Optimizing Web Image Search with Alternative Optimization Technique

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ABSTRACT
At present situation social networking portals like Facebook, Instagram, flicker largely use pictures and post them to share events and express out in clearer, faster and better manner. Social Messenger Services like hangout and similar other provide pictures and ready-made image templates to users. This presents image has become popular means of information sharing and is being used by society. Social networks and blogs could be harnessed for this rich available information and facilitate user search queries. A huge amount of research work exist starting from content based information retrieval systems to current state of the art semantic Image search Engines. Existing Systems Fail to map user Search intent with degradation in relevance. Proposed research develops an alternative optimization algorithm irrespective to time and space complexity for best relevance and mapping user search Goals. Research work has been done in two stages development flicker dataset based Image retrieval System and stage two web image Retrieval system. SIMRank has been implemented on Flicker dataset whereas cluster based image retrieval algorithm with one click feedback facilitated with annotation process is been implemented in web image retrieval. Comparative examination show that Simrank is time complex but has better relevance and identification of similar objects, whereas proposed alternative optimization has faster and better search with no limitations. Proposed System generates recommendation on user search intents. Major innovation contribution to system is development of analyzer which retrieves and generates image dataset only if image not present in dataset. Research methodology presented here is termed as alternative optimization as it does not consider memory or time complexity as enhancement factor but rather system is made better with user feedback and one click mechanism. The Research work has been tested and evaluated on dataset of 1000 images with simrank and complete web image retrieval with parameters of evaluation as time complexity and space complexity, an added evaluation of system has been done with user feedback form. Results found are very satisfactory and prove success of alternative optimization technique.

Keywords: Image Search, SIMRANK, Clustering, optimization, Alternative Optimization,

1. INTRODUCTION
Huge of Pictures are present on websites with tags comments and labels. This social networks and portals when viewed as from image information perceptive form a rich network of images and vital information. Retrieving information from such network would be useful and vital for search community but finding and retrieving information from this huge mixture of information with image and its annotations is challenging task today and problem need to be solved. The major challenge found is image annotation, word ambiguity for text input, attributes of image and similarity due to image visual signatures, with added problem due of network structure. Image can be searched with two major techniques:
[1] Text Based Search
This Technique is based on annotation with are given to image i.e keywords that are added to image filename or collateral text near it ,subtitle and tags marked by expert. This technique is also known as TBIR. System developed on this base are highly dependent on text surrounding image for retrieval.

![Text Based Image retrieval systems](image)

**Figure 2** Text Based Image retrieval systems [6]

Demerits:
1] Keyword specific approach
2] Annotation or tag generation is costlier and time consuming.
3] Irrelevant results as Tag’s with be compound and bring in ambiguity.

[2] Content based Image Retrieval (CBIR)
This technique classify image in Two categories static context and Dynamic context dependent on situation odf application.
1] Static based CBIR: Information added to image is captured and cannot change over time.
2] Dynamic CBIR information can be added to image and change over time.

![Diagram for content-based image retrieval system](image)

**Figure 3** Diagram for content-based image retrieval system
Demerits:
i] System require machine Learning.
ii] Complex and Time consuming process.

[3][Region based Image retrieval (RBIR)]
This Technique is based on content of pictures. Image segmentation in discrete regions and evaluates with objective image of comparison. RBIR system help in Image Similarity and help in better image indexing.

Demerits:
i] Time Complexity with systems is higher.
ii] Systems fail to distinguish shades in real pictures.

Fig 4: Region Based Image Based Information Retrieval

2. LITERATURE SURVEY

Literature survey has been written down in Tabular tally format with find best methodology for Web image search and retrieval. Focus of survey has been web image. The Survey provided below is extension of survey article published previously.

A hierarchical survey is been presented from 2015 to 1990’s a survey on 2 decades is been done finding issues and challenges open areas and unaddressed situations of areas left behind by other authors.

