Supplementary Material

Anonymous ECCV submission
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1 Derivatives

The relaxed objective is:

$$\begin{aligned}\min_{\tilde{y},\tilde{z}} \quad & \sum_{i=1}^{n}\sum_{j=1}^{m} I_{ij}(T_{ij} - \frac{1}{2} - \frac{\tilde{y_i}^T\tilde{z_j}}{2C})^2 \\ +\alpha \sum_{i,j=1}^{n} (\frac{1}{2} + \frac{\tilde{y_i}^T\tilde{y_j}}{2C} - S_{ij})^2 & + \beta \sum_{i,j=1}^{m} (\frac{1}{2} + \frac{\tilde{z_i}^T\tilde{z_j}}{2C} - \frac{T_i^T T_j}{m})^2 \\ & +\gamma(\|\sum_{i=1}^{n}\tilde{y_i}\|^2 + \|\sum_{j=1}^{m}\tilde{z_j}\|^2) \\ s.t. \quad & \tilde{y_i}, \tilde{z_j} \in [-1,1]^{C\times 1}\end{aligned} \tag{1}$$

By taking the partial derivative of Eqn.1 with respect to $\tilde{z_j}$, we can obtain:

$$\begin{aligned}\partial\frac{Eqn.1}{\tilde{z_j}} &= -\frac{1}{C}\sum_{i} I_{ij}(T_{ij} - \frac{1}{2} - \frac{\tilde{y_i}^T\tilde{z_j}}{2C})\tilde{y_i} \\ &+\frac{\beta}{C}\sum_{i}(\frac{1}{2} + \frac{\tilde{z_i}^T\tilde{z_j}}{2C} - \frac{T_i^T T_j}{m})\tilde{z_i} + 2\gamma\sum_{j'}\tilde{z_{j'}}\end{aligned} \tag{2}$$

By taking the partial derivative of Eqn.1 with respect to y_i, we can obtain:

$$\begin{aligned}\partial\frac{Eqn.1}{\tilde{y_i}} &= -\frac{1}{C}\sum_{j} I_{ij}(T_{ij} - \frac{1}{2} - \frac{\tilde{y_i}^T\tilde{z_j}}{2C})\tilde{z_j} \\ &+\frac{\alpha}{C}\sum_{j}(\frac{1}{2} + \frac{\tilde{y_i}^T\tilde{y_j}}{2C} - S_{ij})\tilde{y_j} + 2\gamma\sum_{i'}\tilde{y_{i'}}\end{aligned} \tag{3}$$

LBFGS method is employed with these derivatives to solve for the optimal $\tilde{y}$ and $\tilde{z}$. Note that both S_{ij} and $\frac{T_i^T T_j}{m}$ can be pre-calculated and fixed during the iterations.

2 More Experimental Results

We further show the precision and recall curves of different methods. We use average precision (AP) and average recall (AR) as the evaluation metrics. The performance results are given in Fig.1. From these comparison results, we find that the precision usually declines with the increasing of the number of returned tags, while the recall usually improves. This is called precision-recall tradeoff which is also observed in TMC.

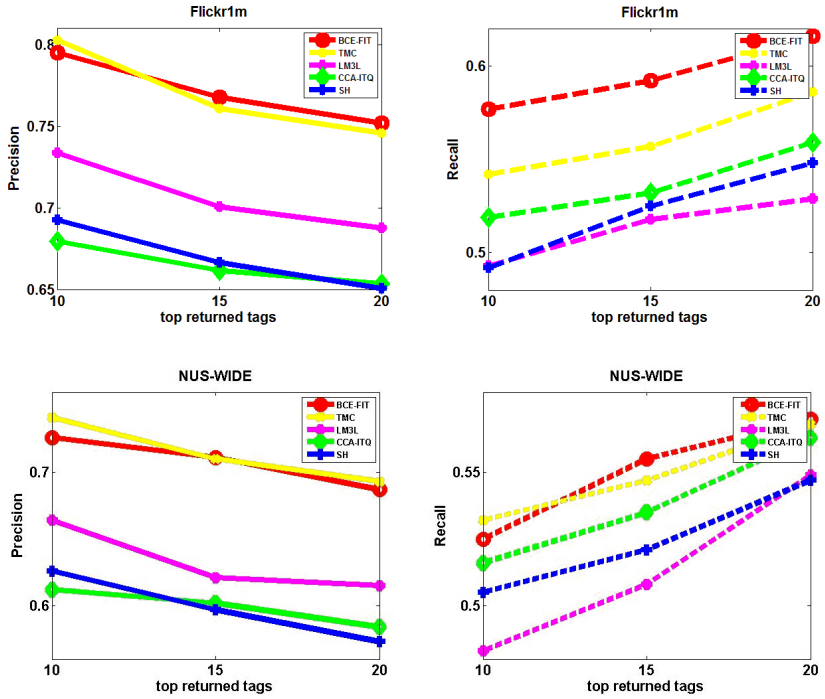

Fig. 1. Precision and Recall curves of different methods. The length of hashing code is fixed to be 32 for all hashing methods.