



一种基于Hough变换的宽带雷达目标检测器

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Hough-transform-based Detector for Wideband Radar Target

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摘要 该文针对宽带雷达目标距离单元走动、具有强距离单元的特性，提出了一种基于Hough变换的目标检测算法(HD)。该算法分为两步：在第1步中，对过一级门限的高分辨距离像数据做Hough变换，并对Hough参数空间的所有数据做相应的累积分布函数(CDF)映射；在第2步中求出各个角度若干个最大值的和，并对这些和值做CDF映射，选出最大的映射和值作为检测算子。3类飞机实测数据的实验结果表明，与基于散射点密度的广义似然比检测算法相比，该方法检测性能至少有1.3 dB的提高。

关键词： 距离扩展目标检测 高分辨距离像 CDF映射 Hough变换 顺序统计量

Abstract: A new detection scheme based on Hough transform for spatially distributed moving target which range walks and has strong range cells is proposed. The proposed scheme, Hough Detector (HD), consists of two steps. In the first step, a primary threshold is set and any range-time cell of High Resolution Range Profiles (HRRPs) with a value exceeding this threshold is mapped into Hough parameter space and then every Hough cell is refined using its own Cumulative Distribution Function (CDF). In the second step, summations of several strongest cells of every angle in Hough space are calculated, then the summations is mapped by their own CDF. The maximum of the mapped summations is used as the test statistic for target detection. Experimental results for measured data of three planes illustrate that Hough detector achieves at least 1.3 dB improvement comparing with the existing Scatter Density Dependent Generalized Likelihood Rate Test (SDD-GLRT).

Keywords: Range-spread target detection High Resolution Range Profile (HRRP) Cumulative Distribution Function (CDF) mapping Hough transform Order statistic

Received 2009-11-10;

本文基金:

国家部委基金资助课题

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引用本文:

夏宇垠, 冯大政, 李涛.一种基于Hough变换的宽带雷达目标检测器[J] 电子与信息学报, 2010,V32(11): 2755-2759

Xia Yu-Yin, Feng Da-Zheng, Li Tao.Hough-transform-based Detector for Wideband Radar Target[J] , 2010,V32(11): 2755-2759

链接本文:

<http://jeit.ie.ac.cn/CN/10.3724/SP.J.1146.2009.01439> 或 <http://jeit.ie.ac.cn/CN/Y2010/V32/I11/2755>

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