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Grouping to perceive an incompressible world

STÉPHANE MALLAT

CMAP
École Polytechnique
91128 Palaiseau Cedex
FRANCE

`stephane.mallat@polytechnique.fr`

Sparse approximations are efficient for low-level signal processing, but much less for pattern recognition. More dimensionality reduction is needed for large scale pattern recognition. Understanding this dimensionality reduction is an important open problem.

Visual psychophysics and physiological findings highlight the importance of grouping mechanisms. Grouping builds signal representations for pattern recognition, outside the paradigm of sparse approximations and low-dimensional manifolds. A grouping is not a signal transformation but can optimize a metric adapted to recognition. Applications to image classification are shown.