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Efficient Content based Image Retrieval (CBIR) Techniques: A Survey

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Abstract

There are several research work is going in the direction of efficient image retrieval. Researchers are mainly concentrated on content based image retrieval (CBIR). In this paper an analysis and survey have been presented based on the previous research. This survey shows that there are several variations are used with CBIR like texture, edges and string fusion. This study shows the implications and findings of the previous research work. Detail analysis is presented also on the advantages and gaps of these techniques.

Keywords

CBIR, Content Retrieval, Colour, Shape and Texture.

1. Introduction

In this period of innovation, visual computation is important in every field and in every way that really matters all circles of human life including exchange, government, scholastics, recuperating offices, observation, outlining, basic building, news-throwing, style and visual computerization, and real examination use pictures for successful organizations[1]. A far reaching social event of pictures is insinuated as picture database. An image database is a system where picture data are facilitated and set away [2-4].Image data consolidate the unrefined pictures and information isolated from pictures through electronic or simulated calculations [5].

Content based Image Retrieval (CBIR) procedures are likewise working with the same lay [6]. A part vector is expelled from every photograph in the database and the game-plan of all highlight vectors is framed as a database record [7]. At solicitation time, a substitution vector is expelled from the request image besides; it is encouraged against the segment vectors in the record [8-16].

The key contrast between the particular frameworks lies in the parts that they evacuate and in the tallies that are used to look at highlight vectors [17].

The colour is the most generally utilized visual segments as a part of picture recovery in light of the way that they are less asking for to disengage separated and surface and shape data. Shading highlight is passably able to foundation multifaceted nature and free of picture size and presentation. Quantifiably, it shows the joint likelihood of the intensities of the three shading channels [18].

Mixes of schedules have been made for measuring course of action comparability [19]. Most frameworks depend on after looking at estimations of what are known as second-request estimations enlisted from solicitation and set away pictures [20]. These timetables figure measures of picture surface, for example, the level of refinement, coarseness, directionality and consistency [21]; or periodicity, directionality and intervention [22]. Elective methodology for surface examination for picture recovery meld the use of Gabor channels [23] and fractals [24].

In this paper background necessary for the exploration of content based image retrieval techniques have been presented. It reviews related concepts in the context of the work and highlights the advantages and disadvantages. Based on the analysis future suggestions have been suggested.

2. Literature Review

In 2014, Yasmin et al. [25] reviewed several content based image retrieval (CBIR) techniques and highlighted the advantages and disadvantages.

In 2014, Yasmin et al. [26] proposed an efficient method based on decomposing and edge detection for image search and retrieval. They have classified pixels based on the edge and inner pixels for the feature selection. They have achieved 66 %-100 % precision and recall results.

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In 2014, Jenni et al. [27] proposed a content based image retrieval method for database classification and efficient image representation. It is based on support vector machine classifier. Colour string coding is used for feature extraction. This string comparison is beneficial in reducing the computational omplexity.

In 2012, Singh et al. [28] proposed an algorithm based on designing feature vectors for solving the problem of content based image retrieval in dynamic environment. They have achieved satisfactory results in case of content based image retrieval.

In 2014, Ulape et al. [29] discussed about Geo-tagging. They have used edge weight calculation and random walk method to provide the visual summary of the geographic location. It is effective in locating the nearby areas of any person in the geographic location.

In 2015, Khodaskar et al. [30] proposed a technique for content based image retrieval (CBIR) based on soft computing techniques. They have proposed a framework based on these techniques to reduce semantic. This system engages and receives feedback based on support vector machine which classifies the images in two parts one is relevant and other is irrelevant. The performance is checked based on precision, recall and accuracy.

In 2014, Choudhary et al. [31] proposed a content based image retrieval integrated technique for color and texture feature extraction. They have used color moment for color feature extraction and local binary pattern (LBP) is used for extraction of texture features on the grayscale image. It is then combined for a feature vector formation. Then based on Euclidian distance similarity measure the database images are compared with the query images. This joined methodology provides precise and effective framework.

In 2015, Hiwale et al. [32] have been traversed different content-based image retrieval (CBIR) techniques. CBIR is used in different areas like medical, image vision, image retrieval etc. Authors have explored the gaps and the current trends in this area and highlighted the advantages.

