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"WEB IMAGE SEARCH RE-RANKING WITH CLICK-BASED SIMILARITY AND TYPICALITY'S"

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Abstract: - In image search re-ranking, besides the well-known semantic gap, intent gap, which is the gap between the representation of users query/demand and the real intent of the users, is becoming a major problem restricting the development of image retrieval. To reduce human effects, in this project, we use image click-through data, which can be viewed as the implicit feedback from users, to help overcome the intention gap, and further improve the image search performance. Generally, the hypothe- sisvisually similar images should be close in a ranking listand the strategyimages with higher relevance should be ranked higher than others are widely accepted. To obtain satisfying search results, thus, image similarity and the level of relevance typ- icality are determinate factors correspondingly. However, when measuring image similarity and typicality, conventional re-ranking approaches only consider visual information and initial ranks of images, while overlooking the influence of click- through data. This project presents a novel re-ranking approach, named spectral clustering re-ranking with click-based similarity and typicality. First, to learn an appropriate similarity measurement, we propose click-based multi-feature similarity learning algorithm, which conducts metric learning based on click-based triplets se- lection, and integrates multiple features into a unified similarity space via multiple kernel learning. Then, based on the learnt click-based image similarity measure, we conduct spectral clustering to group visually and semantically similar images into same clusters, and get the final re-rank list by calculating click-based clusters typ- icality and within clusters click-based image typicality in descending order. Our experiments conducted on two real-world query-image data sets with diverse repre- sentative queries show that our proposed re-ranking approach can significantly im- prove initial search results, and outperform several existing re-ranking approaches.

Keywords:- **Click-based multi-feature similarity learning (CMSL), Spectral clustering reranking with click-based similarity and typicality (SCCST), Supported vector machine (SVM) classifier**

INTRODUCTION

Hundreds of thousands of images are uploaded to the internet with the ex- plosive growth of online social media and the popularity of capture devices, thus, building a satisfying image retrieval system is the key to improve user search expe- rience. Due to the success of information retrieval, most commercial search engines employ text-based search techniques for image search by using associated textual information, such as file name, surrounding text, URL, etc.. Even though text-based search techniques have achieved great success in document retrieval, text informa- tion is often noisy and even unavailable. In order to improve search performance, image search re-ranking, which adjusts the initial ranking orders by mining visual content or leveraging some auxiliary knowledge, is proposed, and has been the fo- cus of attention in both academia and industry in recent years. Most of the existing re-ranking methods utilize the visual information in an unsupervised and passive manner to overcome the "semantic gap" (the gap between the low-level features and high-level semantics). Although multiple visual modalities have been used to further mine useful visual information, they can only achieve limited performance improve- ments. This is because these re-ranking approaches neglect the "intent gap" (the gap between the representation of users query/demand and the real intent of the users).

Objective

The proposed system will helps us in getting relevant images as per intention of user. In our model, the unnecessary data retrieval is strictly avoided with the help of image re-ranking framework. Main objective of our system is that we have reduced searching time and increased search efficiency as well as accuracy.

LITERATURE SURVEY

1.Deepak B. Waghchaure, K. N. Shedge, "A Survey Paper on To Retrieve the Relevant Images according to Re-Ranking of Images with Click based Similarity and Typicality", International Journal of Science and Research (IJSR), 2016.

Searching performance can be improved with image re-ranking. Search engines provide the results according to top ranked set of images. The result set is processed and rearranged by using some specific features. Search engines like Google and Bing uses this concept of re-ranking. In these search engines initially textual query is processed and then pool of images are re- trieved for the text query. A query image is selected from the pool and accord- ing to visual features of the query image, the pool of images are re-ranked. To get semantic signatures, the visual features are projected with semantic space specified by query keyword. Proposed approach enhances matching efficiency of query specific semantic signatures. Similarities of visual features do not well correlate with image semantics. The visual features of images are projected into their related semantic spaces to get semantic signatures. At the online stage, images are reranked by comparing their semantic signatures ob- tained from the semantic space specified by the query keyword. Thus proposed image re-ranking framework using query specific semantic signature improves both the accuracy and the efficiency of retrieval. A semantic signature is a list associated with an administered metadata object. [1]

2.Ms. Arpita S. Baheti, Dr. Sujata N. Kale, Dr. Vilas M .Thakare, "Study and Analysis of Web Image Search Re-Ranking", International Journal of Electronics, Electrical and Computational System, 2017.

