

SYSTEM ENGINEERING

工业PTA氧化工程中4-CBA浓度的模糊支持向量回归模型  
张英芬 李俊 刘瑞三 魏健

National Laboratory of Industrial Control Technology, Institute of Advanced Process Control, Zhejiang University, Hangzhou 310027, China  
收稿日期: 2004-11-18 网络版发布日期: 2005-01-10 接受日期: 2005-01-10

摘要: 在过去的几年中, 支持向量机(SVM)已被应用到许多领域, 如模式识别和数据挖掘等。然而, 仍然存在一些问题需要解决。其中之一是SVM对异常值和噪声非常敏感。为此, 本文提出了一种基于模糊支持向量回归(FSVR)的方法来解决这一问题。该方法基于k最近邻(KNN)和支持向量数据描述(SVDD)来设置数据点的模糊隶属度。本文提出的FSVR软传感器模型基于KNN和SVDD, 用于预测4-羧基苯醛(4-CBA)在纯化的邻苯二甲酸(PTA)氧化过程中的浓度。仿真结果表明, 该方法确实减少了异常值的影响, 并提高了精度。

关键词: 模糊支持向量机; 氧化工程; 4-羧基苯醛; 4-CBA浓度; 模糊支持向量; 回归模型

分类号: DOI:

Fuzzy Support Vector Regression Model of 4-CBA Concentration for Industrial PTA Oxidation Process

ZHANG Ying, LI Jun, LIU Ruisan, WEI Jian

National Laboratory of Industrial Control Technology, Institute of Advanced Process Control, Zhejiang University, Hangzhou 310027, China

Received: Revised: Online Accepted:

Abstract: In the past few years, support vector machines (SVMs) have been applied to many fields, such as pattern recognition and data mining, etc. However, there still exist some problems to be solved. One of them is that the SVM is very sensitive to outliers or noises because of over-fitting problem. In this paper, a fuzzy support vector regression (FSVR) method is presented to deal with this problem. Strategies based on k nearest neighbor (KNN) and support vector data description (SVDD) are adopted to set the fuzzy membership values of data points in FSVR. The proposed FSVR soft sensor models based on KNN and SVDD are employed to predict the concentration of 4-carboxy-benzaldehyde (4-CBA) in purified terephthalic acid (PTA) oxidation process. Simulation results indicate that the proposed method indeed reduces the effect of outliers and yields higher accuracy.

Key words: purified terephthalic acid; 4-carboxy-benzaldehyde; support vector machines; soft sensor; fuzzy membership

通讯作者:  
张英 张英芬 zhangying@ipc.zju.edu.cn, zysun@ipc.zju.edu.cn  
作者个人主页: 张英芬企业网站 刘瑞三博客

扩展功能	
本文信息	
► <a href="#">Download this article</a>	
► <a href="#">Cite this article</a>	
► <a href="#">Print this article</a>	
► <a href="#">Email this article</a>	
► <a href="#">Add to my favorites</a>	
► <a href="#">Add to my watchlist</a>	
► <a href="#">Add to my reading list</a>	
► <a href="#">Add to my collection</a>	
► <a href="#">Add to my bookmarks</a>	
► <a href="#">Add to my RSS feeds</a>	
► <a href="#">Add to my favorites</a>	
► <a href="#">Add to my watchlist</a>	
► <a href="#">Add to my reading list</a>	
► <a href="#">Add to my collection</a>	
► <a href="#">Add to my bookmarks</a>	
► <a href="#">Add to my RSS feeds</a>	