In 2015, Pradeep et al. [33] used CBIR method for acquiring high accuracy for medical image retrieval. The framework stores therapeutic picture alongside its data identified with that restorative picture. Extracting so as to recover should be possible most using so as to enlighten surface element which can be extricated Gray-level-co-occurrence matrix (GLCM). This method performs retrieval based on the flexible queries. This is done for the disease detection. It improves the detection accuracy.

In 2015, Kumar et al. [34] used CBIR technique for efficient searching user's intended information on image database. Authors have suggested that it also overcome the semantic gap. Authors have explored the gaps and the current trends in this area and highlighted the advantages.

In 2015, Wankhede et al. [35] discussed about the Content-based video retrieval. Video recovery is viewed as a standout amongst the most critical in media research. The improvement of media information sorts there is interest of video recovery framework. Video recovery can be utilized for video look and scanning which are valuable in web applications. There are two sorts of highlight extraction, low level component extraction and abnormal state highlight extraction. Low level element extraction in view of shading, shape, surface, spatial relationship.

Their objective is client can give the two distinct sorts of info as picture inquiry and the content question. Initial one is that give the data as picture question and recovered picture which is like the inquiry picture by utilizing the CBIR calculation. CBIR is as yet creating science. Recovery of pictures taking into account visual components, for example, shading, surface and shape.

In 2015, Bhad et al. [36] used color dominant, texture and histogram features for image retrieval. For texture extraction Gray Level Co-occurrence Matrix have been used. Shading histogram is the most essential shading representation variable utilized as a part of picture handling. Shading histogram yields better recovery precision. Histogram figures out the quantity of pixels in dim level. They have applied Euclidean separation, Neural Network, Target look techniques calculation and K-implies bunching calculation for recovery of pictures from the database and making a correlation based methodology between them to see which strategy helps in quick recovery of pictures.

3. Analysis

The analyses based on the previous research are shown in table 1.

Table 1: Analysis

S.no	Reference	Method	Result
1	[26]	CBIR using edge pixels classification and color features.	Their results are comprised of 66%-100% rate for precision and 68%-80% for recall.
2	[27]	CBIR using colour strings comparison.	They have achieved average precision of 85.863.
3	[28]	CBIR based on feature vectors.	For effective Retrieval they have store their corresponding Feature Vectors in the log file.
4	[37]	CBIR using color and edge direction features	They have used the shading list codes to picture recovery and utilize the edges highlight as the shading weight which has a place with the same shading highlight's sub-space.
5	[38]	CBIR using color and texture fused features	Improved visual retrieval shows the effectiveness of this approach.
6	[39]	CBIR research	They have achieved 79.6% precision, 88.3% recall and 3861ms response time.
7	[40]	CBIR using multiple representations	They have achieved performance gain in case of e specificity.
8	[41]	Bayesian Framework for CBIR	It is compared based on human subjects.
9	[42]	Edge based structural features for CBIR	Their method is able to detect edge/structure information.
10	[43]	CBIR Using SOM and DWT	They have achieved average precision of 55.88.

4. Gap Identification

The gaps identified in the above research works are following:

1. All the extended parameters like color, texture and edges should be considered.
2. The color combination should be extracted in the form of dominant color and it can be mapped with the reverse traversal.
3. Several papers focus on semantic gap which should be considered in the future research.
4. Variant data size is also a research problem and it should cover different image format and segmentation.
5. The images with the combination of different areas and edges can be segmented simultaneously.
6. Contour and edge detection can be able to form the edge information properly.
7. Boundary correlation can be efficiently retrieved based on SOM and DWT. String comparison can also be an efficient solution.

5. Conclusion

This study shows that numerous image recovery frameworks have been developed however the issue of recovering images in light of their pixel content remain to a great extent unsolved. In addition to all the current methods of image retrieval they have their preferences and weaknesses. The study shows that there is a need of an image retrieval framework that is able to handle texture, edges and boundary correlation and consequently remove the semantic component that can make the recovery more productive and precise. This persuades us in the field of picture recovery. The procedure which would superior to anything existing system somehow or the other is a better way to utilize the pre prevailing shading based image retrieval which will be founded on grouping and bunching is the better route for the proficient recovery.

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