

Incorporating Side Information by Adaptive Convolution

SPEAKER Mr **KANG Di**

PhD Student
Department of Computer Science
City University of Hong Kong
Hong Kong

DATE 21 November 2017 (Tuesday)

TIME 10:00 am - 10:30 am

VENUE CS Seminar Room, Y6405
6th Floor, Yellow Zone
Yeung Kin Man Academic Building
City University of Hong Kong
83 Tat Chee Avenue
Kowloon Tong

ABSTRACT

Computer vision tasks often have side information available that is helpful to solve the task. For example, for crowd counting, the camera perspective (e.g., camera angle and height) gives a clue about the appearance and scale of people in the scene. While side information has been shown to be useful for counting systems using traditional hand-crafted features, it has not been fully utilized in counting systems based on deep learning. In order to incorporate the available side information, we propose an adaptive convolutional neural network (ACNN), where the convolution filter weights adapt to the current scene context via the side information. In particular, we model the filter weights as a low-dimensional manifold within the high-dimensional space of filter weights. The filter weights are generated using a learned filter manifold sub-network, whose input is the side information. With the help of side information and adaptive weights, the ACNN can disentangle the variations related to the side information, and extract discriminative features related to the current context (e.g. camera perspective, noise level, blur kernel parameters). We demonstrate the effectiveness of ACNN incorporating side information on 3 tasks: crowd counting, corrupted digit recognition, and image deblurring. Our experiments show that ACNN improves the performance compared to a plain CNN with a similar number of parameters. Since existing crowd counting datasets do not contain ground-truth side information, we collect a new dataset with the ground-truth camera angle and height as the side information.

This paper will be presented at NIPS 2017, Long Beach, CA, US, December 4-9, 2017.

Supervisor: Dr Antoni Chan

Research interests: Object Counting; Computer Vision; Deep Learning

All are welcome!



In case of questions, please contact Dr Antoni Bert Chan at Tel: 3442 6509, E-mail: abchan@cityu.edu.hk, or visit the CS Departmental Seminar Web at <http://www.cs.cityu.edu.hk/news/seminars/seminars.html>.