The Image re-ranking is one of the effective methods for improving the web image search. The search engines are mostly based on text and con- strained as the user search by keyword which results into uncertainty among images. Due to which noisy or irrelevant images may be present in the re- trieved results. The purpose of image search re-ranking is to reorder retrieved elements to get optimal rank list. Image re-ranking is useful for recovering the performance of a text-based image search. However, existing re-ranking algorithms are limited for two main reasons: 1) the textual meta-data related with images is often mismatched with their actual visual content and 2) the extracted visual features do not correctly explain the semantic similarities be- tween images. The proposed method system is efficient; also the time com- plexities of the algorithms are using is better than existing systems. So it will help us to get most relevant images in image search process. [2]

3.Mayuri Kawalkar, Gangotri Nathaney, "Re-ranking with Click-Base Sim- ilarity and Typicality using Spectral Clustering", International Advanced Research Journal in Science, Engineering and Technology, 2017.

Application on World Wide Web and internet is increasing exponen- tially. A huge amount of database is added every minute so there is need for effective and efficient image searching. In order to improve image search performance image re-ranking system are proposed, but now days there some problem arises like semantic gap, intent gap which restrict development in im- age retrieval. This paper present a novel re-ranking approach name spectral clustering re-ranking with clicked base similarity and typicality. We use im- age click through data as implicit feedback from user and help to overcome intention gap. Proposed system contains saliencing technique. Saliency re- gion contain more important information in the image. So less time require for searching. Our re-ranking approach can significantly improve search re- sults, and outperform several existing re-ranking approaches. [3]

4.Suhasni S., Ramkumar M. O., "Image Re-Ranking for Web Search", In- ternational Journal of Computer Science and Mobile Computing, 2015.

Modern search engines has adopted Image re-ranking for an efficient

web based image search. A group of images has been saved based on their contextual information and each image has given a specific keyword. By giv- ing a query keyword from the pool, the rest of the images are being re-ranked based on their similarities. So a framework is proposed using semantic signa- tures. The framework that consists of semantic spaces for different keywords in offline. [4]

5.Mayuri H. Kawalkar, Prof. Gangotri Nathaney, "Web Based Image Search- ing and Reranking Using Saliencing Techniques", International Journal of Innovative Research in Computer and Communication Engineering, 2017.

The main aspect of the proposed system is use image click-through data, which can be viewed as the implicit feedback from users, to overcome the in- tention gap, and further improve the image search performance.

The proposed system presents a novel re-ranking approach, named spectral clustering re- ranking with click-based similarity and typicality using saliencing technique. The saliencing technique can be used to estimate foreground and background region according to saliency distribution. To achieve an appropriate similarity measurement, we propose click-based multi-feature similarity learning algo- rithm. It conducts metric learning and integrates multiple features into a uni- fied similarity space via multiple kernel learning. Then based on the learnt click-based image similarity measure, we conduct spectral clustering to group visually and semantically similar images into same clusters, and get the final rerank list by calculating click-based clusters typicality and within- clusters click-based image typicality in descending order.. Our experimentimproves the initial search result. [5]

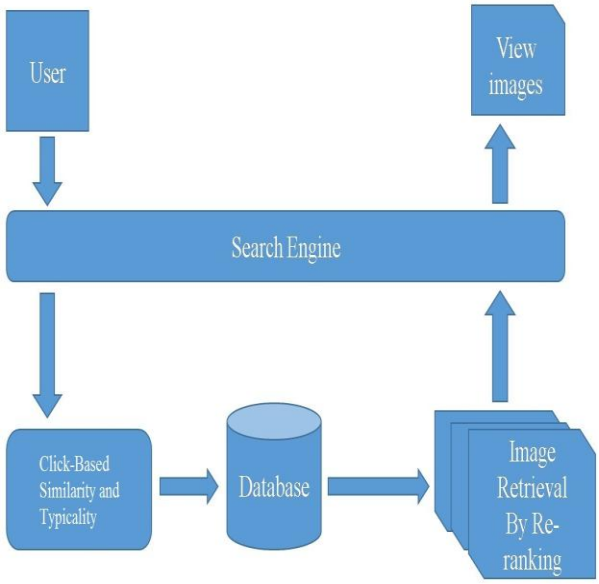
6.Ms. Anjali Barde, Prof. K. V. Warkar, "Image Search Reranking with click based similarity using Color Features Algorithm", International Jour- nal on Recent and Innovation Trends in Computing and Communication, 2017.

