

Sidelobe Free Inverse Synthetic Aperture Radar Imaging of Non Cooperative Moving Targets Using WiFi

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Abstract : In recent years, with the rapid development of radio frequency technology, the differences between radar sensing and wireless communication in terms of receiving and sending channels, signal processing, data management and control are gradually shrinking. There has been a trend of integrated communication radar sensing. However, most of the existing radar imaging technologies based on communication signals are combined with synthetic aperture radar (SAR) imaging, which does not conform to the practical application case of the integration of communication and radar. Therefore, in this paper proposes a high-precision imaging method using communication signals based on the imaging mechanism of inverse synthetic aperture radar (ISAR) imaging. This method makes full use of the structural characteristics of the orthogonal frequency division multiplexing (OFDM) signal, so the sidelobe effect in distance compression is removed and combines radon transform and Fractional Fourier Transform (FrFT) parameter estimation methods to achieve ISAR imaging of non-cooperative targets. The simulation experiment and measured results verify the feasibility and effectiveness of the method, and prove its broad application prospects in the field of intelligent transportation.

Keywords : integration of communication and radar, OFDM, radon, FrFT, ISAR

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