**CHAPTER 5**

**LITERATURE REVIEW**

**Overview**

Mainly this section deliberates about the current software applications with similar implementations relevant to the both domain and technical researches of the explained difficulties in the earlier subdivisions. Here identified comparable software systems will describe about the prevailing Metadata Search Engines and Intelligent Image Content Analysing systems which have been developed and deployed with the objective of resolving corresponding issues which specified in prior chapters.

Domain research has absorbed on deliberating the extents of reviewing connected expected schemes and additional non-technical facts linked to the progress of the projected system. Technical research has absorbed on deliberating all the feasible methods and resolutions obtainable for resolving the issues conferred in the proposed system and assessment on different methods illustrated by dissimilar specialists and scholars.

**Similar Solutions**

When studying and considering towards the domain of meta data searching and intelligent image content analysing, it can be identified that there are several similar systems designed to assist people to interact with digitalization and multimedia automation**.** Main objective of this section is to classify the comparable software implementations, find technologies and practises utilized in similar systems, difficulties confronted by systems and how appropriate solutions have been provided. Moreover, author has explored on structures, functionalities, benefits and disadvantages of similar software applications.

**ADL - Alexandria Digital Library**

This intelligent image analysing and image searching software application is initially implemented by the University of California, Santa Barbara with a map browser and users can effectively search meta data and automatically analyse contents of images. Also two-dimensional maps can be paned and zoomed to locate any areas of interest, and select a query area that must contain or overlap with the database images.

Here the users are capable of select a list of images using an alphanumeric query limits for example type (aerial photos, maps, remote sensing images), and then retrieve the images overlapping with the area indicated with the map browser. Furthermore, images can be searched with texture features by retrieving on keywords.

Advantages

Improved accuracy

Better service and provision

reliability

Disadvantages

The lack of systematization in the annotation process decreases the performance of the keyword-based image search

**AltaVista Photo finder**

This intelligent image analysing and meta data searching software application is initially implemented by AltaVista Company and this is based on visual parameters for example main colours, shapes and textures. Querying The user

Here users can type keywords to find for images tagged with given expressions. If a saved image is exposed with a link and the link provides images which are visually comparable to the specific image. Also, comparison is depended on visual features for example leading colours, shapes and textures.

Advantages

Improved accuracy

Enhanced reliability

Better User friendliness

Disadvantages

Inability to set the comparative weights of features, but judging from the results, colour is the major feature.

High Cost

(http://dspace.library.uu.nl/bitstream/handle/1874/1971/2000-34.pdf?sequence=1)

**Amore (Advanced Multimedia Oriented Retrieval Engine)**

In this system, basically images are divided into at maximum eight regions of similar colour, and economised into 24 24 pixels. Also, areas of the pictures are straight used for analysing and matching processes.

Here category of images. And initial group of images can be selected at random or by keyword. Of visually comparable images can be recovered. Furthermore, system has the capability to designate the comparative position of colour and figure.

When considering towards the intelligent analysing of image mainly a link among sections in the query and expected image is created and consistent to the same areas in the rest of image are compound. The form comparison amid two sections is based on the number of pixels of overlay.

Advantages

Improved accuracy

Enhanced reliability

Better User friendliness

Disadvantages

Not fully Automated and Effective

Need of Many external hardware

High Cost

**Similar Systems related Logical Formulas**

In majority of systems, one or many of the query images are get utilized through logical flow of the systems before repeating an original query. A specific limit cannot be defined to the sum of repetitions in provided that relevance response or in the sum of example images.

Matching Based on relevance feedback from the user, the system selects the appropriate L~m normalized Minkowski metric each time a query is made. The normalization factor im, employed by the normalized distance L~m(xi ; yi) = Lm(xi ; yi)=im, with xi and yi being two subvectors of the image index vectors X and Y , is the expected value over the entire database: im = E[L~m(xi ; yi)]. It is allowed to use metrics of di  
erent orders mi for each of the image index subvectors. Thus, if S is a set of relevant images indicated by the user, the appropriate value for m of the i-th subvector is chosen so as to minimize the distance between relevant images: mi = arg minm E[L~m(pi ; qi)], over all P; Q 2 S. Then the k-nearest neighbor search of the image index vector uses the following weighted distance metric: d(X; Y )=(w1; :::; wn)(L~m1 (x1; y1);:::; L~mn (xn; yn))T where X; Y are the image index vectors and wi are relevance weights.

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**Conclusion of Similar Solutions**

After analysing and reviewing all the above discussed similar software applications with their relevant facts all these illustrated meta data searching and intelligent image content analysing software applications are functioning accurately with improved efficiency and effectiveness. Epically these systems contain with robust and precise meta data searching and content base analysing logical algorithms with least technological implementation issues.