<table>
<thead>
<tr>
<th>Year</th>
<th>Author</th>
<th>Title</th>
<th>Abstract</th>
<th>Methodology</th>
<th>Merits/Demerits</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>Shamim</td>
<td>“Image re-ranking with an alternating optimization”</td>
<td>Abs: At situation’s words in query are irrelevant and to get relevant works from query is an alternative optimization. A repetitive process is been done to align correct words with images</td>
<td>Procedure: &lt;ul&gt;&lt;li&gt;Process1→Initialize a similar images to i.&lt;/li&gt;&lt;li&gt;process2→Query visual word selection for scoring.&lt;/li&gt;&lt;li&gt;dataset (oxford.Pairs) &lt;/li&gt;&lt;/ul&gt;</td>
<td>Merits/Demerits: Memory consumption and lesser cost are issues to be handled.</td>
</tr>
<tr>
<td>2014</td>
<td>Nisang</td>
<td>“Automatic Image-text alignment for large-scale web image indexing and retrieval”</td>
<td>Abs: One click feedback mechanism is used for re-ranking images in user preference of intent accounted from one click. Offline system trains on visual attributes with keyword expansion generating visual signs. Online level system work this sign reducing space to 25 attributes only and better performance.</td>
<td>Procedure: &lt;ul&gt;&lt;li&gt;Keyword-Enlargement and Mapping visual attributes to semantic space in group of semantic signs for keywords with query image choice.&lt;/li&gt;&lt;li&gt;Approach: Re-ranking&lt;/li&gt;&lt;li&gt;Reference class selection&lt;/li&gt;&lt;li&gt;Single classifier for sign. Multiple classifiers for more than two signs. &lt;/li&gt;&lt;/ul&gt;</td>
<td>Merits/Demerits:</td>
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<tr>
<td>2014</td>
<td>Ning</td>
<td>“Web Image Re-Ranking Using Query-Specific Semantic Signatures”</td>
<td>Images organized and stored in a maximum-connected terms group cluster of image are produced on visual content. Methodology is reducing uncertainty in phrases and term related to image. Significance achieved as such is high.</td>
<td>Automated image, text couple generation. Instructive image extraction. Related-text identification. Text deconstructing and break apart with ranking. Automatic duo couple arrangement. Graphs generated from network of pictures and word are generated.</td>
<td>Need better web data extraction system. Indexing reduces search time and hence needs large attention on better indexing.</td>
</tr>
<tr>
<td>2013</td>
<td>Xin</td>
<td>“Reinforce Similarity Integration In Image Rich Information Network”</td>
<td>Both link and attribute similarities are used for better image retrieval process. Image enriched network and performing the recommendation is been done with SimRank. Fusion Approach is used to find image based on content and link association.</td>
<td>HMokSimRank 2 Level algorithm. Algs1:[Link-based similarity measure]. Algs2:[Content-based measure]. IWSL achieves content and link bolstering.</td>
<td>System has not been implemented on distributed platform. Network partitioning is accountable future work.</td>
</tr>
<tr>
<td>2008</td>
<td>Wen</td>
<td>“Real time Google and live image search re-ranking”</td>
<td>Most daily use search engines rely heavily on image and text to adjacent it for information retrieval with mostly solutions text-based query is re-ranked with adaptive visual resemblance.</td>
<td>Approach learning with whichever global or local attributes mass learning.</td>
<td>Time complexity of Simrank is more and reducing this is challenge. Duplicate Image need to removed.</td>
</tr>
<tr>
<td>2010</td>
<td>Xin Jin</td>
<td>“IRIN: Image Retrieval in Image Rich Information Networks”</td>
<td>System retrieves images from rich image networks. Simrank algorithm is enhanced with MOK simrank to work for link and content-based similarity.</td>
