Tracking: CODE algorithm similar to DOT, additionally recognition of the correct code

Feature: Apply as control points on test fields or in tests with 3D analysis

CODE-I

Marker type: 1-spot marker with code ring inverse

COR

Marker type: (structured) image section (= template)

Definition: Recommended size > 20 pixel

Set-up: Interactive definition of center and size

Tracking: COR algorithm (= correlation/matching of image templates)
Standard model using non-adaptive templates (static from set-up image) and translatory displacement (no rotation)

Feature: Flexible measuring of not specially signalized points.
Recommended only in case of constant orientation

PIX

Marker type: 1 single point

Definition: Only coordinates of a picture element

Set-up: Interactive input of the position by cursor (with sub pixel accuracy)

Tracking: Automatic motion prediction and interactive input of the positions

Feature: Manual measuring of scales/rulers or not signalized points.
Measurement accuracy > 1/zoom magnification pixel

Note:

- All algorithms work with a black-and-white extract of the color image, i.e. they do not use color characteristics to identify markers. For most of the digital video cameras we recommend to work with the green extract of the image (configurable in MovXact).
- The markers should show a high contrast.
- The markers should be absolutely mat, i.e. not glossy.
- The physical size of the markers depends on the imaging geometry and the camera resolution. All markers are free in scale!
- MXT and DOT markers (in standard sizes) can be ordered for example from the printing office „Druckerei Franz Maier“, Dorfener Straße 5, D-84424 Isen, Germany,
  Phone: +49 8083 644, Fax: +49 8083 908544, e-Mail: franz.maier@isen-druck.de.