

1103-90-66

Hassan Mansour* (mansour@merl.com), Boston, MA 02122. *Multi-path elimination by sparse inversion in Through-The-Wall-Radar-Imaging.*

We study the problem of detecting sparse objects from subsampled uniform linear arrays in a Through-The-Wall-Radar-Imaging (TWRI) system. Our analysis combines techniques from compressed remote sensing and spectral compressed sensing. We propose a multi-path elimination by sparse inversion (MESI) algorithm that removes the clutter induced by internal wall reflections in TWRI without prior knowledge of the wall characteristics. Our approach iteratively recovers the primary impulse responses of targets behind the front wall then finds a delay convolution operator that best maps the primary impulse response of each target to the multi-path reflections available in the received signal. Since the number of targets and the number of reflecting surfaces is typically much smaller than the downrange extent of the scene, we employ ℓ_1 regularized sparse recovery in both the target detection and reflection-operator estimation. (Received August 11, 2014)