# 2A-L4 Filters as templates

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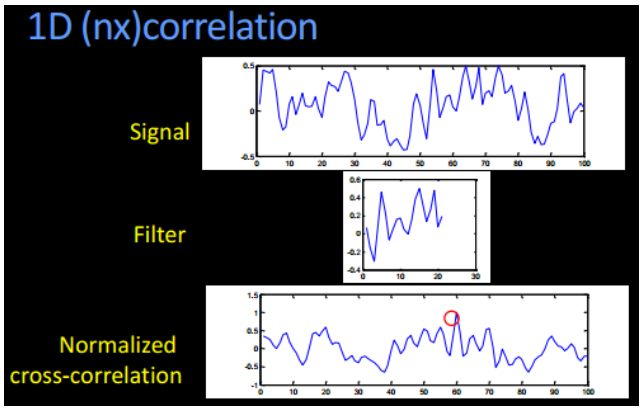
1. SUM
    a. normalized correlation
        i. filter/template
        ii. patches
    b. matlab
        i. normxcorr2(template, img)
        ii. starting on the first overlap till the last overlap
    c. application
        i. use template to find patterns in an image
            1. applicable to the case where the template and object are similar in every aspect but not for the case where the object varies a lot.

2. Normalized correlation
    a. the standard deviation all the pixel in the filter is 1
        i. can be a problem when the filter is a constant one
            1. solutions follows later
    b. the standard deviation of the patch that will be multiplied by the filter is also 1
3. 2. 1D Correlation



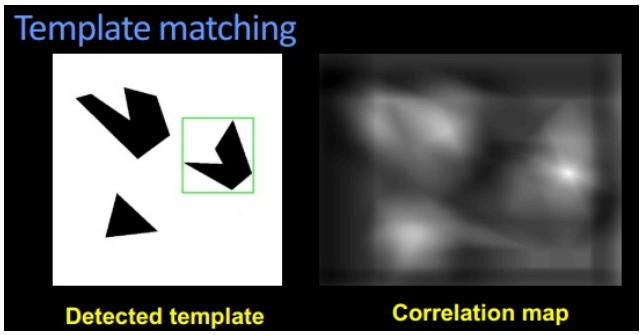

4. 3. Matlab Cross Correlation Doc
    a. C = normxcorr2(template,A) computes the normalized cross-correlation of the matrices

`template` and `A`. The resulting matrix `C` contains the correlation coefficients.

b. ATT

i. the correlation starts computing on the first overlap of the templet and image

5. 5. Template Matching




a. use the templet to traverse the whole image, compute normxcorr2 and then find the index where the max happens.

1. 8. Quiz: What is it Good by using template

a. template is useful when the pattern of the object doesn't much, including the size, rotation, and so on. But for objects that change a lot, e.g. lines, faces, it's not helpful

2. 9. Non Identical Template Matching

a. if the template is similar to the object, then it may be useful.

i. color, shape, rotation ...