SURVEY OF CONTINUOUS IMAGE SEQUENCE RETRIEVAL TECHNIQUES

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Abstract- Content based image retrieval is used to retrieve the data particularly images from a wide collection of databases. The retrieval is done by using features. Whereas Continuous Image Sequence Retrieval (CISR) is used to organize the wide sequence of images by their visual features. This paper presents a survey on efficient Image sequence retrieval techniques. In modern days with the development of social networking mediums, so many digital images are uploaded day by day. In order to access this huge data collection new techniques are very essential. Continuous Image Sequence Retrieval is such a technique which uses features for searching a particular image from a database. It represents visual features like edges, spatial information, texture, shape. The features get classified into low level features such as shape, color and texture and high-level features such as human perception. Here, in this paper the content-based image retrieval techniques are compared and discussed.
Keywords- CISR, k-nearest, color histogram, SVM, GHT.

I.   INTRODUCTION

Continuous Image Sequence Retrieval is a technique that helps to access and arrange the sequence digital images from a large collection of databases by using the images features. In modern era with the development of social networks many digital images are uploaded every day. In order to handle this huge data new techniques are very essential. CISR is such a technique that will ease the data handling and the user can easily access the data. The increasing amount of digitally produced images requires new methods to archive and access. The images can be retrieved using colour, texture and shape. The image mining is used to handle the hidden knowledge extraction, image data association and additional patterns. The most important feature in retrieving an image is color. There are so many methods to retrieve the color. They include color histogram, color moments, auto correlogram etc. The Continuous Image Sequence Retrieval system is built using statistics, pattern recognition, fuzzy logic, soft computing and computer and signal processing. The need for Continuous Image Sequence Retrieval is increased in many applications areas such as biomedicine, military, commerce, education, web image classification and searching.

II. LITERATURE SURVEY

[1] Aiswarya.V and T. Senthil Kumar - 2014

With the advancement and popularity of multimedia technologies and internet mediums, user cannot satisfy with the conventional methods of information retrieval. Because of this, the content-based image retrieval is becoming a new and fast method of information retrieval CBIR is the method of retrieving the data particularly images from a wide collection of databases. The retrieval is done by using features. CBIR is a method to organize the wide variety of images by their visual features. In modern days with the development of social networking mediums, so many digital images are uploaded day by day. In order to access this huge data collection new techniques are very essential. These techniques will ease the data handling and the user can easily access the data. Content Based Image Retrieval is such a technique which uses features for searching a particular image from a database. It represents visual features like edges, spatial information, texture, shape. Here, in this paper the content-based image retrieval techniques are discussed.

[2] Javeria Amin and Annam Zafar – 2014

The field of image processing is addressed significantly by the role of CBIR. Peculiar query is the main feature on which the image retrieval of continuous-based problems is dependent. Relevant information is required for the submission of sketches or drawing and similar type of features. Many algorithms are used for the extraction of features which are related to similar nature. The process can be optimized by the use of feedback from the retrieval step. Analysis of colour and shape can be done by the visual contents of image. Here neural network, Relevance feedback techniques based on image retrieval are discussed.

[3] J. Priya and Dr. R. Manicka Chezian – 2013

Image mining is an expansion of data mining in the field of image processing. Image mining handles with the hidden knowledge extraction, image data association and additional patterns which are not clearly gathered in the images. It is an interdisciplinary field that incorporates techniques like Image Processing, Data Mining, Machine Learning, Database and Artificial Intelligence. The most important function of the mining is to generate all significant patterns without prior information of the patterns. This paper presents a survey of various image mining techniques.

[4] Ritendra Datta Jia Li James Z. Wang - 2005

The last decade has witnessed great interest in research on content-based image retrieval. This has paved the way for a large number of new techniques and systems, and a growing interest in associated fields to support such systems. Likewise, digital imagery has expanded its horizon in many directions, resulting in an explosion in the volume of image data required to be organized. In this paper, we discuss some of the key contributions in the current decade related to image retrieval and automated image annotation, spanning 120 references. We also discuss some of the key challenges involved in the adaptation of existing image retrieval techniques to build useful systems that can handle real-world data.

[5] Gunjan Verma and Vineeta Verma – 2012

Data mining has as goal to extract knowledge from large databases. To extract this knowledge, a database may be considered as a large search space, and a mining algorithm as a search strategy. In general, a search space consists of an enormous number of elements, making an exhaustive search infeasible. Therefore, efficient search strategies are of vital importance. Search strategies based on genetic-based algorithms have been applied successfully in a wide range of applications.

III. METHODOLOGIES ADOPTED

A. RETRIEVAL TECHNIQUES

A.1 Color Based Retrieval:

The most important feature in retrieving a digital image is color. There are so many methods used to retrieve the color feature. They include color histogram, auto correlogram, color moments etc. Color histograms are widely used for CISR systems in the image retrieval area. It is one of the most common methods for predicting the features of an image. The image histogram shows the variations of grey levels from 0 to 255, these all values cannot be used as a feature vector as the dimension is too big to be stored or compared. The image histogram must be sampled into the number of bins to reduce the size of feature vector. Color histograms have the advantages of speed and low memory space. Color histogram method is invariant to rotation but it is not invariant to scaling. It also varies with the angle of view. The color moments widely used are mean, standard deviation, and kurtosis. Color moments are mainly used for color indexing. The other advantages of color moments are: - they are good under lighting conditions, the requirement for their storage are very less. Because of this less storage requirement, the image retrieval speed increases. In color moments there is no need to store the complete distribution, so only low memory is used.

