

A complete set of rotationally and translationally invariant features based on a generalization of the bi-spectrum to non-commutative groups

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Abstract:

Deriving translation and rotation invariant representations is a fundamental problem in computer vision with a substantial literature. I propose a new set of features which:

- a - are simultaneously invariant to translation and rotation;
- b - are sufficient to reconstruct the original image with no loss (up to a bandwidth limit);
- c - do not involve matching with a template image or any similar discontinuous operation.

The new features are based on Kakarala's generalization of the bi-spectrum to compact Lie groups and a projection onto the sphere. I validated the method on a handwritten digit recognition dataset with randomly translated and rotated digits.

Reference: <http://arxiv.org/abs/cs.CV/0701127>