In image search re-ranking, besides the well-known semantic gap, in- tent gap, which is the gap between the representation of users query/demand

and the real intent of the users, is becoming a major problem restricting the development of image retrieval. To reduce human effects, in this paper, we use image click-through data, which can be viewed as the implicit feedback from users, to help overcome the intention gap, and further improve the im- age search performance. Generally, the hypothesis visually similar images should be close in a ranking list and the strategy images with higher relevance should be ranked higher than others are widely accepted. To obtain satisfying search results, thus, image similarity and the level of relevance typicality are determinate factors correspondingly. Then, based on the learn click-based im- age similarity measure, we conduct spectral clustering to group visually and semantically similar images into same clusters, and get the final re-rank list by calculating click-based clusters typicality and within clusters click-based image typicality in descending order. Our experiments conducted on two real- world query-image data sets with diverse representative queries show that our proposed re-ranking approach can significantly improve initial search results, and outperform several existing re-ranking approaches. [6]

7.Jingyu Cui, Fang Wen, Xiaoou Tang, "Real Time Google and Live Image Search Re-ranking", Vancouver, British Columbia, Canada, ACM 2008.

Nowadays, web-scale image search engines (e.g. Google Image Search, Microsoft Live Image Search) rely almost purely on surrounding text features. This leads to ambiguous and noisy results. We propose to use adaptive vi- sual similarity to re-rank the textbased search results. A query image is first categorized into one of several predefined intention categories, and a specific similarity measure is used inside each category to combine image features for re-ranking based on the query image. Extensive experiments demonstrate that using this algorithm to filter output of Google Image Search and Microsoft Live Image Search is a practical and effective way to dramatically improve the user experience. A real time image search engine is developed for on-line image search with re-ranking. [7]



SYSTEM ARCHITECTURE

Figure 1: System Architecture

The system architecture is as shown in fig. in which user enters search query keyword, then web search engine searches the different images based on click-based similarity and typicality normally assigned to that image while uploading image.

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Then it extract the multiple images from the huge database using visual semantic signatures and then re-ranks images based on the visual similarities of the images. The extracted images are then displayed into semantic space allocated for them.

EXPERIMENTATION

MATHEMATICAL MODEL

Set theory:

Let, W= E, V

Where,

W= Set representing edges and vertices E= Represents set of input parameters

V= Represents functions to be performed of E

E= I1,I2,I3,RC,IR,VF1,VF2,SI,PI

Where,

I1= Input as dataset for offline processing I1= I11, I12, ... I1j

I2= Input as Keyword I3= Input as Image

RC= Set of reference classes RC= RC1, RC2, ... RCn

IR= Mapping of dataset images and RC IR= IR1,IR2, ... IRn

IR1= IR11,IR12, ... IR1m IR2= IR21,IR22, ... IR2m IRn= IRn1,IRn2, ... IRnm)

VF1= Visual features of dataset images VF2= Visual features of Query image PI= Pool of images as a result of F5

V= F1,F2,F3,F4,F5,F6,F7

Where,

F1= Function for reference class (RC) formation from the input dataset I1 having j images

F2= Mapping of reference classes and images and generate set IR F3= Visual Feature Extraction i.e. VF1

F4= P1,P2

P1= Select query image and extract visual faetures

P2= Perform online training if result is not available in database

F5= Comparison features of query image and features of images in database F6= To process I3

F7= Generate final reranked output

ALGORITHMS

Algorithms can perform calculation, data processing and automated reasoning tasks. An algorithm is an effective method that can be expressed within a finite amount of space and time and in a well-defined formal language for calculating a function. Starting from an initial state and initial input (perhaps empty), the instructions describe a computation that, when executed, proceeds through a finite number of well-defined successive states, eventually producing "output" and terminating at a final ending state. The transition from one state to the next is not necessarily deterministic.