A.2 Texture Based Retrieval:

Texture based retrieval is the regular repetition or pattern on the surface of any object. The texture of an image can be extracted using GLCM (Grey level co-occurrence matrix), Wavelets, Fourier transform, entropy, correlation methods. GLCM feature extraction technique is more commonly used, because it is more similar to the human visual system features. The features extracted using GLCM are energy, entropy, correlation etc. Wavelets are the complex form for texture feature extraction. In wavelets, the wavelets are discretely sampled and decompose in to different sub bands.

A.3 Shape Based Retrieval:

There are many methods for the extraction of shapes from digital images. Some methods include contour-based shape extraction, Region based shape extraction, Boundary based methods and generalized Hough transform(GHT) etc. GHT is the most commonly used shape extraction technique. GHT gives the complete information of the object shape and can detect multiple occurrences of object shape in a single pass.
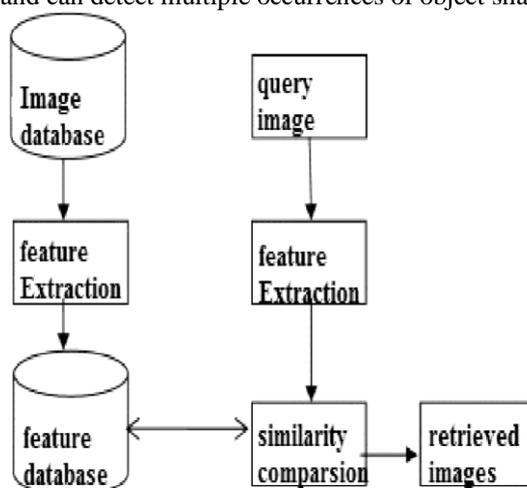
Fig 1 Continuous Image Sequence Retrieval System Architecture

B. INDEXING TECHNIQUES:
B.1 Indexing Technique:

The indexing technique allow access to the source streams in a multitude of ways. The primary index used is created when a stream is originally recorded. For each source of a media, the incoming data will be saved together with an entry in this index. Each index entry contains a reference to the data, the time it arrived at the recorder, and a reference to some meta-data, which will initially be empty. At the end of a recording, each source will have a stream of data and a stream of index entries. It is the editing client which allows the user to manipulate these indexes in order to gain the flexibility required. For example, the user can add a text annotation to any part of the recording, and the server will attach this to the source stream in the relevant place in the index by updating the meta-data field of an index entry.

B.2 Heuristic Technique:

Heuristics are strategic derived from previous experiences with similar problems. These strategies rely on using readily accessible, though loosely applicable, information to control problem solving in human beings, machines and abstract issues.

B.3 Relevance Feedback Technique:

Relevance feedback is a feature of some information retrieval systems. The idea behind relevance feedback is to take the results that are initially returned from a given query, to gather user feedback, and to use information about whether or not those results are relevant to perform a new query. We can usefully distinguish between three types of feedback: explicit feedback, implicit feedback, and blind or "pseudo" feedback.

B.4 Layered Comparison Technique:

Layered comparison technique is used to further compress the data by using entropy or dictionary.

B.5 Fuzzy Logic Technique:

Fuzzy logic is a form of many-valued logic in which the truth values of variables may be any real number between 0 and 1. It is employed to handle the concept of partial truth, where the truth value may range between

completely true and completely false. By contrast, in Boolean logic, the truth values of variables may only be the integer values 0 or 1.

IV. ALGORITHMS

a) k-nearest neighbors algorithm (k-NN):

In pattern recognition, the k-nearest neighbors algorithm (k-NN) is a non-parametric method used for classification and regression. In both cases, the input consists of the k closest training examples in the feature space. The k-Nearest Neighbor classifier is by far the most simple machine learning/image classification algorithm. In fact, it's so simple that it doesn't actually "learn" anything. Inside, this algorithm simply relies on the distance between feature vectors.

b) Gradient Adaptive Lattice Algorithm:

Gradient Adaptive Lattice (GAL) algorithm is a very attractive choice. However, the GAL algorithm with a constant step-size parameter has to compromise between the convergence rate and notch bandwidths. The lattice-based implementations of the gradient adaptive algorithms offer improved convergence rate capabilities, especially for high correlated inputs. In the classical gradient adaptive lattice (GAL) algorithm a division operation per stage is used, which significant grows the computational complexity in a fixed-point implementation context. In this paper, an approximate version of the GAL algorithm is proposed. This algorithm replaces the division operation by three multiplication operations and one addition operation.

c) Genetic algorithm:

