智能机房监控系统中损失函数与图像合成的优化

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摘　要：为了实时监控机房服务器的工作状态，提出了一种智能机房监控方案，其通过基于卷积网络的图像识别完成服务器以及指示灯状态的识别与监控.针对目标识别中样本类别失衡会导致训练模型不收敛的问题，设计了一种自动调控样本类别失衡的损失函数及参数更新算法，用于平衡难易样本的训练，在 VOC2007 数据集上的测试精度为 78.3%，好于 YOLOv2 等先进算法.为了减少训练数据采集所需要的成本，提出了一种基于多尺度化随机边缘信息融合算法的图像合成方法，使合成图片更加注重边缘信息，在 Cityscapes 数据集测试的像素精度为 71%，较大程度超过 pix2pix 等方法，证明其可以大大降低图像采集成本.

关键词：目标检测；类别失衡；边缘信息；图像合成

Optimization of Loss Function and Image Synthesis in Smart Server Monitoring System

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Abstract：A smart server monitoring system is proposed to detect the working status of the server in real time, which finishes the recognition of the status of the server and indicator light through image recognition based on convolutional neural network. In order to solve the problem of class imbalance in target recognition, a novel loss function is designed to adjust class imbalances automatically. Its test accuracy of VOC2007 is 78.3%, which is better than the advanced methods such as YOLOv2. In addition, an image synthesis method based on multi-scale edge information fusion algorithm is proposed to reduce the cost of data collection. Its pixel precision of Cityscapes is 71%, which is much better than pix2pix.

Key words：target detection; class imbalance; edge information; image synthesis

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