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Implementation of an Efficient Mechanism for Improving Web Image Search based on User Intention.

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Abstract-In this paper we implemented a novel web Image search method, which will overcome the drawbacks of text based retrieval system and some of the drawbacks of content based image retrieval system. In this system we have captured the user intention and then system retrieves those images which are intended to user and even we have implemented a detection of duplicate and repeated images function. The main drawback of content based retrieval is though the system forms a cluster of images according to similarity function but its result set contains bunch of duplicate images so we have focused on to overcome this drawback and to detect duplication of images and avoid them so that user can get quality image retrieval and also user can be satisfied with results. In this system we combined the information of text based query as well as visual information of image. In this system we have maintained database of Images which are categorised by some predefined properties of system like image id, image type, image category, image colour etc. Database has been defined manually by defining all above mentioned properties to each image. User only has to click once on result retrieved system and he has to select one image as a query image to system so that its intention can be captured. There are total 5 methods, initially image searching is done by doing text based search on search engine then query image get selected by user. Next step, query image is categorised, database is formed. Next similarity will check and according to similarity function of query image and dataset, re-ranking of images will be done. Next To identify the duplicate images in dataset and also identify repeated images in certain amount, neglect them and return to user intended result. This method provides the user satisfactory output images and user doesn't need to put extra effort. Our approach significantly improves the quality retrieval of top re–ranked images and related user interest.

Index Terms-image search, visual property, text keyword, visual expansion, image re-ranking.

INTRODUCTION

Nowadays content based search is used everywhere to obtain bunch of relevant image over a text based search. Image searching is the process of finding and obtaining relevant images based on user query on internet. Content based image retrieval combines text information and visual image similarity [06]. There are various visual features are used like DWave, HoG, Gist, Sift [1] to categorize images. Relevance feedback is widely used to identify similarity of images and forms cluster of them. To check the image similarity a lot of images are taken in dataset and performs some manual evaluation where the relevant images are paired. But because of huge amount of web images are on internet database [7], so to define unique set of attribute is challenging task. To combine visual features and text query information has following common steps to get re-ranked top intended images **[8]**. Those are 1) user enters a text keyword and based on that set of images are returned by search engines. 2) Out of the retrieved images, some images are set as query image by manual process or by automatic predefined steps in system.3) re-ranking model is used to check the similarity between query image and images in database to return accurate result.

We have used text based search as initial step just to obtain images from popular search engine and the user is required to select query input from set of images. A database has been maintained at server side manually by using some predefined set of properties like image id, image type, name, colour behaviour etc. For example consider the following image

Fig1. Uploading Image

Now suppose, image id=123, image name=desert.jpg, image colour =brown, image behaviour= nature, image type=.jpg, category = nature. These are some values which are taken at the time of uploading the images in dataset. We also have used detection of duplicate images function so that user will get relevant images and quality image retrieval can be done.

At first there is admin login form for developer/admin, admin will authenticate the access. Next there is upload image form, where we have uploaded every single image by giving input of some asked properties of image. Then the user from comes, in this form images are searched by two ways by entering input for search query and image category. And based on given keyword and image category relevant images are retrieved from system. Then user has to select query image so its intention can be captured and the set of relevant images are retrieved from system.

In re-ranking approach, we have done re-ranking of images by searching query keyword from dataset images and we have then applied detection of duplication algorithm to

avoid it. K-means algorithm is used for finding similarities from images and maintained dataset

The plan of remaining section is as follows. Section 2 is background gives the idea of existing system and explains the architecture of system. Section 3 explains the representation of methods and algorithms used in proposed system. Section 4 shows the experimental work of proposed system with evaluation results. Section 5 concludes the paper.

2. BACKGROUND

There are popular web search engines are like Google search engine or Bing search engine uses text and visual information method to retrieve relevant images from database. User has to type text query on Bing search engine and based on that result user gets relevant images. But there is one drawback that all retrieved images are not relevant to text query .this is the output of Bing search engine when we entered query apple as a fruit. Still we get irrelevant set of images. Also the retrieved images contain repeated images in result as shown below.

