A Review on Association Rules Mining for Image Retrieval using Multimodal Fusion Method

Sonal W.Thakare
Student, CSIT Department
SanmatiEngg.College, Washim

Sapna R.Tayde
Guide
SanmatiEngg. College, Washim

ABSTRACT
The search based on the text query is to be performed firstly in image re-ranking. Then it returned list of images is according to the visual features similarity reordered. The proposed retrieving method in this paper uses the fusion of the images multimodal information i.e. textual and visual which is a current trend in image retrieval researches. For this association rule mining techniques is used. To improve the retrieval accuracy of content-based image retrieval systems, in proposed system has tries to focus on designing sophisticated low-level feature extraction algorithms to narrowing the 'semantic gap' between the visual features and the richness of human semantics. Proposed worked trying to increased the image retrieval performance by fusing i.e. textual and visual features for retrieving and to reduced the semantic gap problem .The obtained results show that the proposed method achieved the best precision score among different query categories. A Multimodal Fusion method based on Association Rules mining (MFAR) is presented in this paper. It is assume as a late fusion and it uses two different data mining techniques for retrieving images: clustering and association rules mining (ARM) algorithm. In this method there are two main phases: offline and online phase. In the offline phase, The Semantic Association Rules is used to identified the relations among the clusters different modalities in the offline phase. At online phase (retrieving phase) uses the generated ARM, to retrieve the related images of search query.

Keywords
Multimodal fusion, clustering, ARM algorithm**.**

1. INTRODUCTION
Now a days, most Web based images search engines depends on textual metadata. For finding visual content (e.g., images, videos, etc) from World-Wide Web search engines are the most powerful resources .When user enter web based image for search it produces a lot of garbage in the results. Because of client usually enter that metadata i.e. Data about data manually which is not sufficient, expensive and it is difficult to capture every word that describes the image. On the other hand, to filter images based on their visual contents the Content Based Image Retrieval (CBIR) systems is used that can be derived from the image itself which may provide more indexing and return accurate result. At the same time, for the extraction of these visual features contents by the computer which is different from the image contents that client understand. It requires the translation of high-level user observation into low-level image features. Semantic gap problem is the main drawback so, the CBIR systems are not widely used for retrieving Web images. A lot of efforts have been made to bridge this gap by using different techniques. In[2], the authors identified the major categories of the state of the art techniques in narrowing down the semantic gap one of them is fusing the retrieval results of multimodal features. Fusion for image retrieval (IR) is considered as a novel area with very little achievements in the early days of research [3].The purpose system of image mining techniques is discovering meaningful correlations and formulations from previously collected image data. The paper presents the semantic gap problem and enhance the retrieval performance by fusing the two basic modalities like textual and visual features for retrieving of Web images. A Multimodal Fusion method based on Association Rules mining (MFAR) is presented in this paper. It is assume as a late fusion and there are two different data mining retrieving techniques : clustering and association rules mining (ARM) algorithm. In this method there are two main phases: online and offline phase. In the offline phase, to find the relation among the cluster of different modalities the Semantic Association Rules is used. At online phase (retrieving phase) uses the generated ARM, to retrieve the related images of search query.

2. LITERATURE REVIEW
In literature, Raniah A. AlghamdiMouniraTaileb ―A New Multimodal Fusion Method Based on Association Rules Mining for Image Retrieval it combines two different data mining techniques to retrieve semantically related images: clustering and association rules mining algorithm. The association rules mining is constructed at the offline phase where the association rules are discovered between the text semantic clusters and the visual clusters of the images to use it later at the online phase. The experiment was conducted on much more images from Wikipedia collection. The experiment was compared to an online image retrieving system and to the proposed system but without using association rules [1] . The information retrieval community found the power of fusing multiple information sources on the retrieving performance [4]. H.Muller[5],describes that, information fusion has the potential of improving retrieval performance by relying on the assumption that the heterogeneity of multiple information sources allows cross correction of some of the errors, leading to better results. There is a huge amount of research work fusing on the searching ,retrieval and re-ranking of images in the image database. On the basic of available information in a certain field, different levels of fusion may be defined. In literature, different levels of the retrieving process in image retrieval systems such as early fusion, late fusion, trans-media fusion and re-ranking are used in the fusion of the image visual and textual features.