Algorithm 1 Spectral Clustering Re-Ranking With Click-Based Similarity and Typicality

Input:

For a given query q, top n initial ranked list with click information $\mathcal{X} = \{x_i | c_i \geq 0, i = 1, 2, ..., n\}$ and m different visual modalities.

1: Select clicked-clicked pairs $\mathcal{J} \triangleq \{(i,j) |\ 0 \leq c_i - c_j \leq \delta\}$:
2: **if** $|\mathcal{J}| > \tau$ **then**
3: Sort click-click pairs based on $(c_i - c_j)$ in an ascending order, and choose the top τ pairs.
4: **end if**
5: Select click-based triplets $\mathcal{S}$ based on the updated $\mathcal{J}$: $\mathcal{S} \triangleq \{(i,j,k) |\ (c_i - c_j) \in \mathcal{J}, c_k = 0\}$.
6: Assign basic kernel $K^p (p = 1, 2, .., m)$ to each feature.
7: Conduct click-based multi-feature similarity learning algorithm following Eqn. (6).
8: Execute spectral clustering based on the learnt W^p, and obtain v clusters (v is the number of clusters previously assigned).
9: Calculate click-based cluster typicality $CT(u)$ $(u = 1, 2, ..., v)$, and sort clusters based on $CT(u)$ in descending order.
10: Calculate click-based local typicality within each cluster $CT(x_j^i | u^i)$ $(1 \leq j \leq |u^i|)$, and sort images based on $CT(x_j^i | u^i)$ in descending order.

Output:

