

适用于硬件高速计算的 CNN 目标跟踪算法

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摘要: 针对硬件上实现指定目标的高速跟踪, 提出一种适用于硬件高速计算的深度卷积神经网络 (convolutional neural network, CNN) 目标跟踪算法. 通过分析卷积层、卷积核、亚采样层和激活层对于网络性能的影响, 针对硬件实现构建多种 CNN 结构. 训练指定目标样本, 得到基于卷积深度特征的目标模型, 采用灵活的搜索策略, 调用优化后的模型参数实现硬件上的目标跟踪. 结合实例, 对比了多种网络的性能和跟踪效果, 其中最优模型参数仅为 368 Byte, 测试错误率为 0.0125, 跟踪误差均值为 0.779 像素, 证明了该算法在硬件上实现目标追踪的有效性和可行性.

关键词: 卷积神经网络; 硬件计算; 目标跟踪

A Target Tracking Algorithm Based on CNN for High-speed Calculation of Hardware

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Abstract: To achieve the specified target tracking on the hardware. A target tracking algorithm based on convolution neural network for hardware is proposed. By analyzing the effects of the coiling layer, convolution kernel, subsampling layer, and activation layer on network performance, various CNN structures are constructed for hardware implementation. By training the target sample, the target model based on the convolution depth characteristics is obtained. The optimized model parameters are invoked to track the target tracking on the hardware, by using a flexible search strategy. The performance and tracking effect of a variety of networks are compared with an example. The parameter size of the optimal model is 368Byte, and the test error rate is 0.0125, and the mean of tracking error is 0.779. The effectiveness and feasibility of the algorithm to achieve target tracking on hardware is proved.

Key words: convolutional neural network; hardware calculation; target tracking

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