Department of Computer Science

COMPUTER SCIENCE SEMINAR SERIES

Recurrent Filter Learning for Visual Tracking

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ABSTRACT

Recently using convolutional neural networks (CNNs) has gained popularity in visual tracking, due to its robust feature representation of images. Recent methods perform online tracking by fine-tuning a pre-trained CNN model to the specific target object using stochastic gradient descent (SGD) back-propagation, which is usually time-consuming. In this paper, we propose a recurrent filter generation methods for visual tracking. We directly feed the target's image patch to a recurrent neural network (RNN) to estimate an object-specific filter for tracking. As the video sequence is a spatiotemporal data, we extend the matrix multiplications of the fully-connected layers of the RNN to a convolution operation on feature maps, which preserves the target's spatial structure and also is memory-efficient. The tracked object in the subsequent frames will be fed into the RNN to adapt the generated filters to appearance variations of the target. Note that once the off-line training process of our network is finished, there is no need to fine-tune the network for specific objects, which makes our approach more efficient than methods that use iterative fine-tuning to on-line learn the target. Extensive experiments conducted on widely used benchmarks, OTB and VOT, demonstrate encouraging results compared to other recent methods.

This paper will be presented at the 2017 IEEE International Conference on Computer Vision (ICCV) on Visual Object Tracking Challenge (VOT) Workshop, Venice, Italy, October 22-29, 2017.

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Research Interest: Visual Tracking

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.