Even supposing above explained systems give the impression to be actual feasible and reliable, one of the major issues is high expensive price of these applications. Also, these applications must use particularly completed hardware devices which increases the maintainability of overall process. Furthermore, less automotive support and incapability of setting the comparative weights of features can be identified as other drawbacks.

All these existing meta data searching and image analysing software deployments are correct and consistent but then again these software solutions are not reachable for the planned user groups due to high cost and high complexity in implementation and configuration.

**Technical Analysis**

**Metadata Search Engine**

Proposed Metadata Search Engine of this project is capable of extensively retrieve images on windows platform by giving defined search criteria for example name, date, resolution, camera model and then content of the image will be certainly analysed over the operative automated object identification progression of the scheme. This system provides more flexibility in stipulating search queries based on metadata.

This sector explains a summary of current approaches which have been used and applied within metadata search engine development and implementation. (citeseerx)

**Query Specification**

Numerous querying procedures have been deployed with the purpose of assisting towards operators to describe their data necessities. When considering towards querying instances, simple visual feature query, feature combination query, localized feature query, query by example, user-defined attribute query, object relationship query, and concept queries can be mentioned.

**Result Visualization**

Mainly most mutual retrieval image result presentation method is created on showing as two-dimensional grid of image forms. Also, the grid has been planned rendering to the likeness of each returned image through the query pattern (for example left-to right, from top to bottom). Especially contemporary querying techniques help users to easily scan/retrieve the grid image This method shows retrieved images of different similarity degrees at the identical physical distance from the image query. Furthermore, applied query methods able to enhance the visual formation by reviewing zoom properties to expand image browsing. users have been benefited by this to get group of images settled as per their similarity, therefore images that are identical can be located simultaneously. They define research to inspect whether likeness-based preparations of the runner images support in picture selection. Moreover further display methods attempt to reflect comparative similarity not only among the query pattern and respectively retrieved image, also between entirely retrieved images themselves.

**Importance of relevant Response**

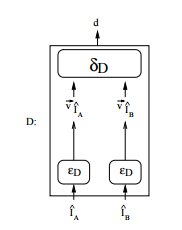
Relevancy of the response can be considered as a one of conclusive factor. It is usually accepted to advance the efficiency of retrieval schemes interactively. Fundamentally, it is collected of three steps:

* a preliminary search which completed through the system for a user-supplied query pattern, returning a minor number of images.
* User then specifies which of the retrieved images are useful
* lastly, the system mechanically reformulates the unique query based upon user’s relevance judgments.

This progression can run to repeat until the user is fulfilled and relevant feedback approaches openly assist to improve the semantic breach problem, where this permits the metadata search engine to absorb user’s image acuities. Brief of logical flow of meta data search engine has been illustrated in below figure.



**Query Specification and Result Visualization Formulation**



A theoretical picture for further information need is appeared into a query description. A query specification Q is a tuple Q = {(Hq, Contentsq, Pq)}, where Hq = ((Vq, Eq), Lq, Fq) is a structure (i.e., a directed graph with vertices Vq and edges Eq, along with labels Lq and labeling function Fq on the graph; see Def. 2 in [13] for details), Contentsq includes digital objects and all of their streams, and Pq is a mapping function Pq : Vq → Contentsq.

q = (Hq, Contentsq, Pq) ∈ Q. For example: q is an image, which contains five spatially related sub-images (objects). A user wants to find some images similar to an existing one as shown in Fig. 3(a). Thus, q = ((Vq, Eq), Lq, Fq), Contentsq, Pq), where Vq = v1, v2, v3, v4, v5, Eq = e1, e2, e3, e4, e5, Lq = ′f ire′ , ′ earth′ , ′ metal′ , ′ water′ , ′ wood′ , ′ produce′ , Fq : Vq ∪ Eq → Lq, Contentsq is the stream of the five spatially related sub-images with their location information, and Pq : Vq → Contentsq

A query specification q ∈ Q is a K-nearest neighbor query (KNNQ) information need if there exists v ∈ Vq, a real number k ∈ Contentsq, and Pq(v) = k.

A query specification q ∈ Q is a range query (RQ) information need if there exists v ∈ Vq, a real number r ∈ Contentsq, and Pq(v) = r.

**Image Collection and Image Searching Service**

An image collection ImgC is a tuple (C, Simgdesc), where C is a collection and Simgdesc is a set of image descriptors.