A genetic algorithm (GA) is a search heuristic that mimics the process of natural evolution. This heuristic is routinely used to generate useful solutions to optimization and search problems. Genetic algorithms belong to the larger class of evolutionary algorithms (EA), which generate solutions to optimization problems using techniques inspired by natural evolution, such as inheritance, mutation, selection, and crossover. Genetic Algorithm based optimisation technique for an automatic selecting of the thresholds in image segmentation, considering in a combined way, the parameters of the segmentation and the parameters of the pre-processing and post-processing operators.

d) Support Vector Machine Algorithm:

Support Vector Machines (SVMs) are a relatively new supervised classification technique to the land cover mapping community. They have their roots in Statistical Learning Theory and have gained prominence because they are robust, accurate and are effective even when using a small training sample. By their nature SVMs are essentially binary classifiers, however, they can be adopted to handle the multiple classification tasks common in remote sensing studies. The two approaches commonly used are the One-Against-One (1A1) and One Against-All (1AA) techniques. In this paper, these approaches are evaluated in as far as their impact and implication for land cover mapping. The main finding from this research is that whereas the 1AA technique is more predisposed to yielding unclassified and mixed pixels, the resulting classification accuracy is not significantly different from 1A1 approach.

e) Color Histogram Generation Algorithm:

Color Histogram Generation The color histogram for an image is constructed by counting the number of pixels of each color.

Steps:

1. Scale the image to size 512 x 512 to normalize the histogram.
2. Set up parameters for the Histogram object.
3. Bin → number of bins in histogram.
4. Low → lowest value of the bin.
5. High → highest value of bin.
 6. Create a object of class histogram
7. Create a Histogram operation with the required parameters or create a Parameter Block with the parameters and pass it to the Histogram operation.
8. The histogram data stored in the object.
9. Number of bands in the histogram
10. Number of bins for each band of the image
11. Lowest value checked for each band
12. Highest value checked for each band

V. RESULTS AND DISCUSSION

Year	Author Name	Algorithms	Results
2014	Javeria Amin and Annam Zafar[1]	k-nearest neighbors Algorithm (k-NN)	52.30
2014	Javeria Amin and Annam Zafar[2]	Gradient Adaptive Lattice Algorithm	50.5
2011	Neetu Sharma. S [3]	Color Histogram Generation Algorithm	78.75
2005	Maneela Jain and Pushpendra Singh Tomar[4]	SVM Algorithm	71.12
2012	Gunjan Verma and Vineeta Verma[5]	Genetic Algorithm	68.87

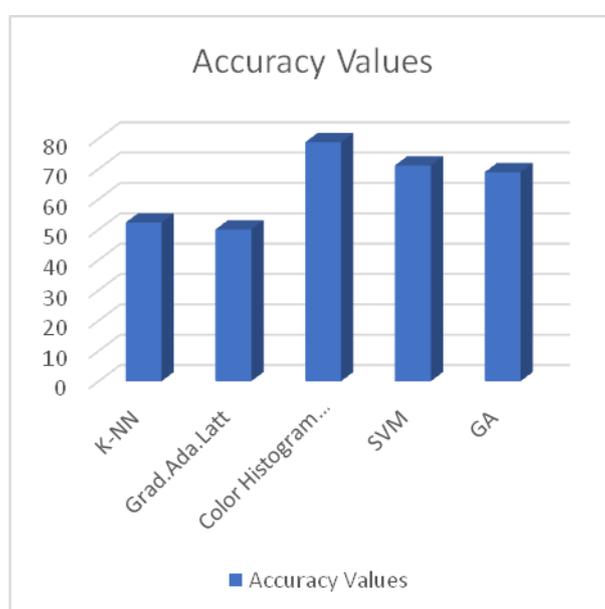**Table 1. Comparison Table**

Chart 1. Accuracy Chart

Description:
The k-nearest neighbors (k-NN), Gradient Adaptive Lattice Algorithm, Color Histogram Generation, SVM and Genetic Algorithm were used to retrieve the image the from the image database. Color Histogram Generation Algorithm is one of the best algorithm used to retrieve the image from the database. The chart illustrates the result of each algorithms that used to retrieve the image form the image database.

VI. CONCLUSION

The goal of this survey is to provide an overview of the functionality of content based image retrieval systems. Most CISR systems uses color, texture, edge features etc. various techniques were used to retrieve the image from the image database. The indexing, heuristic, relevance feedback, layered comparison and fuzzy logic were used to retrieve the exact image from the image database. Analysis of color, texture and shape can be done by the visual contents of image. Here we discussed the techniques which are mostly used in CISR and to improve the retrieval system of images along with the performance.

REFERENCES

[1]. Aiswarya.V and T. Senthil Kumar "Survey on Content Based Image Retrieval Techniques" in International Journal of Research in Engineering and Technology, 2014.

[2]. Javeria Amin and Annam Zafar "A Survey: Content Based Image Retrieval", 2014.

[3]. J. Priya and Dr. R. Manicka Chezian "An Image Mining Techniques for Image Retrieval", 2013.

[4]. Ritendra Datta Jia Li James Z. Wang "Content-Based Image Retrieval - Approaches and Trends of the New Age", 2005

[5]. Gunjan Verma and Vineeta Verma "Role and Applications of Genetic Algorithm in Data Mining", 2012.