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摘要：为了实现威胁源自动报警,使用BP神经网络构建自动报警系统。针对帧差法提取出的目标轮廓有重复和受变化背景影响的问题,提出了种基于轮廓片段的目标特征提取方法。首先使用K-mediod聚类以剔除重复轮廓,再结合轮廓片段生长的方法,计算待识别轮廓和验证图片集的配代价以剔除背景轮廓,提取出匹配代价最小的轮廓生成轮廓片段字典。随后计算归一化的轮廓矩生成特征向量。最后将提取出的特征向量输入先训练生成的BP神经网络进行分类。实验结果表明,算法适用于典型刚性目标识别,对于实验视频中枪支的平均识别率达到93.5%,单帧平均运算时间3.67 ms;对于Berkeley运动分割数据集中车辆的识别率达到98.2%,单帧平均运算时间5.26 ms。算法具有高实时性、高准确率的特点。

关键词：轮廓片段 K-mediod聚类 匹配代价 神经网络

## Target Recognition Using Neural Network Based on Contour Features

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Abstract: In order to achieve automatic alarm for source of threats, an automatic alarming system is established using BP neural network. A feature extraction algorithm using contour fragments are proposed to solve the problem that the edges of the target extracted by frame subtraction is repeated and affected by changing background. Firstly, K-mediod clustering is used to remove repeated edge fragments. Then the matching cost between fragments to be recognized and validation set are computed combining with fragments growing method to eliminate the fragments of background. Then the fragments that have the minimal matching costs are extracted to obtain a codebook of edge fragments. Then improved normalized moments are calculated to generate the feature vector. At last the feature vector is inputted into the improved BP neural network for classification. Experimental results indicate that the algorithm is suitable for typical rigid target recognition. The averaging detection rate is up to 93.5% and averaging computing time of single frame is 3.67 ms for guns in experimental video. For cars in motion segmentation data set from Berkeley the averaging detection rate is up to 98.2% and averaging computing time of single frame is 5.26 ms. The algorithm proposed in this article has a high recognition rate and good real-time performance.

Keywords: contour fragments k-mediod clustering matching cost neural network

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