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A Novel Approach to Represent High Quality Images via SR and IR

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***Abstract:-*With the rapid development of Internet, search engine has gradually become almost the chief tools for obtaining network resources. Search engine optimization (SEO) is a technique which helps search engines find and rank a site higher than the millions of other sites in response to a search query. SEO helps to get traffic from search engines. Where a site ranks in a search is essential for directing more traffic toward the site. The search engine gives the result in indexed way. The higher quality images should have higher ranking in that indexing. In this paper two-fold work is done. First, a database of face images is assembled and used to illustrate SEO and ranking. Second, Cellular Automata (CA) based image processing techniques is used, in order to eliminate the noise present in images and restore their quality.**

***Index Terms*—, Cellular Automata (CA), Image processing, Noise reduction, Search Engine Optimization (SEO), Information Extraction, Page-Ranking, Image-Rank (IR), Noise Filtering, semantic relevancy (SR).**

1. Introduction

All electronic art images are divided into one of two core types, raster images (also known as 'bitmap') and vector images. Most of the search engines are ranking their search results in response to users' queries to make their search navigation easier. Page-Rank measure's a web page's importance. Page-Ranking is a link analysis algorithm and is being used by the several popular search engines all over the world, that assigns a numerical weighting to each element of a hyperlinked set of documents that includes both the textual and images, such as the World Wide Web, with the purpose of measuring its relative importance within the set. In this paper, I introduce and study an efficient learning algorithm (semantic search algorithm) for combining multiple rankings or preferences.

1.1 Semantic Search Introduction

As with the WWW, the growth of the Semantic Web will be driven by applications that use it. Semantic search is an application of the Semantic Web to search. Search is both one of the most popular applications on the Web and an application with significant room for improvement. There is no unique definition of the notion of semantic search on the Web. However, the most common use is the one as an improved form of search on the Web, where meaning and structure are extracted from both the user's Web search queries and different forms of Web content, and exploited during the Web search process.

Semantic Search attempts to augment and improve traditional search results (based on Information Retrieval technology) by using data from the Semantic Web. Semantic search seeks to improve search accuracy by understanding searcher intent and the contextual meaning of terms as they appear in the searchable data space, whether on the Web or within a closed system, to generate more relevant results.

In semantic search, the user provides the search engine with a phrase which is intended to denote an object about which the user is trying to gather or search information. There is no particular document which the user knows about that s/he is trying to get to. Rather, the user is trying to locate a number of documents which together will give him/her the information s/he is trying to find. Traditional Information Retrieval (IR) technology is based almost purely on the occurrence of words in documents. Search engines like Google ([Google]), augment this in the context of the Web with information about the hyperlink structure of the Web. The availability of large amounts of structured, machine understandable information about a wide range of objects on the Semantic Web offers some opportunities for improving on traditional search.

1.2 Semantic Search Technology

Semantic Search Technology works on the following concepts

1.3 Page-Rank: Page-Ranking is a link analysis algorithm and is being used by the several popular search engines all over the world, that assigns a numerical weighting to each element of a hyperlinked set of documents that includes both the textual and images, such as the World Wide Web, with the purpose of measuring its relative importance within

the set. The algorithm may be applied to any collection of entities with reciprocal quotations and references. The numerical weight that it assigns to any given element *E* is referred to as the Page-Rank of E and denoted by A Page-Rank results from a mathematical algorithm based on the graph. Page-Rank is a probability distribution used to represent the likelihood that a person randomly clicking on links will arrive at any particular page. Page-Rank can be calculated for collections of documents of any size.

Image ranking:

Today, typical web documents not only include text information only, but a plenty of images and other multimedia files are being contained. A webpage containing n-number of pictures/images are considered as to be a collection of n+1 number of files. It is assumed in several research papers that the distribution is evenly divided among all documents in the collection at the beginning of the computational process.

1.4 Noise Removal

In most applications involving images or image processing one of the most common problems is the presence of noise. To get the original image from the noisy image one should have to use noise filtering techniques.

