

论文

## 基于两级2DPCA的SAR目标特征提取与识别

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摘要

对二维图像用主分量分析(PCA)来提取特征具有准确估计协方差矩阵比较困难、计算复杂度大的缺点。二维PCA(2DPCA)克服了PCA的局限性,但2DPCA仅去除了图像中各行像素间的相关性,因此它用于特征提取时得到的特征维数较大。该文采用两级2DPCA的图像特征提取方法,可进一步压缩特征维数,减少识别运算量。用运动和静止目标获取与识别(MSTAR)计划录取的合成孔径雷达(SAR)地面静止目标数据的实验结果表明,结合该文的预处理方法,两级2DPCA在大大降低了特征维数的同时,提高了识别率,且对目标方位角变化具有较强的鲁棒性。

关键词 [合成孔径雷达](#) [二维PCA](#) [两级2DPCA](#) [最近邻分类器](#)

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## SAR Target Feature Extraction and Recognition Based on Two-Stage 2DPCA

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Abstract

Feature extraction based on PCA for 2 dimensional images has the disadvantages of evaluating the covariance matrix accurately with great difficulty and high computational complexity, 2-dimensional PCA (2DPCA) overcomes these flaws. However, a drawback of 2DPCA is that it needs more features, since it only eliminates the correlations between rows. In this paper, two-stage 2DPCA is applied to further compress the dimensions of features and decrease the recognition computation. Experimental results performing on SAR ground targets based the Moving and Stationary Target Acquisition and Recognition (MSTAR) database indicate that two-stage 2DPCA combining with the pre-processing method in this paper not only decreases sharply feature dimensions, but increases recognition rate, and is robust to the variation of target azimuth.

Key words [SAR](#) [2DPCA](#) [Two-stage 2DPCA](#) [Nearest neighbor classifier](#)

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