

RESEARCH PAPER

Aspect-dependent efficient multipath ghost suppression in TWRI with sparse reconstruction

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In through-the-wall radar imaging, multipath propagation can create ghost targets, which can adversely affect the image reconstruction process. However, unlike genuine targets, ghost positions are aspect-dependent, which means their position changes with the transceiver location. This paper proposes efficient ghost suppression methods exploiting aspect dependence feature under compressive sensing framework. This paper proposes a generalized signal model that accommodates for the reflections of the front-wall and target-to-target interactions, making the scheme more practical, yet the knowledge of the location of reflecting geometry is not a requirement as in most of the recent literatures. In addition, the sensing matrix is greatly reduced making the methods more attractive. Moreover, this paper investigates the influence of array configurations by examining two antenna array configurations: multimonostatic, and single-view bistatic configurations. Results based on synthesized data and real experiment show that the proposed method can greatly suppress multipath ghosts and hence increase signal-to-clutter ratio.

Keywords: Radar, Antenna design, Modeling and measurements, Aspect dependence

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