

Unconstrained NMF NMF receives input matrix  $V_{(FxN)}$  and number of factors  $K$ .

And it outputs non-negative matrices  $W_{FxK}$ ,  $H_{KxN}$ :

$$V \approx WH$$

Solve:

$$\hat{W}, \hat{H} = \underset{W \geq 0, H \geq 0}{\operatorname{argmin}} d_{\beta}(V|WH)$$

Method

1. MU\*(Févotte et al., 2009)\*:

$$H \leftarrow H \odot W^T [V \odot (WH)^{\beta-2}] W^T (WH)^{\beta-1}$$

$$W \leftarrow H \odot W^T [V \odot (WH)^{\beta-2}] W^T (WH)^{\beta-1}$$