电子与信息学报
JOURNAL OF ELECTRONICS & INFORMATION TECHNOLOGY

电子与信息学报 » 2011, Vol. 33 » Issue (10) :2452-2457 DOI: 10.3724/SP.J.1146.2011.00287

基于压缩感知的稀疏阵列MIMO雷达成像方法

顾福飞* 池龙 张群 彭发祥 朱丰*

空军工程大学电讯工程学院 西安 710077

An Imaging Method for MIMO Radar with Sparse Array Based on Compressed Sensing

Gu Fu-fei Chi Long Zhang Qun Peng Fa-xiang Zhu Feng*

Telecommunication Engineering Institute, Air Force Engineering University, Xi'an 710077, China

摘要 针对MIMO雷达对空目标单次快拍成像时天线数目较多问题，该文提出了一种稀疏阵列MIMO雷达的成像方法。首先分析了MIMO雷达天线的稀疏布阵方式，其次结合压缩感知理论具体阐述了稀疏阵列MIMO雷达的成像方法。该方法不仅能够对运动目标实现单次快拍成像，避免了目标机动带来的运动补偿难题，同时又能够大幅减少MIMO雷达的天线规模，便于工程实现。最后利用仿真实验验证了所提方法的有效性。

关键词： MIMO雷达 稀疏阵列 压缩感知 单次快拍成像

Abstract： The number of antenna elements of MIMO radar is too many when imaging for moving target with single snapshot. To solve the problem, an imaging method for MIMO radar with sparse array is proposed. Firstly the configuration of sparse antenna array is analyzed. Then, combining Compressed Sensing (CS) theory, a novel imaging algorithm for MIMO radar with sparse array is put forward. Single snapshot imaging for moving target is implemented by this algorithm, which not only can avoid the difficulty of motion compensation aroused by the target's maneuver, but also can reduce the number of antenna, it is the advantage to engineering practice. Finally, the effectiveness of this algorithm is validated by the simulative results.

Keywords： MIMO radar Sparse array Compressed Sensing (CS) Single snapshot imaging

Received 2011-03-27;

本文基金:

国家973计划项目(2010CB731905)和国家自然科学基金(60971100)资助课题

通讯作者: 顾福飞 Email: gffpan@126.com

引用本文:

顾福飞, 池龙, 张群, 彭发祥, 朱丰.基于压缩感知的稀疏阵列MIMO雷达成像方法[J] 电子与信息学报, 2011,V33(10): 2452-2457

Gu Fu-Fei, Chi Long, Zhang Qun, Peng Fa-Xiang, Zhu Feng.An Imaging Method for MIMO Radar with Sparse Array Based on Compressed Sensing[J] , 2011,V33(10): 2452-2457

链接本文:

http://jeit.ie.ac.cn/CN/10.3724/SP.J.1146.2011.00287 或 http://jeit.ie.ac.cn/CN/Y2011/V33/I10/2452