A Fiducial Tag Invariant to Rotation, Translation, and Perspective Transformations

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PII: S0031-3203(18)30114-6
DOI: 10.1016/j.patcog.2018.03.024
Reference: PR 6502

To appear in: *Pattern Recognition*

Received date: 4 October 2016
Revised date: 23 March 2018
Accepted date: 25 March 2018

Please cite this article as: Heriberto Cruz Hernández, Luis Gerardo de la Fraga, A Fiducial Tag Invariant to Rotation, Translation, and Perspective Transformations, *Pattern Recognition* (2018), doi: 10.1016/j.patcog.2018.03.024

Highlights

- We test experimentally the use of the Computational Geometry con- struction called order type for auto-identification of a fiducial tag.
- We describe a procedure for detecting the fiducial tag from an image and the algorithms for computing an identification number from them.
- We do extensively tests to show that the proposed construction is invariant to translation, rotation, and perspective transformations.
- We analyze which is the maximum noise in point positions for all points within a set that allows to compute correctly the order type in that set of points.
- As the proposed new tags are invariant to perspective transformation, it is not necessary to remove in the tag image this distortion in order to recover its associated identification number.
- With a tag of 21×21 cm and images of size 640×480 pixels, our results show that the tag and its associated ID can be recovered if the tag is tilt less than 81°, including perspective distortion, and at a distance less than 62 cm. Also, up to 3,472 of such IDs are available.