RESEARCH REPORT

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RESEARCH CONTENTS-HASHING

Database

Features

x1	x2	x3	…	xN
0.1	0.85	0.66	…	0.59
0.5	1.1	0.27	…	0.21
1.2	0.3	0.39	…	0.52
0.9	0.32	0.41	…	1.17

Hash Functions

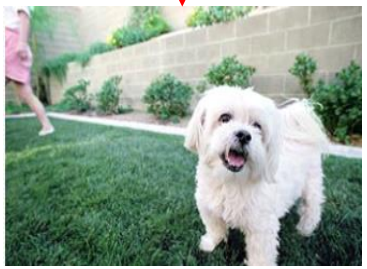
Database Binary Code

Query Image

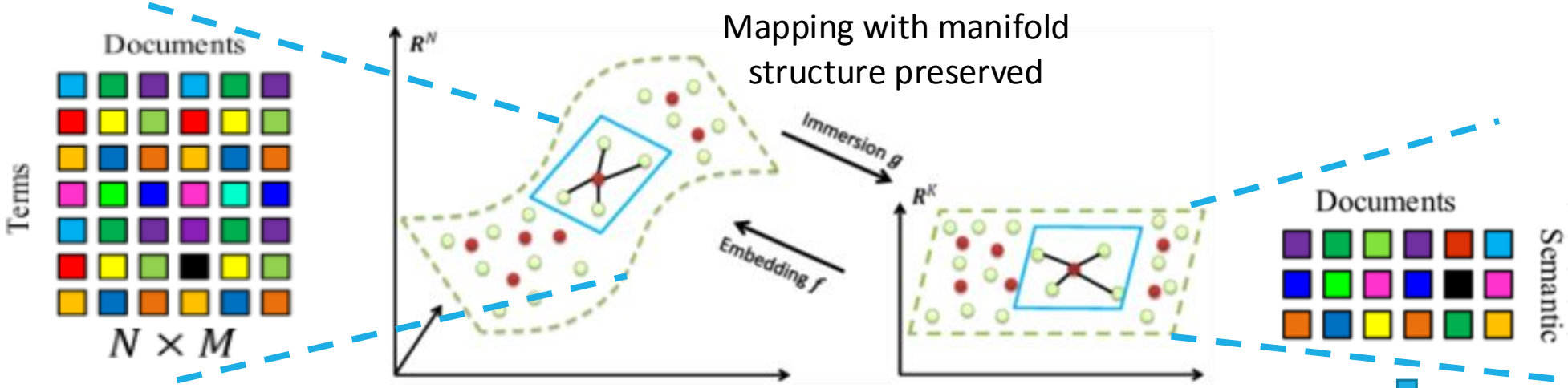
0.78	1.5	0.59	…	0.81

0011

Query Binary Code



PROGRESS & TECHNOLOGIES-HASHING



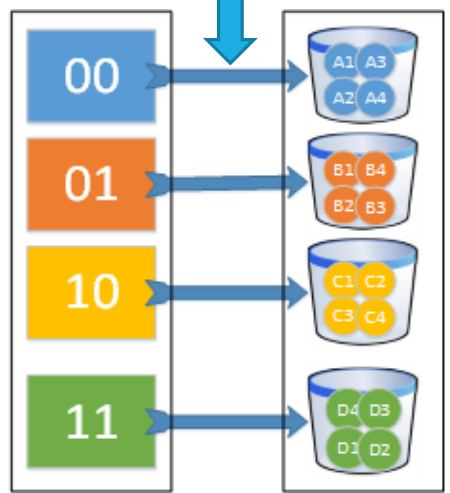
$$\mathcal{O} = Tr\left((\mathbf{X}-\mathbf{BY})(\mathbf{X}-\mathbf{BY})^T\right) + \alpha Tr(\mathbf{BB}^T) + \beta Tr(\mathbf{YLY}^T) + 2\lambda\|\mathbf{Y}\|_1$$