Re-ranked list for query q

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PERFORMANCE ANALYSIS

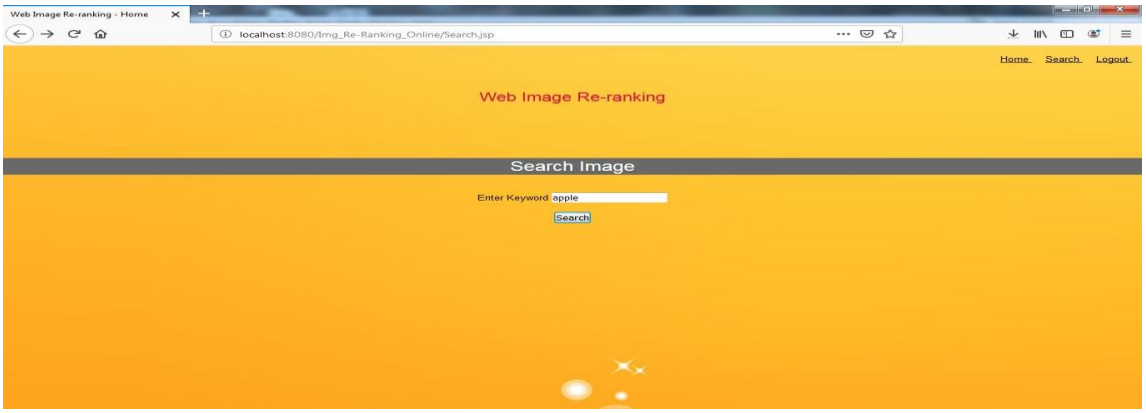

Figure 2: Search Image Enter Keyword

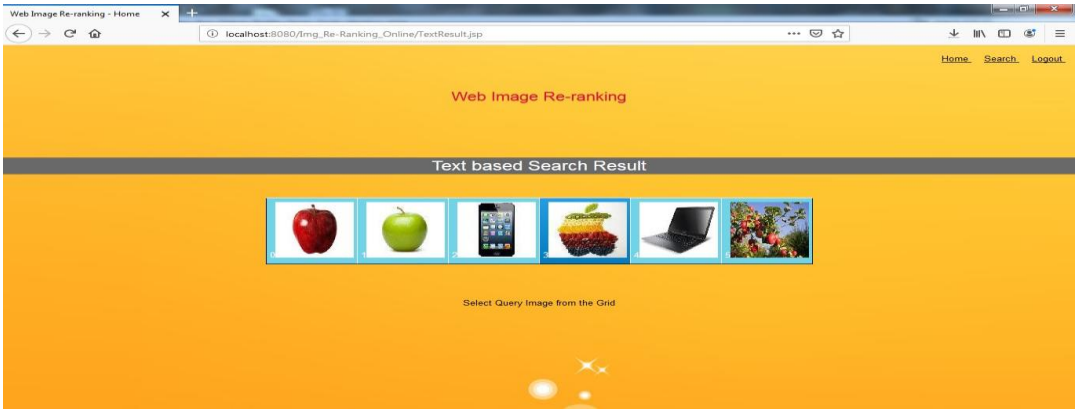

Figure 3: Text based search result- select query image from the grid

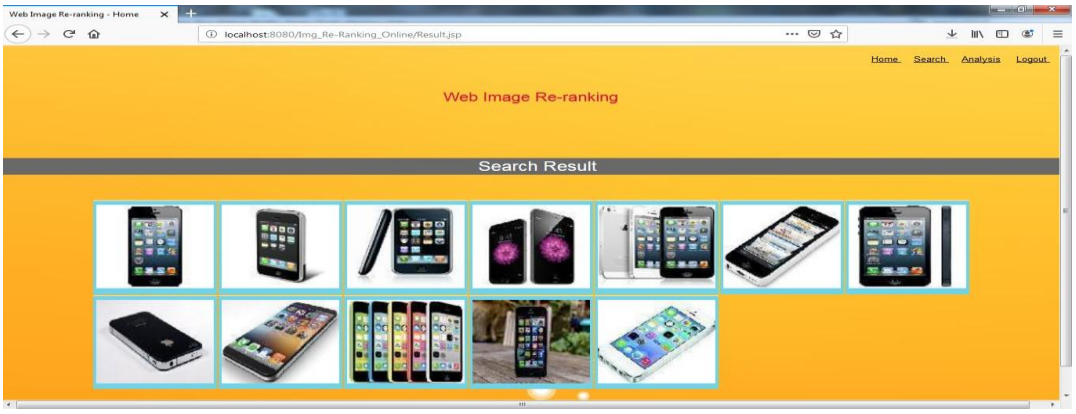

Figure 4: Search result

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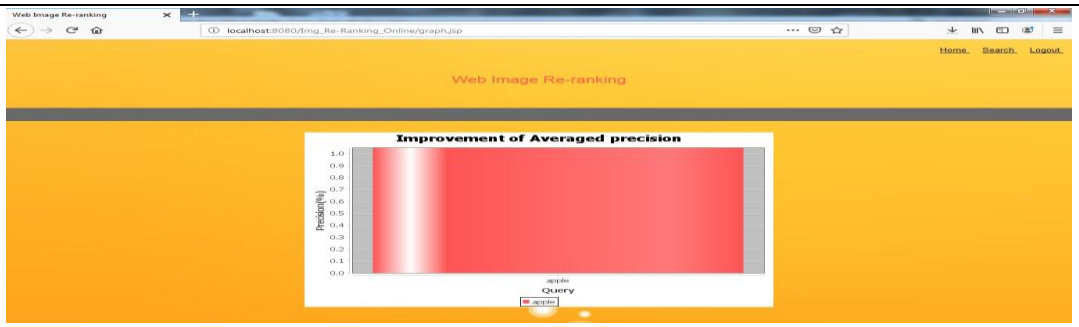

Figure 5: Improvement of average precision

Figure 6: Add image and keyword

Figure 7: Image re-ranking - offline stage - (Add image, View image, Remove image, Search image

