Compressive Sensing in Radar Detection (Ramot)

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Nir Asher SOCHEN, T.A.U Tel Aviv University, Exact Sciences, School of Mathematical Sciences
Yossef FERDMAN, T.A.U Tel Aviv University, Exact Sciences, School of Mathematical Sciences

Technology

The signal processing in a pulse-Doppler radar is typically based on pulse compression filter and discrete Fourier transform (DFT). Detection, measurement accuracy and good resolution require the transmission of train of pulses, where each pulse is frequency modulated. In some cases, for ambiguity resolution, a few trains of pulses are required. A reasonable assumption is that the number of targets that intersect each transmitted beam is relative small. This assumption motivates our algorithm for radar detection. We propose a novel approach to radar detection that does not rely on the traditional methods. In the proposed algorithm, detection and good resolution are obtained by the transmission of a single pulse, rather than from a train of pulses. The transmitted pulse is rectangular pulse, without frequency or phase modulation. Still target detection is possible and good range and Doppler resolution is obtained even for low SNR of 2-3 [dB]. This approach opens wide range of radar signal processing architecture realizations that utilize low radar resources for target tracking.

Stage of Development

Early stage, simplified computer simulation

The Need

The performance of a pulse-Doppler radar designed for multiple target tracking is limited by the radar resources (the duration of the transmitted beams to each target). The proposed technology utilizes radar resources more efficiently.

Potential Application

Radar signal processing unit

Patents

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Contact for more information:

Ofer Shneyour ✉, VP Business Development, ICT, +972.3.640.6496

Ramot at Tel Aviv University Ltd. P.O. Box 39296, Tel Aviv 61392 ISRAEL
Phone: +972-3-6406608
Fax: +972-3-6406675