0	1	0	0	1	0
1	1	1	1	0	0
0	0	1	0	1	1

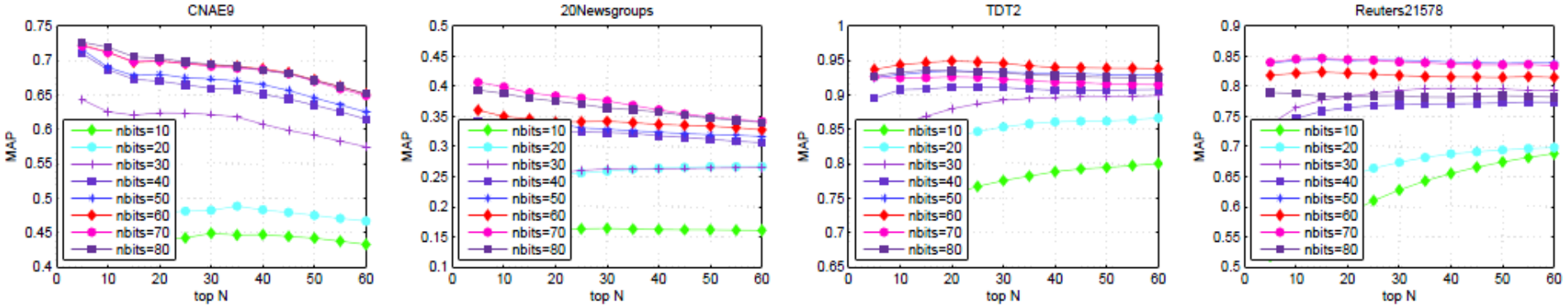
$$b_{ik} \leftarrow b_{ik}\frac{(\mathbf{XY}^T)_{ik}}{(\mathbf{BYY}^T+\alpha\mathbf{B})_{ik}}$$

$$y_{kj} \leftarrow y_{kj}\frac{(\mathbf{B}^T\mathbf{X}+\beta\mathbf{YW})_{kj}}{(\mathbf{B}^T\mathbf{BY}+\beta\mathbf{YD})_{kj}+\lambda}$$

