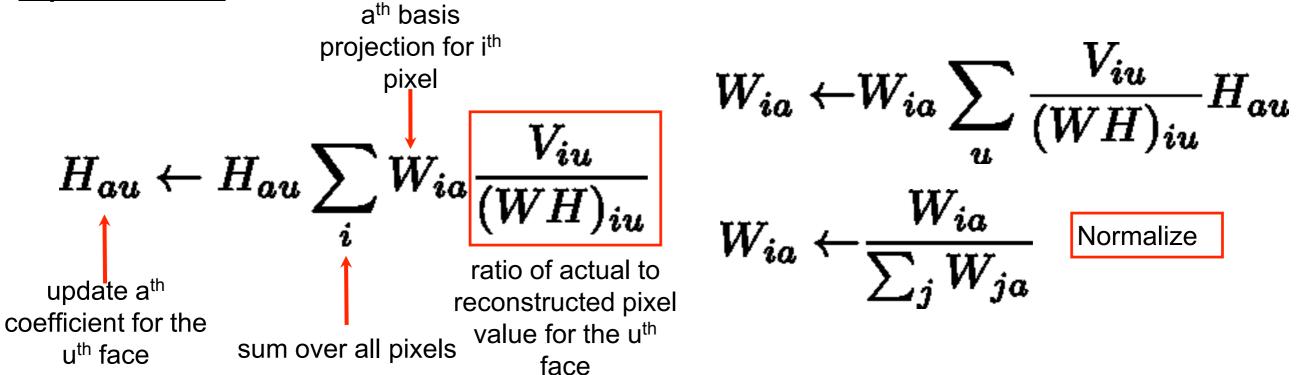
$$V_{iu} \approx (WH)_{iu} = \sum_{a=1}^{r} W_{ia} H_{au}$$

One possible objective function

Reconstruction error:

$$\arg\min_{W,H} E_r = ||V - WH||^2, \text{s.t. } W, H \ge 0$$

Update rule:

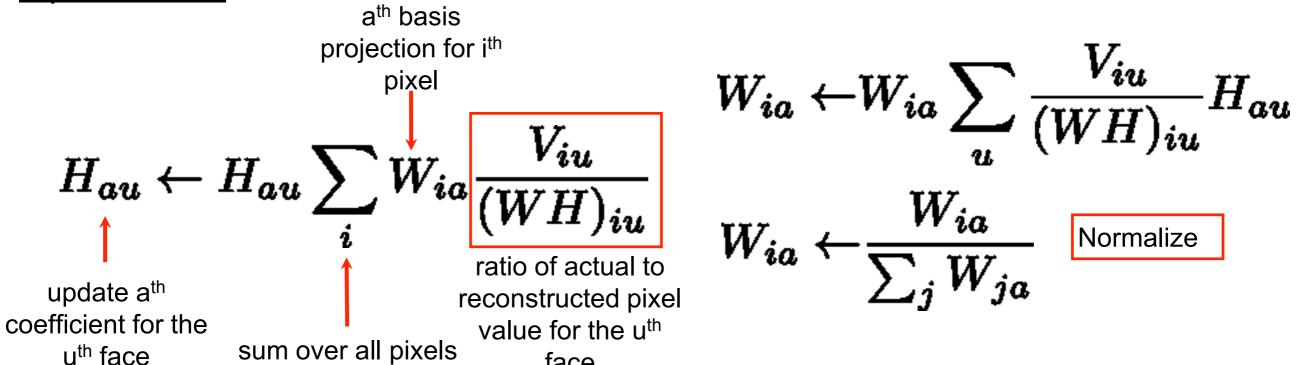


$$\arg\min_{W,H} E_r = ||V - WH||^2$$
, s.t. $W, H \ge 0$

$$V_{iu} \approx (WH)_{iu} = \sum_{a=1}^{r} W_{ia} H_{au}$$

One possible objective function

<u>Update rule</u>:



Basic idea: multiply current value by a factor depending on the quality of the approximation.

If ratio > 1, then we need to increase denominator.

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If ratio < 1, then we need to decrease denominator.

If ratio = 1, do nothing.