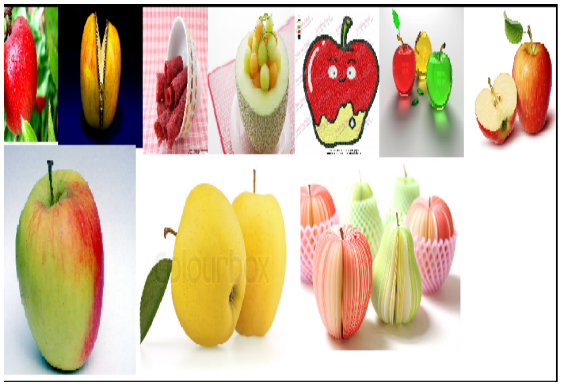


Fig 2 shows the query apple of images and showing duplication.

There is one more drawback of text based search is at the time of typing the query user should have knowledge of it, If he doesn't have knowledge of particular search or how to type query in words, so the results can be unsatisfactory. Have a look of following example, there is famous character Barney Stinson in the Hollywood serial ,so now if user is not aware of his name or if user want to search famous quotes said by barney ,so still user gets the unsatisfactory images ,containing combination of barney's quotes and some irrelevant quotes.

Fig.3 shows the relevant and irrelevant images of Barney Stinson and its quote search.

Google or Bing search engines also provides a suggestion text to help user to type intended query but this method also sometimes diverse the user mind from intended to unintended search.

3. METHODOLOGY

In proposed system, we have implemented 5 Methods. 1) Image Search, 2) Query Categorization, 3) Visual Query Expansion, 4) Images Retrieved by Expanded Keywords, 5) Removing Duplications.

3.1 *Image search*

Content-based image retrieval uses visual features to evaluate image similarity. One of the major challenges of content-based image retrieval is to learn the visual similarities which will reflect the semantic relevance of images. Image similarities can be learned from a large training set where the relevance of pairs of images is checked.

3.2 *Query Categorization*

In this method, image similarity is defined. Query image has assigned set of category and according to theses category training image set also categorised to store in database. The query categories we consider are: General Object, Object with Simple Background, Scenery Images, Portrait, and People. At initial stage we use 500 manually labelled images, 10 for each category, to train a C4.5 decision tree for query categorization. The features we used for query categorization are: existence of faces, the number of faces in the image, the percentage of the image frame taken up by the face region, the coordinate of the face centre relative to the centre of the image.

3.3 *Visual query expansion*

In this method, the goal of visual query expansion is to obtain multiple positive example images to learn a visual similarity metric which is more robust and more specific to the query image. E.g. The query keyword is "Paris" and the query image is an image of "Eiffel tower". The image re-ranking result based on visual similarities without visual expansion. And there are many irrelevant images among the top-ranked images. This is because the visual similarity metric learned from one query example image is not robust enough. By adding more positive examples to learn a more robust similarity metric, such irrelevant images can be filtered out. In a traditional way, adding additional positive examples was typically done through relevance feedback, which required more users' labelling burden. We aim at developing an image re-ranking method which only requires one-click on the query image and thus positive examples have to be obtained automatically. So in visual query expansion images of Eiffel tower are retrieved by text keyword plus all the suggestive images will be added to expand the image pool.

3.4 *Images Retrieved by Expanded Keywords*

In this method, considering efficiency, image search engines, such as Bing image search, only re-rank the top *N* images of the text-based image search result. If the query keywords do not capture the user's search intention accurately, there are only a small number of relevant images with the same semantic meanings as the query image in the image pool. Visual query expansion and combining it with the query specific visual similarity metric can further improve the performance of image re-ranking.

