

Robust classification of underwater targets under geometric deformations using scattering transforms

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We will discuss our new method to classify underwater targets based on sonar waveforms, which is insensitive to geometric deformations of targets (e.g., position change, rotations, shape deformations, etc.). Our method first constructs redundant features that are insensitive to those deformations by computing the scattering transform representation of input sonar waveforms. Then, the LASSO-based multiclass logistic regression extracts a small number of critical features and classify them. We will demonstrate its power using both synthetic and real examples and compare its performance with some other invariant pattern classification techniques. This is a joint work with David Weber.