Combining MLLSC with ASL loss function

MLLSC can be easily integrated into different types of multi-label loss functions. Here we provide the resulting loss function for MLLSC + ASL (Ridnik et al., 2021). ASL is an asymmetric multi-label loss which weights positive and negative labels differently (see Eq.4 in the main paper). We define MLLSC combined with ASL as

\[
\begin{align*}
L^+_k & = \mathbbm{1}(p_k > \tau) (1 - P'_{k,m})^{\gamma_+} \log(P'_{k,m}) + (1 - \mathbbm{1}(p_k > \tau)) P'^{\gamma_-}_{k,m} \log(1 - P'_{k,m}) \\
L^-_k & = \mathbbm{1}(p_k < \tau') P'^{\gamma_-}_{k,m} \log(1 - P'_{k,m}) + (1 - \mathbbm{1}(p_k < \tau')) (1 - P'_{k,m})^{\gamma_+} \log(P'_{k,m})
\end{align*}
\]  

(1)

where \(\gamma_+\) and \(\gamma_-\) are the focus parameters for positive and negative labels, and \(P'_{k,m} = \max(p_k - m, 0)\) is the marginal probability with tunable hyper-parameter \(m\). Besides, \(\mathbbm{1}(\cdot)\) is an indicator function. We set \(\gamma_- = 4, \gamma_+ = 2\) and \(m = 1\) according to the default values in (Ridnik et al., 2021).

References


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