DeepDCF

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1 Discriminative Correlation Filters

1.1 DSST

(PCA-HOG+Gray)+DCF+Scale Esimation
key word: circular correlation,Parserval's identity, dense feature

1.1.1 Derivation

patch: $x_1, ..., x_t$
label: $y_1, ..., y_t$
filter: w_t
test patch: z

$$\epsilon = \sum_{j=1}^{t} \|w_t \star x_j - y_j\|^2 = \sum_{j=1}^{t} \left\|\overline{W}_t \odot X_j - Y_j\right\|^2$$

$$W_t = \frac{\sum_{j=1}^{t} \overline{Y}_j \odot X_j}{\sum_{j=1}^{t} X_j \odot \overline{X_j}}$$

$$y = \mathfrak{F}^{-1}\left(\overline{W}_t \odot Z\right) = \mathfrak{F}^{-1}\left(\frac{\sum_{j=1}^{t} \overline{X}_j \odot Y_j \odot Z}{\sum_{j=1}^{t} \overline{X_j} \odot X_j}\right)$$

This is a little different between MOSSE[1] and this Derivation. No regularization term.

References

[1] David S Bolme, J Ross Beveridge, Bruce A Draper, and Yui Man Lui. Visual object tracking using adaptive correlation filters. In *Computer Vision and Pattern Recognition (CVPR), 2010 IEEE Conference on*, pages 2544–2550. IEEE, 2010.

[2] Martin Danelljan, Gustav Häger, Fahad Khan, and Michael Felsberg. Accurate scale estimation for robust visual tracking. In *British Machine Vision Conference, Nottingham, September 1-5, 2014*. BMVA Press, 2014.