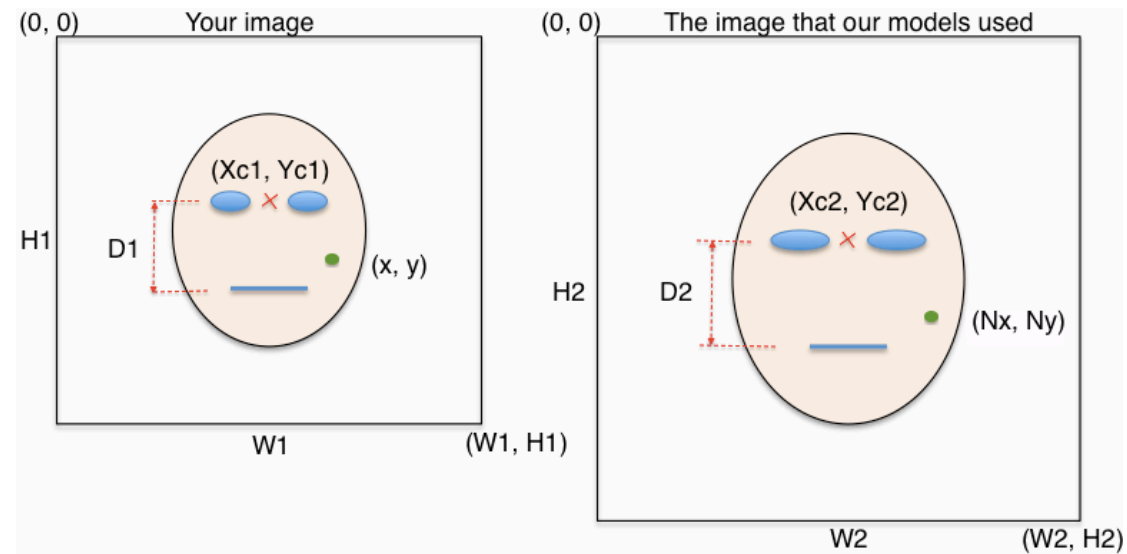


How to normalize the coordinates of the fixations on your face images

Cynthia Y.H. Chan, Janet H. Hsiao
Department of Psychology
University of Hong Kong

IMPORTANT NOTE: normalization of new data to an old model is only valid when the presentation sizes (visual angle) of the old and new data are the same.



First, you need to have below information.

Your image:

$(Xc1, Yc1)$: Coordinates of the mid-point of the eyes of your image

(x, y) : Coordinates of a fixation that you collected

$D1$: Distance between the eye level and the mouth level of your image, in pixel

$W1$: width of the image, in pixel (not used in the calculation)

$H1$: height of the image, in pixel (not used in the calculation)

**note: Please check if the value of $D1$ is the same across all images. If the values differ quite much among images, then you may need to change this value for each of your images.*

Our model's image:

$(Xc2, Yc2)$: Coordinates of the mid-point of the eyes of our image

(Nx, Ny) : Normalized coordinates of (x, y)

$D2$: Distance between the eye level and the mouth level of our image, in pixel

$W2$: width of the image, in pixel (not used in the calculation)

$H2$: height of the image, in pixel (not used in the calculation)

**note: the value of $D2$ is the same across our face images*

Thus, the **general formulas** for normalizing your fixations are:

$$\begin{aligned} N_x &= X_{c2} + (x - X_{c1}) * (D2 / D1) \\ N_y &= Y_{c2} + (y - Y_{c1}) * (D2 / D1) \end{aligned}$$

Models generated from the 34YA + 34OA study

As for the models of the 34YA + 34OA study, the image we used is of:

$(X_{c2}, Y_{c2}) = (160, 195)$

$D2 = 285 - 195 = 90$

Thus, you can normalize your fixations by

$$\begin{aligned} N_x &= 160 + (x - X_{c1}) * (90 / D1) \\ N_y &= 195 + (y - Y_{c1}) * (90 / D1) \end{aligned}$$

For **example**, your image is of:

$(X_{c1}, Y_{c1}) = (200, 260)$

$D2 = 380 - 260 = 120$

One fixation that you collected = $(x, y) = (180, 300)$

The normalized coordinates of this fixation =

$N_x = 160 + (180 - 200) * (90 / 120) = 145$

$N_y = 195 + (300 - 260) * (90 / 120) = 225$

I.e., a fixation (180, 300) on your image is normalized/transformed to (145, 225) on our image.