<td>1. Mok-SimRank 2. Simlearn i. Link similarity. H. Weight-content Similarity. iii. Feature weight learning.</td>
<td>Algorithm is found to be complex and performs very slow on 4000 images.</td>
</tr>
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*Note: The table content is based on the provided text and may not reflect the exact format of the original document.*
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<td>2007</td>
<td>Rudi L.</td>
<td>“The Google Similarity Distance”</td>
<td>Finding Semantics of word and their use in genuine is very vital.</td>
<td>1. Google Distance is been castoff to compute Word similarity. 2. Proposed work is initiated to be better associated to classes of WordNet.</td>
<td>Applying this work on web domain has major challenge.</td>
</tr>
<tr>
<td>2007</td>
<td>Raswasa</td>
<td>“Bringing the gap: Query by semantic example”</td>
<td>A Query by example (QBE) and semantic retrieval (SR) hybrid approach has been castoff images are tagged with sample of dictionary pictures offered as vector. Query by example products RS which is large precise than what was formerly believable. Straightening of visual &amp; semantic performances under a joint query model.</td>
<td>1. Semantic Labeling Scheme. 2. Semantic Multinomial. 3. Similarity Function.</td>
<td>Advantage in designing retrieval systems with huge concept Classifications. multi-resolution semantic spaces.</td>
</tr>
<tr>
<td>2003</td>
<td>Greece</td>
<td>“SimRank: A Measure of Structural Context Similarity”</td>
<td>Abs: Similarity Recognition has remained a challenge in numerous requests and frequently derived. Simrank is procedure where algorithm finds object→object similarity grounded on relation they hold. Two O’s are related if they are RELATED to Same O’s. Author has presented Simrank working and finds it to be better.</td>
<td>1. Graph based Approach. 2. SIMRANK. 3. Similarity ‘S’ for object a and b.</td>
<td>Even though it is recursive. Function Time complexity for Simrank is larger.</td>
</tr>
<tr>
<td>1998</td>
<td>Huang</td>
<td>“Relevance feedback: a power tool for interactive Content-based image retrieval”</td>
<td>CBIR scheme’s have two limits high level views and low attributes with particular human insight. Presented framework setups in user search at requestings and object is hold with weight of responses RF (Relevance Feedback) is initiated to upgrade system retrieval and verified on 7,000 pictures and images.</td>
<td>1. Object model for Multimedia processing. 2. Adding RF in CBIR: Get masses of objects. 3. Find user search dispersal. 4. Attribute/subject calculate object comparison. Normalization. Weight update.</td>
<td>Various media format as audio video has to handle as image. Future scope is optimal sub weight updating strategy. Expectation Maximization (EM).</td>
</tr>
<tr>
<td>1996</td>
<td>Yong</td>
<td>“Image Retrieval: Current Techniques Promising Directions, and Open Issues”</td>
<td>Abs: Author has presented work that is survey on CBIR system with more than 100 Articles under survey. Focusing on indexing features presentation, design of system. Extending work on open challenges and research directions in Image Retrieval.</td>
<td>1. Techniques related to image Retrieval like Feature Extraction (color, shape, texture, shape, segmentation,). 2. Multi-dimensional indexing. 3. IMAGE IR techniques: randomized browsing, search by example, search by sketch, search by text (speech or keyword). 4. Image categories. 5. Systems like NETA, weedbook, MARS, photo book.</td>
<td>Higher level content and lower level visual features are open issue. Web oriented approach. Better Performance Evaluation with standard test bed. Design and Development of ‘better Architecture and multiple discipline integration is work.</td>
</tr>
</tbody>
</table>
3. PROBLEM DEFINITION