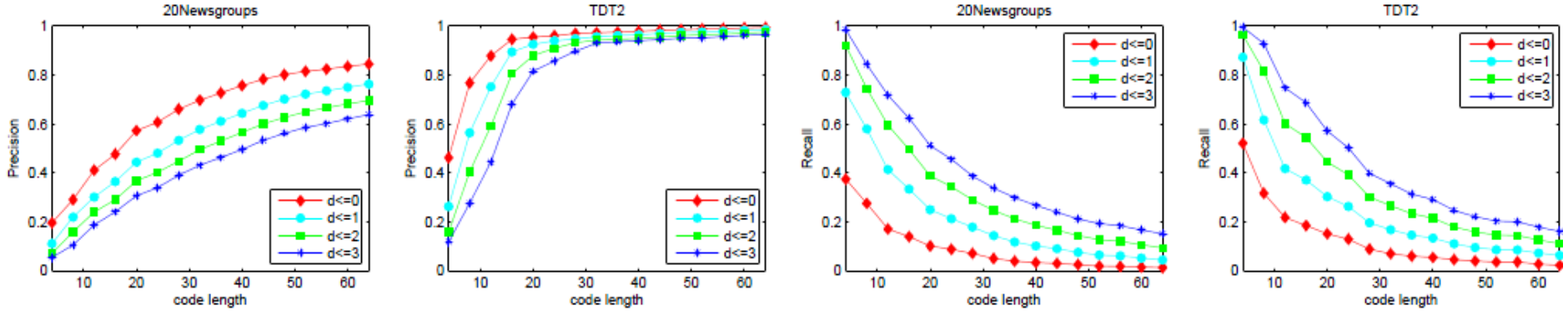
Mean Value Based Binarization



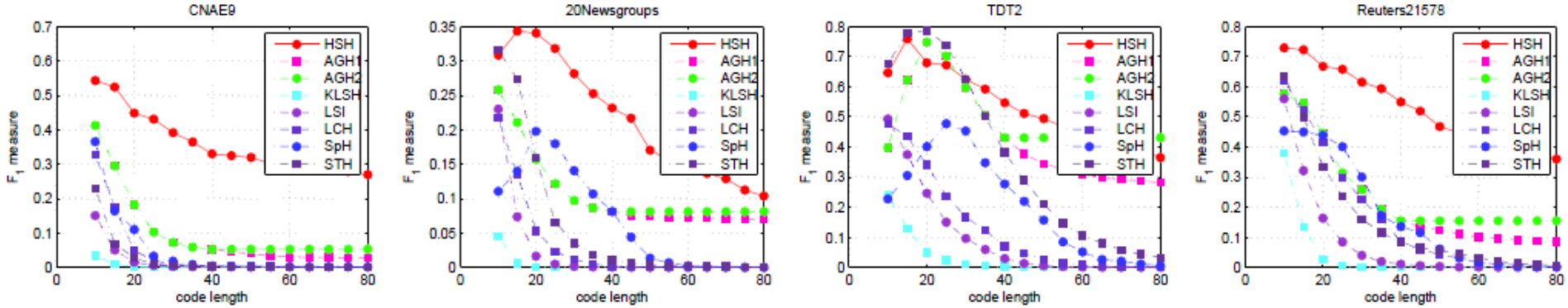
RESEARCH RESULTS-HASHING



Code Length

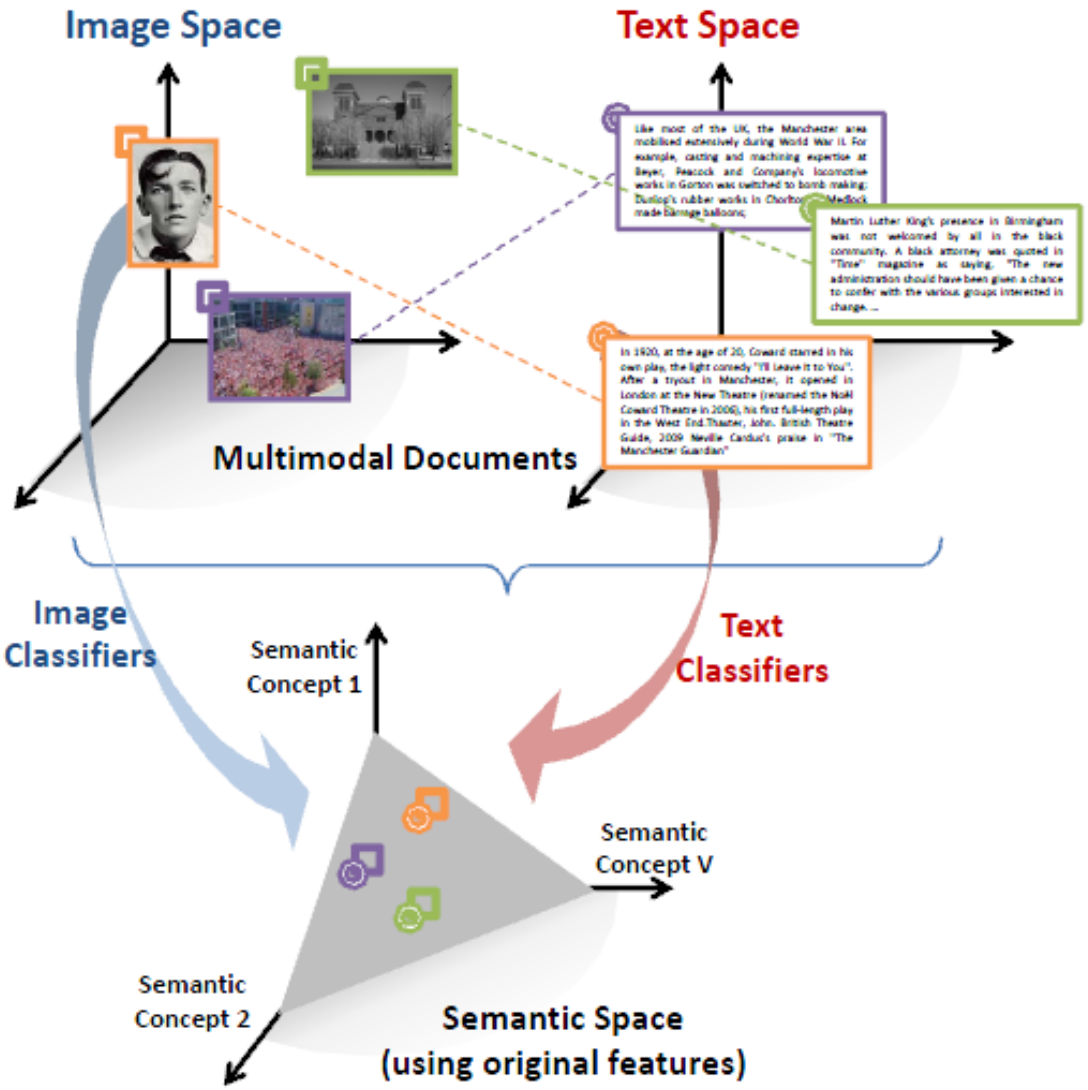


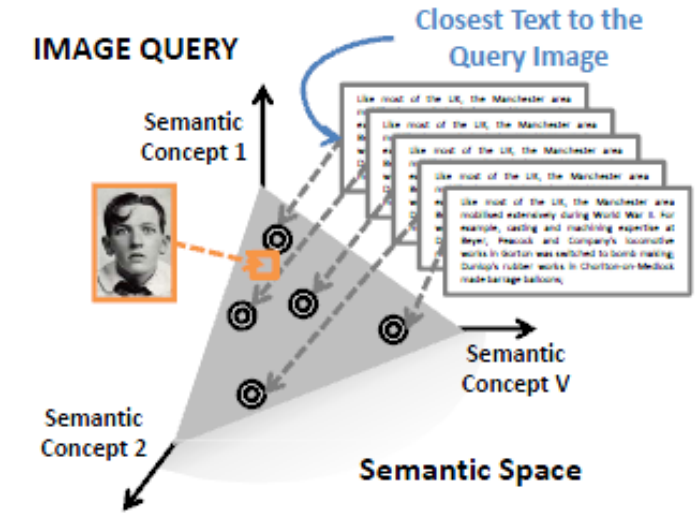
