Improving Low-Resolution Image Classification by Super-Resolution with Enhancing High Frequency Content

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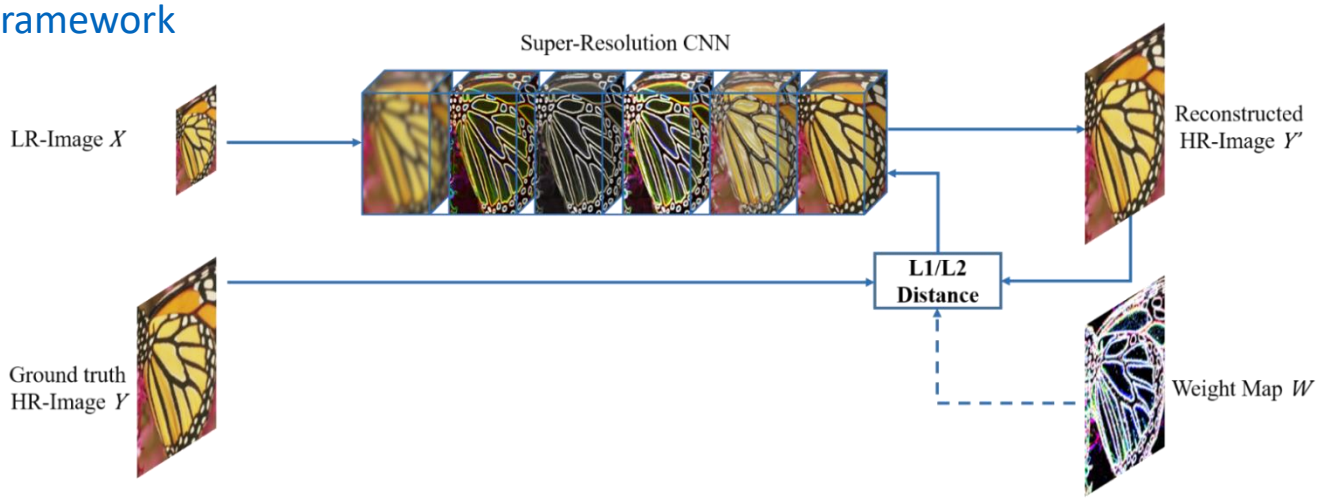
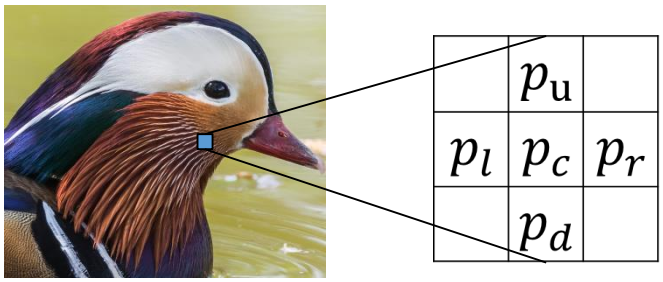
Framework



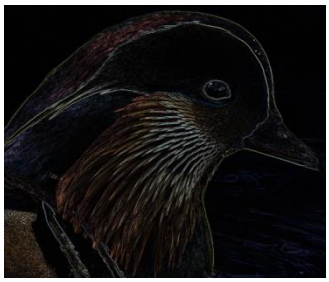
Pixel's max Diff (with Nearest neighbor)



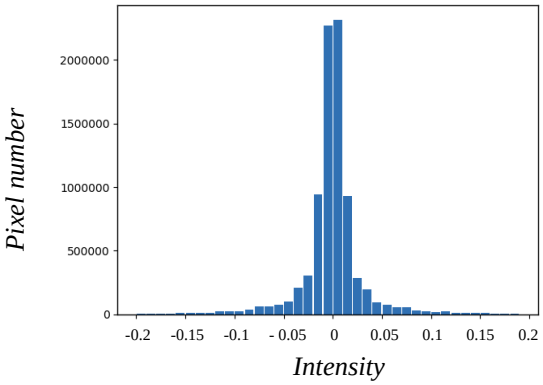
$$D = \begin{bmatrix} \boldsymbol{p}_c - \boldsymbol{p}_u \\ \boldsymbol{p}_c - \boldsymbol{p}_d \\ \boldsymbol{p}_c - \boldsymbol{p}_l \\ \boldsymbol{p}_c - \boldsymbol{p}_r \end{bmatrix} \qquad D_a = \begin{bmatrix} |\boldsymbol{p}_c - \boldsymbol{p}_u| \\ |\boldsymbol{p}_c - \boldsymbol{p}_d| \\ |\boldsymbol{p}_c - \boldsymbol{p}_l| \\ |\boldsymbol{p}_c - \boldsymbol{p}_r| \end{bmatrix}$$

$$\boldsymbol{i}_c = D[argmax(D_a)]$$

Distribution of Pixel's max Diff



Map of Pixel's max Diff



Give more Weight to Pixel with greater max Diff

$$w = \begin{cases} 0, & \boldsymbol{i} \in [\boldsymbol{\mu} - \boldsymbol{\alpha\sigma}, \boldsymbol{\mu} + \boldsymbol{\alpha\sigma}] \quad \text{（Low Frequency）} \\ 1, & otherwise \quad \text{（High Frequency）} \end{cases}$$

Weight Map