研究简报

基于修改核函数的RLS－SVM多用户检测算法

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摘要
为了解决支持向量机算法在多用户检测中存在的模型复杂及产生的支持向量数目较多的问题, 该文提出一种新的非线性多用户检测算法。该算法在第一次小样本训练时引入了遗忘因子, 该因子使支持向量数减少了28％。在第一次训练后产生的支持向量的基础上, 将黎曼几何结构引入到输入空间, 利用黎曼几何结构将分类器中的核函数进行修改, 在第二次训练中再次减少了支持向量数目。此方法在牺牲较少误比特率的基础上, 简化了算法模型和降低计算复杂度。仿真实验表明, 该算法抑制了多径引起的码间干扰, 性能接近于最优多用户检测器。

关键词　　码分多址　支持向量机　递归最小二乘　黎曼几何　核函数

分类号　TN914.5　TN911.23

An algorithm for recursive least squares support vector machine multiuser detection based on modifying kernel

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Abstract
To solve the problems of the complexity of SVM-MUD model and the number of support vectors, a new algorithm for nonlinear multiuser detection is proposed in the paper. The algorithm introduced the forgetting factor to get the support vectors at the first training. The number of support, vectors is decreased by 28%. Then, the structure of the Riemannian geometry is introduced in the input space, and using the Riemannian geometric modifies the kernel function of the classifier and gets less improved support vectors at the second training. The algorithm simplifies the SVM-MUD model of the algorithm at the cost of only a little more bit error rate and decreases the computational complexity. Simulation results illustrate, that the algorithm has an excellent effect on multipath interference suppression and shows that its performance can closely match that of the optimal detector.

Key words　CDMA　Support vector machine　Recursive least squares　Riemannian geometry　Kernel function

DOI :

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