Hamming Radius

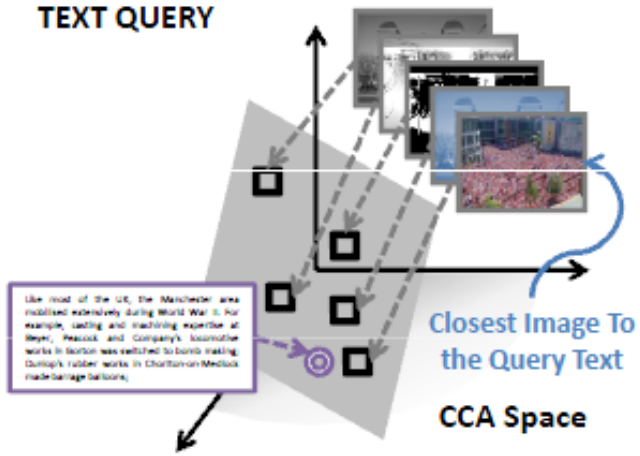


Comparison

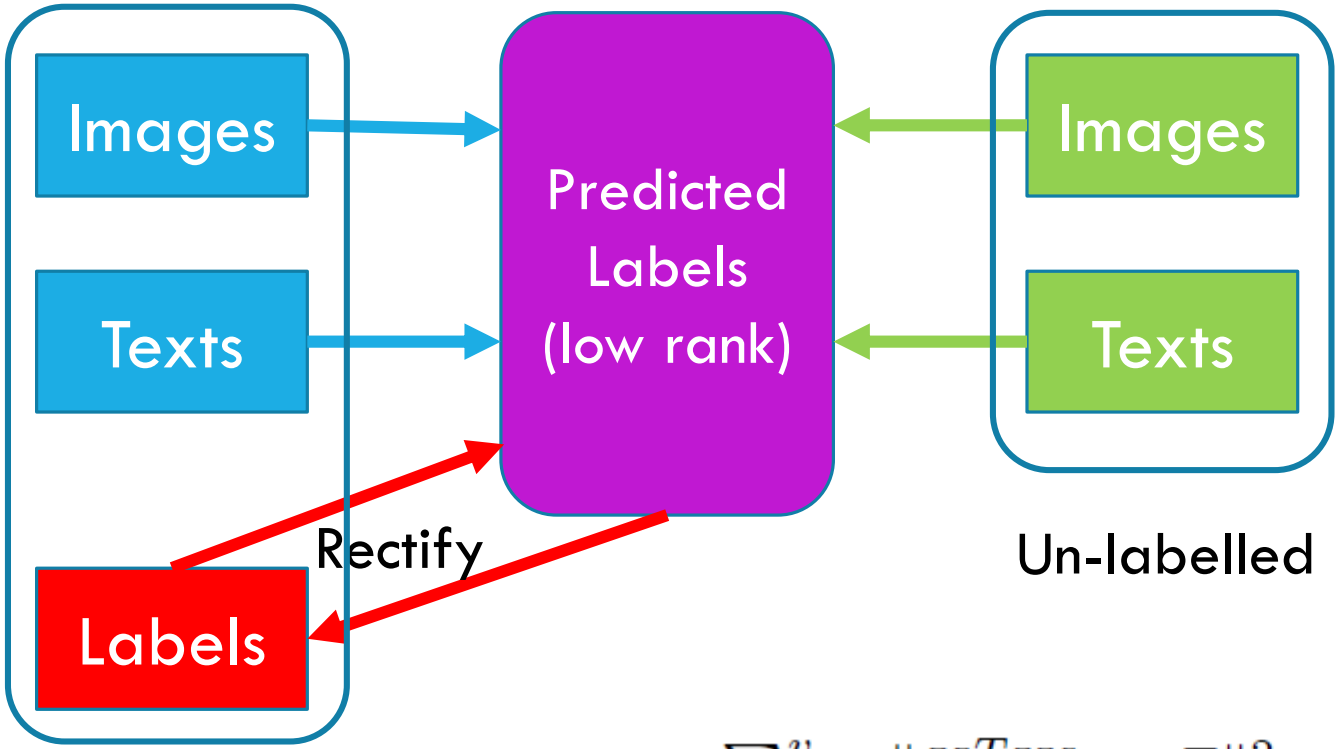
RESEARCH CONTENTS-CROSS MODAL LEARNING

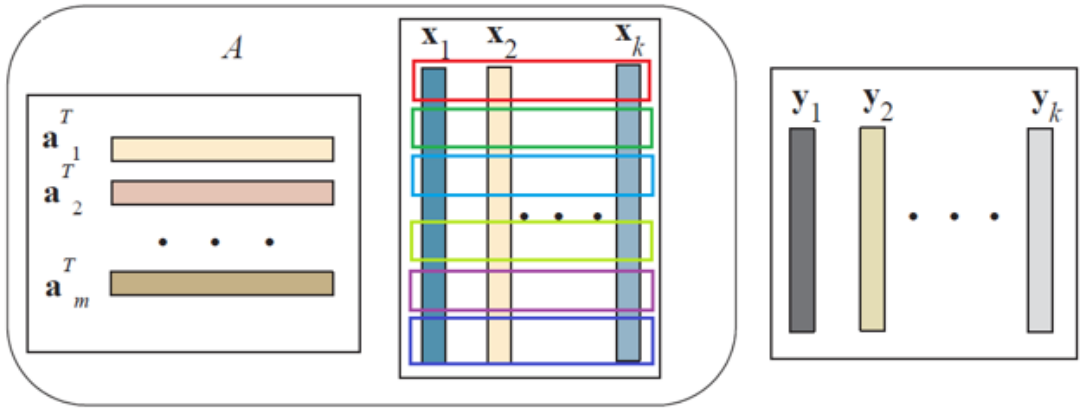






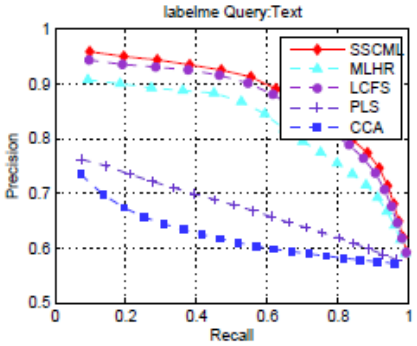