This image searching service contains with group of retrieving scenarios wherever individual scenario is a sequence of proceedings, and every proceeding has been related with the OPs function defined as follows:

OPs : (Q × C) × Sims → 2 Contents, where Sims = OPq(q, ido)|q ∈ Q, ido ∈ C, and where OPq : Q × C → R is a matching function that associates a real number with q ∈ Q and a digital object ido ∈ C. The calculation of OPq depends on the usage of suitable image indicators (abstraction and distance calculation procedures) definite in the image assortment ImgC. The variety of purpose OPs is the insides related with group ImgC. When the likeness function OPq defined in the saved results have not defined there. Here author has measured the retrieved results as a subsection of main contents.

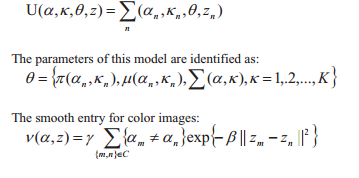
An image descriptions coupling, feature vector abstraction purpose and distance purpose have been used for image indexation by resemblance. The extracted method course includes the image possessions and the distance method calculates the difference among two images with accordingly to relevant properties. Image locators differ with the system domain and practised requirements. Therefore, so as to classify suitable image indicators (in abstraction and distance calculation algorithms), authors should achieve a group of tests to assess them in terms of efficiency for a specified group of images. Efficiency assessment can be considered as a very compound activity, connecting queries related to the explanation of a group of images, a set of query images, some of applicable images for respectively query image, and passable repossession efficiency events.

Numerous methods for dispensation of low level prompts are illustrious by the features of domain-images. The routine of these methods is defied by numerous features such as image resolution, intra-image illumination variations, nonhomogeneity of intra-region and inter-region textures, multiple and occluded objects etc. The other major difficulty, described as semantic-gap in the literature, is a gap between inferred understanding / semantics by pixel domain processing using low level cues and human perceptions of visual cues of given image. In other words, there exists a gap between mapping of extracted features and human perceived semantics. The dimensionality of the difficulty becomes adverse because of subjectivity in the visually perceived semantics, making image content description a subjective phenomenon of human perception, characterized by human psychology, emotions, and imaginations. The image retrieval system comprises of multiple inter-dependent tasks performed by various phases. Inter-tuning of all these phases of the retrieval system is inevitable for over all good results. The diversity in the images and semantic-gap generally enforce parameter tuning & threshold-value specification suiting to the requirements.

Various techniques for extraction and representation of image features like histograms – local (corresponding to regions or sub-image ) or global , colour layouts, gradients, edges, contours, boundaries & regions, textures and shapes have been reported in the literature. Histogram is one of the simplest image features. Despite being invariant to translation and rotation about viewing axis, lack of inclusion of spatial information is its major drawback. Many totally dissimilar images may have similar histograms as spatial information of pixels is not reflected in the histograms. Consequently, many histogram refinement techniques have been reported in the literature. Histogram intersection based method for comparing model and image histograms was proposed for object identification. The technique considers spatial information and classifies pixels of histogram buckets as coherent if they belong to a small region and incoherent otherwise. Though being computationally expensive, the technique improves performance of histogram based matching.

Conceptual Image Separation

E(D N T,,, z )=U(D N T,,, z)+V(D,z ) (1) Where: D stands for opacity, D ę[0,1], 0 as the background, 1 for the foreground object; T stands for histogram of the image of foreground and background, T = {h (D,z ),D = 0,1}; z stands for the gray degree array of image values, z =( 1 z ,…, n z ˈ…, Nz ). (1) is mainly affected by the GMM variables N . The data items of the GMM colour data model can be defined as



**Indexing, Searching and Organizing**

Many classic problems originating from text search have been revisited in the new context of images. Many researches have conducted result diversification in the context of image search; the former considered a specialized case of landmark images, whereas the latter considered a more general case involving a wider range of topics such as animals and cars. Lempel and Soffer dealt with the problem of authority identification for web images by analysing the link structures of the source pages. Mehta et al presented a solution to the problem of spam detection for web images; they analysed visual features and looked for duplicate images in suspiciously large quantities as potential spam. Here author has considered the problem of relevance judgment and demonstrated the ability of image excerpts to help users judge results faster. It is a challenge of organizing a large dataset in the setting of tens of millions of geo-tagged images, taking a comprehensive approach involving visual, textual, and temporal features. Similar to these existing works, the current work relies on state-of-the-art computer vision algorithms in order to index and search screenshots effectively

**Retrieval and indexing:** User fired query to proposed system in the form of query image, feature of query image are extracted using proposed semantic image analysis techniques which are compared with image features stored in semantic feature image knowledge base and retrieved set of relevant images which are further indexed based on relevance feedback.