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Wojciech Czaja* (wojtek@math.umd.edu), Norbert Wiener Center, Department of Mathematics, University of Maryland, College Park, MD 20742. *Fourier Scattering Transforms as Efficient Feature Extractors.*

We present a construction of a family of feature extractors which combine Mallat's scattering transform framework with the benefits of different time-frequency representations. We do this by introducing a class of frames, called uniform covering frames, which includes a variety of semi-discrete Gabor systems and other Fourier-based representations. We then incorporate these frames into an iterative neural network-like structure, to generate our candidate features, which we aggregate into a new scattering transformation. This approach proves advantageous in several data-related applications, in particular in the context of hyperspectral imaging and similar imaging modalities. We also explore several other mathematically-inspired ideas, including those of composite wavelets and rotationally invariant Fourier frames. This talk presents a body of joint work with several co-authors: Weilin Li, Ilya Kavalero, Mike Pekala, and Rama Chellappa. (Received September 15, 2020)