PROGRESS & TECHNOLOGIES-CROSS MODAL LEARNING



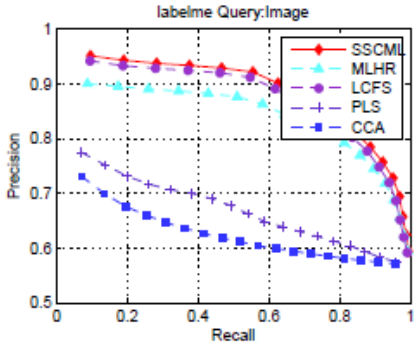


$$\min_{W_g,F} \sum_{g=1}^{v} \|X_g^T W_g - F\|_F^2 + 2\lambda \sum_{g=1}^{v} \|W_g\|_{21}$$
$$+\mu Rank([X_1^T W_1, X_2^T W_2, \cdots, X_v^T W_v])$$
$$+Tr[(F-Y)^T U (F-Y)]$$

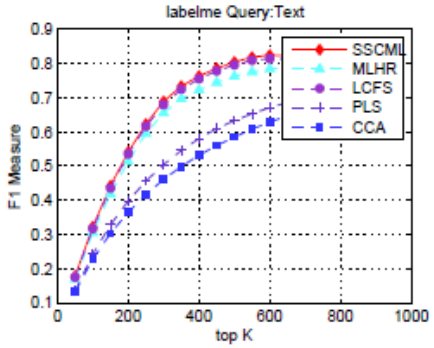
RESEARCH RESULTS-CROSS MODAL LEARNING



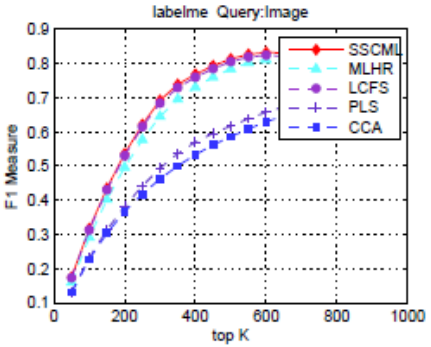
(a)



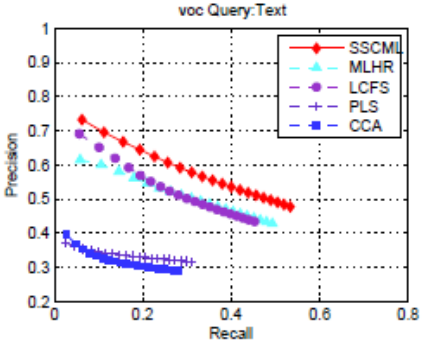
(b)