M.Ferecatu describes[6] the concept of Early fusion could be used without feature weighting; they concatenate the normalized feature spaces of the visual and the textual features. On the other side, in order to provide more weight for specific features the feature weighting was used in different works. In [7] and [8],proposed method is part of Image CLEF 2006 and 2007 respectively, they used the

maximum entropy framework to train a logistic model, which can be used to calculate a score for a query/database image pair.

In the late fusion method, the extracted features of each modality are classified using the appropriate classifier then each classifier provides the decision. Late fusion was used widely in image retrieval systems and there is diversity in the proposed methods. In [9], a Web application called MM Retrieval is proposed. The score normalization and combination are the two components used in this Fusion process .

In Trans-media fusion method, the main idea is to use first one of the modalities (say image) to gather relevant documents (nearest neighbors from a visual point of view) and then to use the dual modalities (text representations of the visually nearest neighbors) to perform the final retrieval. J.Ah-Pine proposed methods[10] based on adopted relevance feedback or pseudo-relevance feedback techniques.

An image Re-ranking is another level of method which is used for fusing the visual and textual modalities. In this method the search is first base on the text query. The next step returned list of images is reordered according to the visual features similarity. R.He,N.Xiong proposed a method used to construct a semantic relation between text (words) and visual clusters using the ARM algorithm. The authors proposed a Multi-Modal Semantic Association Rules (MMSAR) algorithm to fuse keywords and visual features automatically for Web image retrieval in [11]

The proposed method in [1] is a Multimodal Fusion method based on Association Rules mining (MFAR). It is considered as a late fusion method and it uses two different data mining techniques for retrieving images: clustering and association rules mining (ARM) algorithm. ARM is a data mining technique which is useful for finding interesting relationships hidden in large databases.

3. PROPOSED WORK

The proposed method used association rules mining algorithm for Web image retrieval system to construct a semantic relations between images clusters based on the visual features and the images clusters based on textual features for the same dataset. MFAR method consists of two main phases: online phase and offline phase.

3.1 Offline phase

In the offline phase, the input are images dataset which contains two modalities i.e. The images and their associated text. Firstly the clustering algorithm are apply to extract the visual and textual features. Then to identify the relation between the cluster from modality to create the ARs the modified association algorithm is used.(As shown in fig.1)

In the offline phase there are three operation are performed.

3.1.1 Features Extraction

In the proposed system, use a set of generic MPEG-7 descriptor. To balance the color and the edge of the image the features are get selected. After the process of extracting the visual features. For each visual feature the image of data set are represented as object. The several linguistic preprocessing are need to perform for the textual features like tokenization, removing stop word and stemming.

3.1.2 Clustering

An efficient clustering method which is need for the large quantity of images and the high dimensionality of descriptor used for the visual features. The high dimensional index technique called NOHIS (Non Overlapping Hierarchical Index Structure) [12] is used in the system.

3.1.3 Association rules mining algorithm of clusters

To determine the items set I and the transaction dataset T used the ARM algorithm. The transaction database T is need tobe constructed to the ARM algorithm over it.