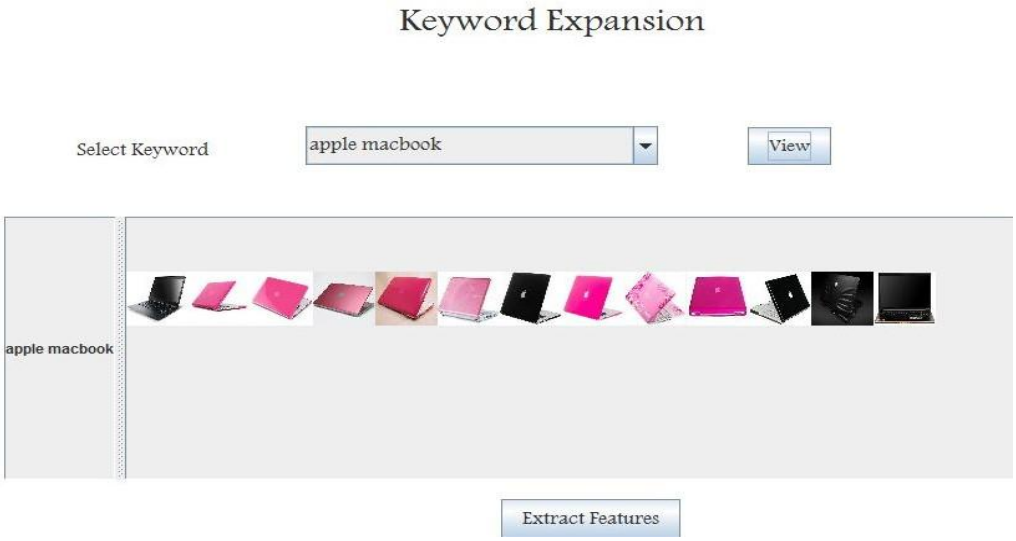

Figure 8: Keyword expansion - select keyword, view, extract features

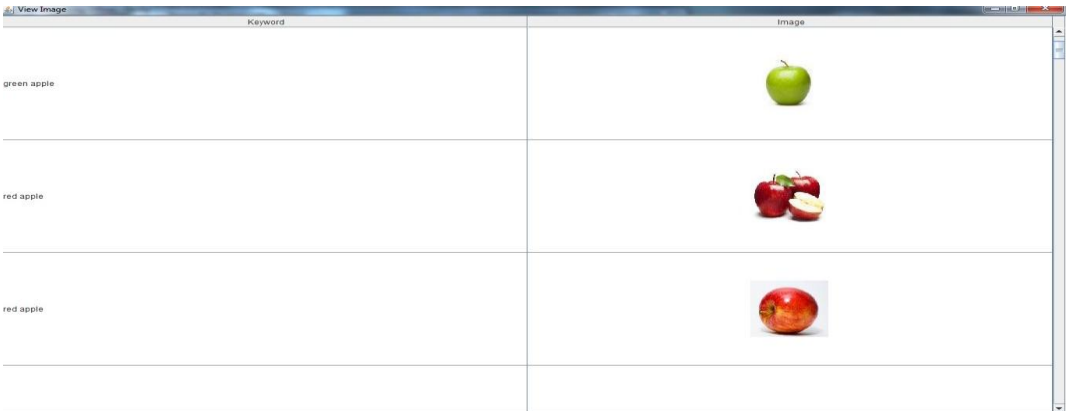

Figure 9: View keyword and image

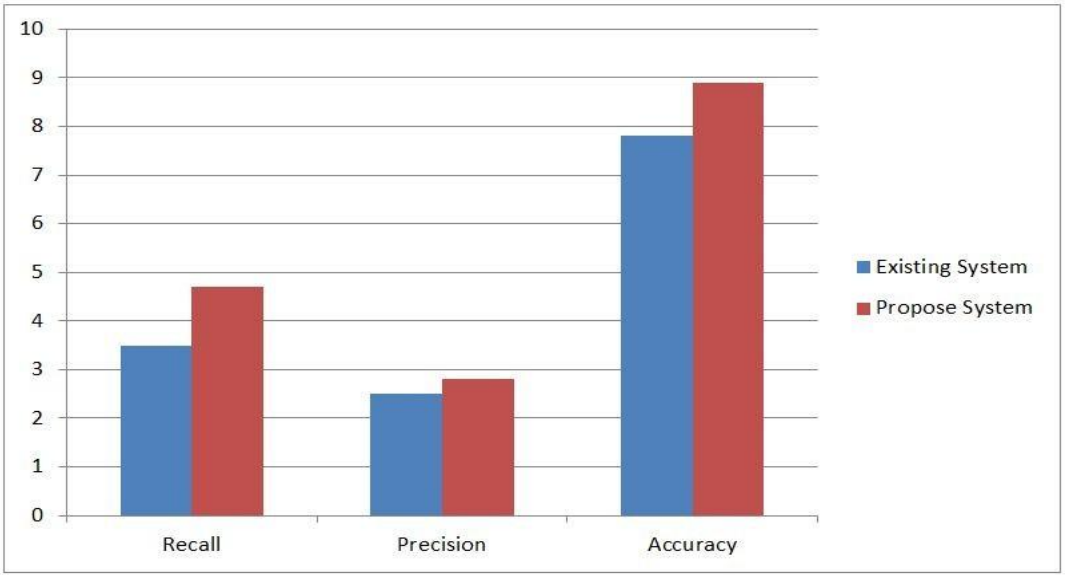

Figure 10: Comparison of Existing System and Propose System

CONCLUSION

In this project, we have studied the issue of leveraging click-through data to re- duce the intent gap of image search. We propose a novel image search re-ranking ap- proach, named spectral clustering re-ranking with click-based similarity and typical- ity (SCCST). In this proposed re-ranking scheme, click information is fully adopted to guide the image similarity learning and image typicality learning. With the de- tection of click-based triplets, we present a novel image similarity measurement, named click-based multi-feature similarity learning (CMSL), which integrates mul- tiple kernel learning into metric learning to learn similarity measure for each feature in a unified space. Based on the learnt similarity measure, SCCST performs spectral clustering to group visually and semantically similar images into same clusters. The final re-rank list is obtained by calculating clusters typicality and within-clusters image typicality in descending order. Experiments conducted in this project have demonstrated the availability and superiority of our proposed SCCST compared with several existing re-ranking approaches. Metric adaptive fusion weights are not con- sidered in SCCST and CMSL due to the optimization difficulty, and we will figure this out in our future work.

ADVANTAGES

The proposed system will helps us in getting relevant images as per intention of user. In our model, the unnecessary data retrieval is strictly avoided with the
help of image re-ranking framework. Main advantage of our system is that we have reduced searching time and increased search efficiency as well as accuracy.