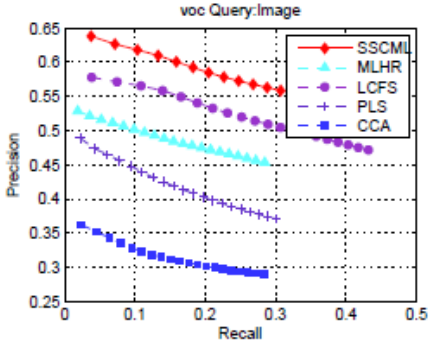
(c)



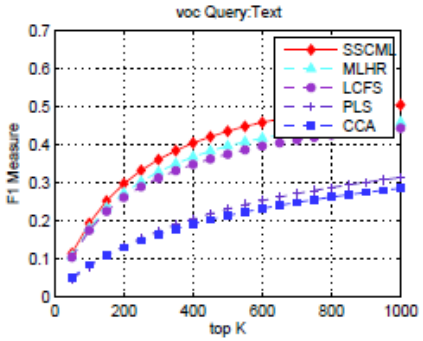
(d)



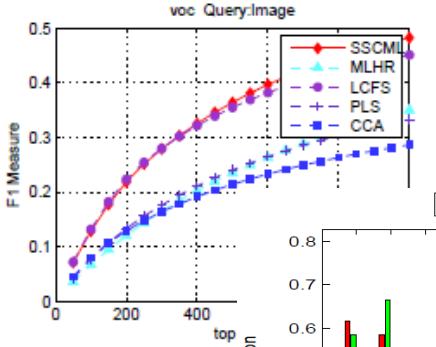
(e)



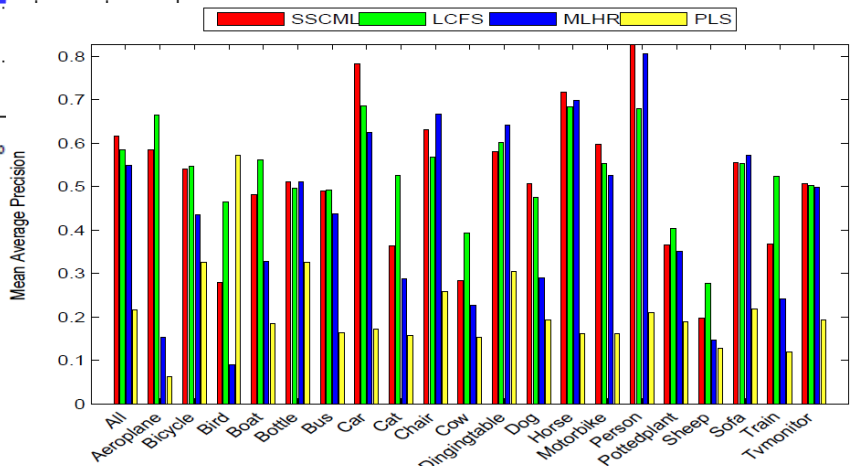
(f)



(g)



(h)



GRADUATION THESIS-THOUGHT

1. Data from different modalities in a web page have relations to each other.
   But, how can we obtain their association on semantic level?
   Co-occurrence? NO! Content-based analysis? Yes!
2. Generally, the amount of un-labelled data are more that of labelled data.
   Ignore the un-labelled data(supervised)? No! Discard the labels(unsupervised) No!
   Can we use both of them for learning? Semi-supervised learning!
3. There are huge amounts of data on the Internet.
   Can we find a way to accelerate the retrieval?
   Hashing(content based)? Yes! Distributed processing? Yes!
   Combination of hashing and distribution? Yes!

Why not explore the fast retrieval between data from different modalities?

GRADUATION THESIS-OUTLINES

① Semi-supervised cross modal learning

② Content-based hashing in the common space

③ Distributed retrieval with ranking