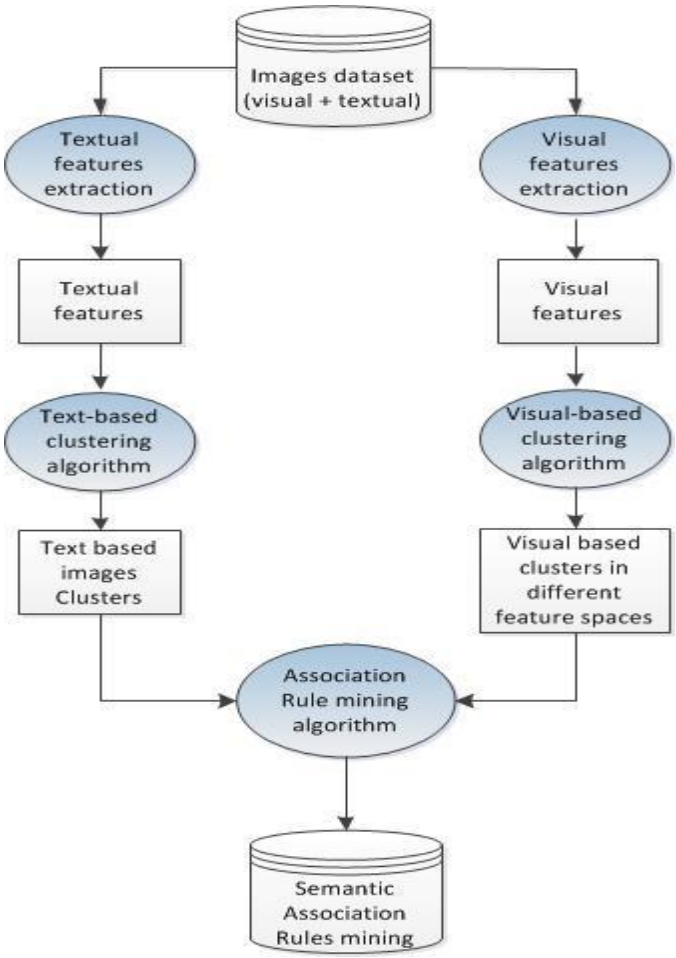

Fig. 1. The offline phase of the proposed fusion method

3.2 Online phase

In the online phase ,actually retrieving phase to retrieve the related images of the query. For retrieving images there are four process take place. Such as Query modalities and processing,

Search and retrieve the related visual clusters, Retrieve ARs with similar visual clusters and Get images of the text clusters, normalize scores, fuse them and reorder the list

4. CONCLUSION

Multimodal fusion method proposed in this paper, this method is trying to narrow the semantic gab problem by using association rules mining algorithm in Web image (i.e. textual and visual)retrieval system to construct a semantic relations between images clusters based on the visual features and the images clusters based on textual features for the same dataset. After constructing the ARs in the offline phase, the retrieving

process should starts with example image query in the online phase. so by using this proposed method improve accuracy and seed of the system.

5. REFERENCES

[1] Raniah A. Alghamdi, MouniraTaileb, Mohammad Ameen, Faculty of Computing and Information Technology, King Abdulaziz University, Saudi Arabia – Jeddah, ―A New Multimodal Fusion Method Based on Association Rules Mining for Image Retrieval‖, 17th IEEE Mediterranean Electrotechnical Conference, Beirut, Lebanon, 13-16 April 2014

[2] Y. Liu, D. Zhanga, G. Lua, and W-Y.Ma , "A survey of content-based image retrieval with high-level semantics", Pattern Recognition, Vol. 40, No. 1. (2007), pp. 262-282.

[3] R. Datta, D. Joshi, J. LI, and J. Z. Wang, "Image retrieval: Ideas,influences, and trends of the new age", ACM Computing Surveys (CSUR), April 2008, 40(2):1-60.

[4] S. Wu and S. McClean, "Performance prediction of data fusion for information retrieval".Information Processing, Management, 2006. 42(4): p. 899-915.

[5] H. Müller, P. Clough, Th. Deselaers, B. Caputo, ImageCLEF(ser. The Springer International Series on Information Retrieval), vol. 32, pp.95 -114, 2010, Springer-Verlag.

[6] M.Ferecatu and H. Sahbi, "TELECOM ParisTechatImageClefphoto 2008: Bi–modal text and image retrieval with diversity enhancement". In: Working Notes of CLEF 2008, Aarhus, Denmark.

[7] T. Deselaers, T. Weyand, and H. Ney, "Image retrieval and annotation using maximum entropy", in Evaluation of Multilingual and Multi modal Information Retrieval, 2007, pp. 725-734.

[8] T. Gass, T. Weyand, T. Deselaers, and H. Ney. "FIRE in ImageCLEF 2007: Support vector machines and logistic models to fuse image descriptors for photo retrieval". In: CLEF 2007 Proceedings. Lecture Notes in Computer Science (LNCS), 2007,vol 5152. Springer, pp 492–499.

[9] K.Zagoris,A.Arampatzis,S.A.Chatzichristofis,www.MM Retrieval.net: a multimodal search engine", Proceedings of the Third International Conference on Similarity Search and Applications, 2010, Turkey.

[10] J. Ah-Pine, M. Bressan, S. Clinchant, G. Csurka,, Y. Hoppenot,and J. Renders. "Crossing textual and visua content in different application scenarios", Multimedia Tools and Applications, 42(1):31–56, 2009.

[11] R. He, N. Xiong, L. Yang, J. Park, "Using multi-modal semantic association rules to fuse keywords and visual features automatically for web image retrieval". In: International conference on information fusion. 2011.

[12] M. Taileb, S. Lamrous and S. Touati, "Non OverlappingHierarchical Index Struture", International Journal of Computer Science, vol. 3 no. 1, pp. 29-35, 2008.