

论文

基于1类SVM的高分辨雷达真假目标识别

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摘要:

本文将高分辨雷达目标检测问题等效为真假目标识别问题, 并针对现有的高分辨雷达目标检测算法的缺陷, 借鉴处理异常值问题的思想, 首次将1类SVM引入高分辨雷达目标检测之中, 为解决高分辨雷达目标检测问题提供了一条崭新的思路. 同时针对现有的1类SVM对数据域描述的不足, 结合高分辨雷达目标数据分布的特点, 提出了一种聚类式的1类SVM模型, 通过对训练的正类样本的聚类分组, 用多个小的超球来代替原来的1个大的超球, 从而更准确的实现了对数据域的描述. 最后针对存在多类真目标的情况, 提出了对每一类真目标分别进行处理的方法, 以满足后续真目标类型识别的需要. 雷达实测数据实验结果表明本文算法是有效的.

关键词: 高分辨雷达目标检测 真假目标识别 1类SVM 数据域描述

True-False Target Recognition In High Resolution Radar Based on One-Class SVM

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Abstract:

The problem of high resolution radar target detection is taken as the problem of true-false target recognition in this paper. In allusion to the shortcoming of the existing high resolution radar target detection algorithm, and by borrowing ideas from the dealing with novelty problem, one-class SVM is introduced to high resolution radar target detection for the first time. That can provide a new idea for solving high resolution radar target detection problem. At the same time, in allusion to the incompleteness of one-class SVM in describing data domain, and combing the data distribution characteristics of the high resolution radar object, a cluster one-class SVM model is proposed. It conducts training positive kind based on clustering, uses several small spheres instead of previously one big sphere, and gives more accurate description of the data domain. At last, in allusion to the condition of the existing several kinds of true targets, a method that deals with every single kind of true target separately is proposed to satisfy with the need of the succeeding true target type identifying. Experiments with radar raw data show the validity of this algorithm.

Keywords: High resolution radar target detection True-false target recognition One-class SVM, Data domain description

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