APPLICATIONS

1.Medical Diagnosis: This approach helps in medical diagnosis so that we can extract images of various MRI results with efficiency and accuracy.

2.Military: To retrieve images of military persons in heroic poses which will be a huge inspiration to young generation. Obtaining images of different military instruments from huge database is difficult task which is possible with the help of our approach.

3.Crime Prevention: This approach is effectively useful in crime prevention. To obtain and verify matching images of two persons for similarity.

4.Weather Forecasting and Remote Sensing: In weather forecasting and re- mote sensing we take a lot of images of earth from satellite, so for retrieval and re-ranking of these images, our approach can be used effectively.

5.Management of Earth Resources: Huge database is available which is hav- ing large amount of images of various earth resources. This technique can be used to retrieve required images from this database.

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3) Ms. Arpita S. Baheti, Dr. Sujata N. Kale, Dr. Vilas M .Thakare, “Study and Analysis of Web Image Search Re-Ranking”,

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4) Mayuri Kawalkar, Gangotri Nathaney, "Re-ranking with Click-Base Similarity and Typicality using Spectral Clustering", International Advanced Research Journal in Science, Engineering and Technology, 2017.
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6) Mayuri H. Kawalkar, Prof. Gangotri Nathaney, "Web Based Image Searching and Reranking Using Saliencing Techniques", International Journal of Innova- tive Research in Computer and Communication Engineering, 2017.
7) Ms. Anjali Barde, Prof. K. V. Warkar, "Image Search Reranking with click based similarity using Color Features Algorithm", International Journal on Re- cent and Innovation Trends in Computing and Communication, 2017.