



# Classification & Regression Loss

$$\mathcal{L}_{\text{Focal}}(p, y) = -\alpha_t(1 - p_t)^{\gamma} \log(p_t)$$

Objectness

$$\mathcal{L}_{\text{Focal}} = -\sum_{c=1}^C \alpha_c(1 - p_c)^{\gamma} y_c \log(p_c)$$

Multi class

$$\mathcal{L}_{\text{Smooth } L_1}(x, y) = \begin{cases} 0.5(x - y)^2, & \text{if } |x - y| < 1 \\ |x - y| - 0.5, & \text{otherwise} \end{cases}$$

Regression