

论文

基于Hermite神经网络的动态手势学习和识别

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摘要:

为提高动态手势学习速度和识别准确率, 本文提出一种基于Hermite正交基前向神经网络的动态手势识别方法。利用Camshift算法实时跟踪手势运动轨迹, 提取手势特征向量作为神经网络的输入; 以Hermite正交基函数作为隐含层激励函数构造三层前向神经网络, 并给出一种基于伪逆的直接计算权值方法和根据网络目标精度要求自适应确定隐含节点数目方法; 运用训练好的Hermite神经网络识别动态手势。测试结果表明: Hermite神经网络能够提高网络的学习训练速度和精度, 提高手势学习速度和识别准确率, 而且在手势识别方面具有较好的鲁棒性和泛化能力。

关键词: Hermite神经网络 权值直接确定 隐含节点数自适应确定 指尖跟踪 动态手势识别

Dynamic Gesture Learning and Recognition Based on the Hermite Neural Network

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Abstract:

In order to improve the training speed and identification accuracy, a method of dynamic gesture recognition based on the Hermite orthogonal basis feed forward neural network is put forward. At first, the CamShift algorithm is used to track trajectories of moving fingertips and the characteristic vector of gesture is extracted as the input of the neural network. Then, a feed forward neural network which hides the layer neurons is activated by a group of Hermite orthogonal polynomial functions is, and a method to determine the network weights directly and determine the number of hidden layer nodes adaptively is proposed. Finally, gestures based on machine vision are recognized through the trained Hermite neural network. The experimental results show that the Hermite neural network can enhance the speed and precision of network training, improve the learning speed and identification accuracy of gesture recognition and has good robustness and generalization ability.

Keywords: Hermite neural network; weights' direct determination; hidden node number adaptive determination; fingertips tracking; dynamic gesture recognition

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