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Template matching with noisy patches: A contrast-invariant GLR test

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Matching patches from a noisy image to atoms in a dictionary of patches is a key ingredient to many techniques in image processing and computer vision. By representing with a single atom all patches that are identical up to a radiometric transformation, dictionary size can be kept small, thereby retaining good computational efficiency. Identification of the atom in best match with a given noisy patch then requires a contrast-invariant criterion. In the light of detection theory, we propose a new criterion that ensures contrast invariance and robustness to noise. We discuss its theoretical grounding and assess its performance under Gaussian, gamma and Poisson noises.

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