

基于表面肌电信号形态特征的多模式识别研究

作者：张启忠, 席旭刚, 罗志增

单位：杭州电子科技大学 机器人研究所

基金项目：具有触觉临场感的肌电遥控操作研究

摘要：

特征选取是肌电信号多模式识别的关键，论文根据肌电信号的产生机理提出了选用信号的形态特征实现肌电信号多运动模式识别的新方案。方案中，以分形理论中关联维及分维数的概念分别表征肌电信号的复杂度及自相似性。关联维的计算采用了一种改进的G-P算法，即G-P关联维逼近法。针对操作者手部动作模式的识别问题，论文以关联维和分维数作为表面肌电信号多模式识别的特征向量，分类器采用由对支持向量机构造的二叉树结构多类分类器。在对张开、合拢及腕伸、腕屈四种运动模式的识别实验中，正确识别率达到了91.0%，已具备一定的实用性。

关键词：表面肌电信号；模式识别；对支持向量机；关联维；分维数

Study on multi-pattern recognition based on sEMG morphological characteristics

Author's Name:

Institution:

Abstract:

Feature selection is the key to the electromyography (EMG) pattern recognition. Based on EMG signal generation mechanism, this paper is to present new method of multi-movement pattern recognition in accordance with EMG morphological characteristics. The concepts of correlation dimension and fractal dimension in the fractal theory represent the complexity and self-similarity of the EMG respectively. The calculation of the correlation dimension adopts an improved G-P algorithm, named G-P correlation dimension approximation method. To classify the manipulator's gesture and action, the combination of correlation dimension and fractal dimension is used as an input eigenvector of multi-pattern recognition classifier and the binary-tree architecture classifier is constructed with twin support vector machines (TSVM). The experiment, aiming to classify four hand gestures including hand open, hand grasp, wrist extension and wrist flexion, shows that by using this method, the recognition rate has reached 91.0%, with a certain practicality of this approach..

Keywords: surface electromyography; pattern recognition; Twin support vector machine ; correlation dimension; fractal dimension

投稿时间：2012-09-07

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