Cellular automata: Cellular automata appear as natural tools for image processing due to their local nature and simple parallel computer implementation. Cellular automata were introduced by Von Neumann [4]. They have been progressively used to model a great variety of dynamical systems in different application domains. A cellular automaton is basically a computer algorithm that is discrete in space and time and operates on a lattice of sites (in our case, pixels). Using some predefined mathematical rule, CA can be used to model for filtering purpose of digital images.

A cellular automaton is basically a computer algorithm that is discrete in space and time and operates on a lattice of sites (in our case, pixels). A (bi-dimensional, deterministic) cellular automaton (CA) is a triple

$A = (S, N, \delta)$;

Where,

S is a nonempty set, called the state set, $N \in Z^2$ is the neighborhood, and, $\delta: S^N \rightarrow S$ is the local transition function (rule)

The argument of δ indicates the states of the neighborhood cells at a given time, while its value the central cell state at the next time. The most common neighborhoods are: von Neumann neighbourhood and Moore neighbourhood. The Moore neighborhoods for ranges r= 1 and 2 are illustrated in Fig. 3. The number of cell in the Von Neumann neighborhood of range r is

the odd squares i.e., (2r+1)2 and the first few of which are 1, 9, 25, 49, 81. If the range value $r \geq 2$ then it is consider as Extended Moore neighborhood.

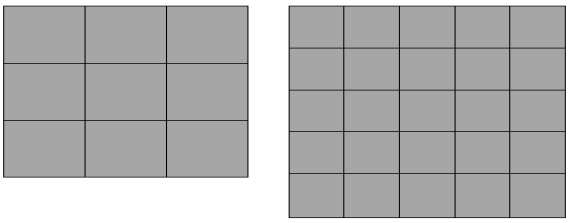

Fig. 3: A) Moore neighbourhood

B) Extended Moore neighborhood

Analysis of Problem :-

The problem addressed in this work is closely related to the topics:

1) Semantic search.
2) page-ranking.
3) Denoising.

Semantic search seeks to improve search accuracy, and then a CA based noise filtration technique is used to enhance the quality of the image.

2. Proposed Work and Objectives

Searching for images of people based on visual attributes has been previously investigated however; these methods do not consider the fact that attributes are highly correlated. In the case of image ranking, given a multi-attribute query Q, our goal is to rank the set of images Y according to their relevance to Q.

A digital image is assumed to be a two dimensional array of m × n pixels, each with a particular gray value or color. An image can be considered as the lattice configuration of a 2D CA where each cell corresponds to an image pixel, and the possible states are the different gray values or colors.

Here, instead of providing direct image-ranking, this system should first check whether any of the required images contains the peeper and salt noise or not. If it finds it, then an CA based noise filtration technique is used to enhance the quality of the image. In our approach, we have chosen Moore neighbourhood Moore neighbourhood consists of 8

neighbours so that the detection of the noise is performed in a better way. This CA based methodology is define by following algorithm.

CA Algorithm:

Step 1: Consider a noisy image with mn matrix of 8 bit gray scale image and 3 3 masks
Step 2: Consider CA of r=2 and center pixel is considered as cv. So total neighbor n=8 and total cell of CA is 9
Step 3: Store the pixel value in vi for all i=1 to 9, which belong to the considering mask area
Step 4: Sort vi in ascending order
Step 5: Eliminate minimum and maximum vi values and Calculate avg =Σ vi /k, for all i = 2 to k and k=n-1
Step 6: Update center pixel value by using CA rule
Step 7: Move the mask in the next location and go to step 3 until it reach to the last location of noisy image
Step 8: End

3. Conclusion

Propose system gives the approach for multi-attribute retrieval which explicitly models the correlations that are present between the attributes. A structured prediction framework will be utilized to integrate ranking and retrieval within the same formulation. Instead of providing direct image-ranking, propose system will check whether any of the required images contains the peeper and salt noise or not. If it finds it, then a Cellular Automata based noise filtration technique will be used to remove noise.

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