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应用

基于KPCA和稀疏表示的SAR目标识别方法

韩萍,王欢

中国民航大学智能信号与图像处理天津市重点实验室

摘要：

提出了一种基于KPCA（Kernel Principal Component Analysis）和稀疏表示的合成孔径雷达（Synthetic Aperture Rader，SAR）目标识别方法。该方法首先利用KPCA方法提取样本特征，然后在特征空间内构造稀疏表示模型，通过梯度投影法（Gradient Projection for Sparse Reconstruction，GPSR）求得测试样本的稀疏系数，最后根据稀疏系数的能量特征实现分类识别。利用美国运动和静止目标获取与识别（Moving and Stationary Target Acquisition and Recognition ，MSTAR）实测SAR数据进行实验，实验结果表明该方法在方位角未知的情况下平均识别率达到96.78%，能够明显的提高目标的识别结果，是一种有效的SAR目标识别方法。

关键词： 目标识别；合成孔径雷达；核主成分分析；稀疏表示；梯度投影法

Synthetic Aperture Rader Target Recognition Based on KPCA and Sparse Representation

HAN Ping,WANG Huan

Tianjin Key Lab for Advanced Signal Processing, CAUC

Abstract:

SAR(Synthetic Aperture Rader) target recognition method based on KPCA and sparse representation is proposed. First, KPCA(Kernel Principal Component Analysis) feature extraction is used to get the feature of the samples. Then a sparse representation model is built in the feature space. The sparse coefficient is obtained by GPSR(Gradient Projection for Sparse Reconstruction). Finally, the recognition is achieved by computing the energy of the sparse coefficient. Experimental results with MSTAR(Moving and Stationary Target Acquisition and Recognition) SAR data sets show that the average recognition rate with the proposed method is up to 96.78% without knowing the target azimuth which can improve the target recognition result. And the proposed method is a effective method for SAR target recognition.

Keywords: Target Recognition　Synthetic Aperture Rader　Kernel Principal Component Analysis　Sparse Representation　Gradient Projection for Sparse Reconstruction

通讯作者：

作者简介：

作者Email: hanpingcauc@163.com

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