3.5 Removing Duplication

In this method, we have removed the duplicate image entries. While searching relevant images there are some

numbers of images with similar pixel values and features so we are searching with category for exact result. We are also detecting the repeated images by calculating their pixel size and removing repetitive images.

4. EXPERIMENTAL WORK

1) At first we are providing admin login form, where admin will authenticate the system. And he will handle all the database and control.
2) Next step is to form dataset. Admin will use upload image form to input each single image in database.

Here in this step, database is being created by categorizing each image .and then image get uploaded in database.

3) At user side user has to type text query, and then he can get relevant or similar but distinct set of images.

E.g suppose user want to get images of "saniya nehwal " and he has written text query ="saniya" only, so he would get following output.

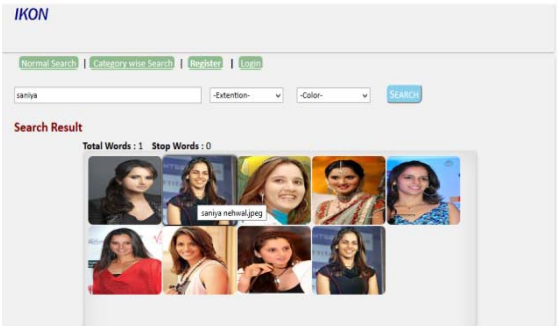


Fig 4. User image search form

4) Images shown by system are relevant to the query but still system can't recognise user intention exactly so next step is –user has to select one image out of result and next output will be relevant set of images only.

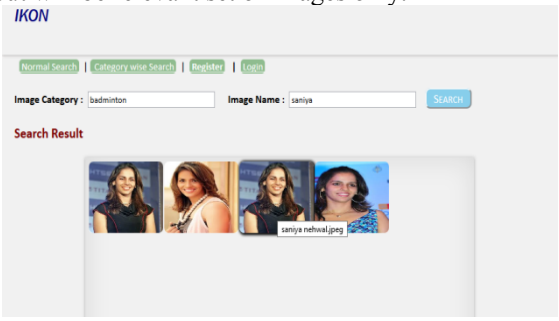


Fig 5. Intended output shown by system

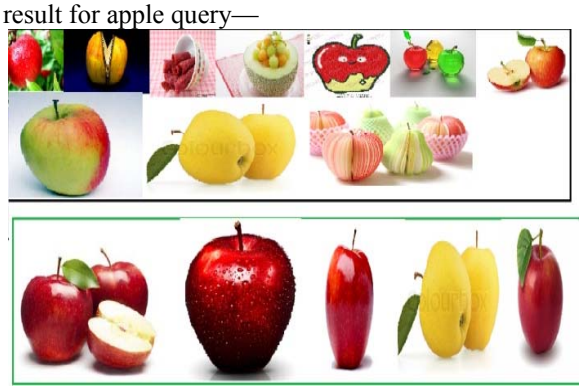
4.1 Evaluation work

In the first experiment, we have taken image set of 500 images. All images are manually labelled by using 2nd form of proposed system as uploading images. For example, for query apple, the categories are 'fruit', 'apple logo', 'apple tree'. Images are stored in database by image category type, because the semantic meanings of images are closely related to user intention. System is running of and without code optimization system running of Pentium IV 2.4 GHz CPU, secondary memory 80 GB and RAM is 512 MB. Accurately and showing results in few seconds, this is computed time for each single query given to system.

Following diagrams shows the results of few queries on Google search and implemented system.

Above result is of Google search and below part is of our system.

1st result for apple query—



2rd result for Mona Lisa paintings---

5. CONCLUSION

In this paper, we have combined text based feature with visual image feature to retrieve quality images from internet search. Our proposed system has been implemented as shown in experimental work section. Our system will overcome the drawbacks of existing system by generating quality and exact match result of user intention and the additional function stops retrieving duplicate images and also the repeated images are detected and avoided by system in output. So user will be getting final output as plain, intended images.

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