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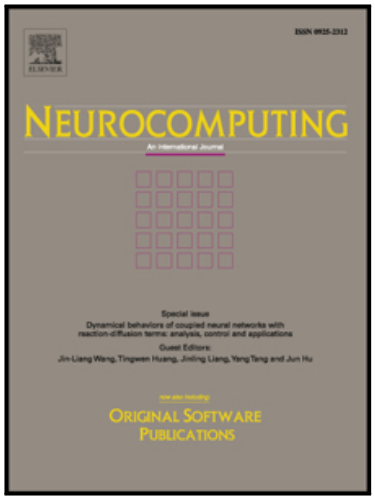


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# Auxiliary learning for Crowd Counting via Count-net

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**Abstract**

This paper aims to develop a simple but effective method that can estimate the number of people in still images. Inspired by the successful applications of deep learning and the appearance of crowd, we design a count-net based on Convolutional Neural Network (CNN). The count-net takes the appearance of crowd as auxiliary mechanism, thus filtering out most of the backgrounds and focusing more on people's heads. In addition, we adopt a separated-aggregated framework since the structure of crowd in an image is rarely uniform. Firstly, we separate the crowd image into patches to treat different spatial locations discriminatively. Afterwards, these patches and the manual marked labels are fed into a count-net to train the parameters of this network. For practical application, only the counting channel of the count-net is demanded. Finally, the numbers of people in patches that belong to one image are summed as the output of the whole framework. Experimental results conducted on UCF and AHU-CROWD datasets demonstrate the superiority of our proposed method.

*Keywords:* crowd counting, count-net, Deep Learning, Convolutional Neural Network (CNN), appearance

## 1. Introduction

Crowd analysis is a crucial task that has drawn remarkable attentions in video surveillance research [1] [2] [3]. As one of the research contents in crowd analysis, crowd counting has a wide range of applications in crowd

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