3.1 Scope of Research

Work Scope [5]: Work scope is System is remained tested for set of 4000 pictures only. Still MOK-Simrank is better approach.

Work Scope [6]: Scope is dictionary or vocabulary is need for improved consequences \[\text{wordnet Implementation is scope}\].

Work Scope [7]: Scope is incremental learning and duplicate image Removal.

Work Scope [8]: Scope is creation of rich cross picture and text dataset in for \[\text{word, image}\] disambiguation.

Work Scope [9]: Scope is focused slight cost counting both memory and computation.

Work Scope [10]: Scope is Effort on Increasing \text{dissibluation}. Computing with Product Recommendation System is Future and foremost Scope of Work.

3.2 Problem Statement

Problem Definition is been designed on KIS Principle Keep it as Simple as it can. The Research work is been carried out in 3 RW(Research Works). Design and Development of base System and further incrementing System in further works.

Research Work RW1: Development system based on Image search System based on Graph based search with SIMARNK Algorithm with Flicker dataset(Query based Search).


Research Work RW4: Development of Image Search and Retrieval system with weakly supervision.

4. PROPOSED SYSTEM

4.1 System Design
The System is been Designed in 5 Phase. Where Every Phase is been Developed and Designed in Layered Approach.

**Phase 1:** Query Examiner: Query Examiner is phase which determines if word image is present in dataset. If word is present then Query is not sent to www BING API else if not found in Dataset sent to API.

**Phase 2:** Offline System designed to process Query based Search on Flicker dataset of 1000 Images. System is designed on Tag Schema of Group Tag with IDS. SIMRANK is been Implemented in this Phase.

**Phase 3:** Online Web Model is Model which sends Query to Bing API. The Phase sends Query to Bing Sysnet. subsequent phase Processes Keyword Expansion. Image Clustering is Phase which performs Image Grouping based on search terms.

**Phase 4:** Phase developed for Wordnet Processing. A commercial Word Net is been used for Keyword Expansion.

**Phase 5:** Phase is Recommendation Phase which performs Recommendation of Search to user based on browsing and feedback input of User.

4.2 Proposed Algorithm

The Proposed Algorithm has been developed in iterative manner and The Research is been Presented in Research Work RW’s Small Efforts Towards Research Contributions.

```
1. Input: Image Information Network “IN” is been setup with Flicker Dataset At base.
2. Tag Schema and Group Schema is been Developed for System with set of 36 Group tags and Tag_id.
3. Graph_Search(); // Junk Graph is been built on Flicker dataset with 120ms/
4. Read_Graph_File(); // Simrank Algorithm is implemented for Images and Graph is read.
5. Sample_Img(); // Comparison is done for sample Image/
7. Search Query ➔ Apple.
8. Find_ksimilar(); // Find images with group id as apple and group name fruits.
9. Firstservelt();
10. Image_List<>;
```
11. DisplayServlet();

Output: List of Images.

Research Work 2 and 3

Unsupervised Algorithm

1. Input: Web (www is been Queried for Web images) Specifically BING API
3. Search Query \( \rightarrow \) java.
4. If(word.Equals(“query”))
5. Select(Query_Bing() OR Wordnet;  
6. Keyword Expansion
7. Firstservlet1();
8. Download_Allimages();
9. Cluster_k(); //Cluster are generated for Each very and intercluster generation is been done//
10. One Click();// user input is been taken for selecting cluster feedback mechanism for relevant search//
11. Restructuring Image Search();
12. Else Retrieve(Image dataset).

Output: Sorted List of Relevant Image Cluster.

Research Work 4

Weakly-Supervised

1. Input: Web (www is been Queried for Web images) Specifically BING API
3. Search Query \( \rightarrow \) java.
4. If(word.Equals(“query”))
5. Select(Query_Bing() OR Wordnet;  
6. Keyword Expansion
7. Input C= {user desired cluster value}// minimum Human effort i.e weakly supervised system//
8. Firstservlet1();
9. Download_Allimages();
10. Cluster_k(); //Cluster are generated for Each very and intercluster generation is been done//
11. One Click();// user input is been taken for selecting cluster feedback mechanism for relevant search//
12. Restructuring Image Search();

Output: Sorted List of Relevant Image Cluster.

5. Research output

The Propose Research work has been evaluated on numerous parameters and different ways to find effectiveness of solution.
6. CONCLUSION

The research work could be extended to Video Re-ranking Domain. System is been tested for Two word Query but needs to be tested for Tri-gram and N-gram. The research scope found in above survey reveals distributed Image search from various portals is better. System can be programmed for multi-threaded approach on retrieving images from various portals simultaneously.

REFERENCES
