CVT: Lecture 3

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1 Projection peaks
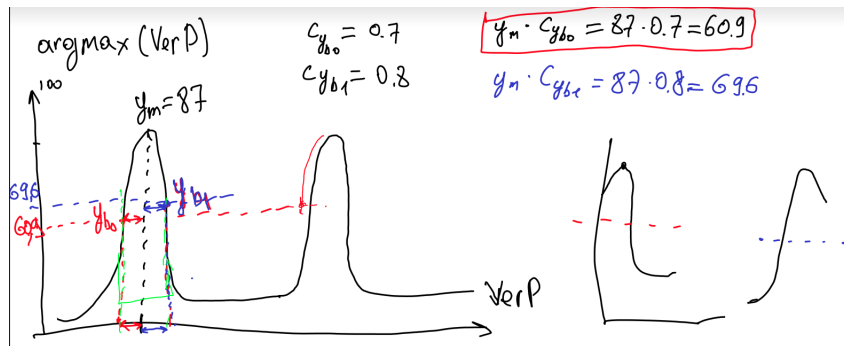
Given calculated projection of text lines in the input image, then you want to find maxima of them:

$$y_{\mathrm{bm}} = \arg\max p_y(y) \tag{1}$$

In this case, first we need to find left and right minimum per some coefficient of the peak:

$$y_{\mathrm{b0}} = \max_{y_0 < y < y_{\mathrm{bm}}} (y | p_y(y) <= c_y * p_y(y_{\mathrm{bm}})) \tag{2}$$

$$y_{\mathrm{b1}} = \min_{y_0 < y < y_1} (y | p_y(y) <= c_y * p_y(y_{\mathrm{bm}})) \tag{3}$$

2 Sobel gradients magnitude

Given calculated with Sobel filter gradients of X and Y axis, you can combine them, deriving

- magnitude - $\sqrt{x^2 + y^2}$

- gradient angle - $\text{atan2}(y, x)$

3   HOG

HOG (Histogram of oriented gradients) can be used for generating features
(Sobel X, Y gradients magnitude and angle) for machine learning model
(Was presented in CVPR 2005 with SVM usage for object detection).

HOG requires params as:

- cell_size

- orientation

- block_size

, where orientation is integer (in opencv2) of N-dimensionality of axis.

HOG can be also used as normalization for rotation and region (template) detection, e.ġfor normalization - can be used to analyze the rotation
effect (histogram will be shifted but magnitude values remain same), for
template detection - take the tiny part of the image, get its HOG, and you
can find its position in the image, comparing template HOG with image's
testing region HOG