IJCSC International Journal of Computer Science & Communication Vol. 1, No. 1, January-June 2010, pp. 87-89

A Novel Method for Aquamarine Learning Environment for Classification of Fish Database

[1]A. Ramaswamy Reddy, [2]B. Srinivas Rao, [3]G. Siva Nageswara Rao & [1]C. Nagaraju

[1,2,4]L. B. Reddy College of Vijayawada Engineering,
[3]P.B. Siddhartha College of Arts and Science, Vijayawada
Email: [1]ramaswamyreddya@yahoo.com, [2]bhukya@rediff.com, [3]sivanags@india.com & [4]cnrese@yahoo.com

ABSTRACT

In this paper a biological study for aquamarine learning environment for classification of fish data base is proposed. The content of this paper is a result of projects called Image content-based retrieval on a fish database. The objective of this paper is to classify different kinds of fishes basing on some of the features extracted from those fishes. It is well known that conventional fish databases can only be retrieved by text-based query. In this paper we show how to use the shape, color, and other features extracted from a captured fish image to search the fish database. In the existing Grey Level Co-occurrence Matrix based methods the Features in different orientations are extracted for the images and basing on those features the images are classified into different groups which is difficult for implementation. The proposed technique is able to perform classification among different kinds of fishes very efficiently than conventional methods like co-occurance based methods. This method is tested on 10 more different size, shape and color images and produced some of best results in this paper.

Keywords: Aquamarine, Image Normalization, Ecology and CBIR

INTRODUCTION

This paper proposes to extract the features of different kinds of fishes and classify them according to the extracted features using the image Recognitions core technology .The Image recognition system includes Image Acquisition, image preprocessing, and segmentation. The task of Image Acquisition is to understand the quality of the image. The task of image preprocessing is to enhance the quality of the image i.e. Remove the foreign material added to the image and use of Image blurring and image normalization. In the stage of segmentation to find out a shape of image and compute feature extraction. The result feature will be compared with other fish images and result is fed back for the interpretation. In this paper we proposed a method, which could learn the family, name, ecology, and activity behavior of fish, and uses content-based image retrieval system to easily acquire the fish information without giving any data about the characteristic during the fish-watching activity. Feature extraction is the basis of the content-based image retrieval. Sometimes image feature may include text (caption, keywords etc.) or visual feature (shape, color, texture) or both. We can characterize image feature into two categories. This issue is most relevant to partitional approaches designed to optimize a squared error function. This optimization can be accomplished using traditional techniques or through a random search of the state space consisting of all possible labeling.

Feature Selection

Feature selection concerns the reduction of the dimensionality of the pattern space and the identification of features that contain most of the essential information needed for discriminating between normal and abnormal cases. Selection of efficient features can reduce significantly the difficulty of the classifier design. From the above features one or more efficient features are calculated and those features of different images are compared. Based on these comparisons the images are classified into different groups.

Proposed System

In the proposed method, the colored image is first converted into grey scale image and this grey scale image is preprocessed to enhance the quality of the image. Histogram equalization is applied on this image for uniform distribution of the pixels. The entire Image is converted into object, background and misclassification gerions based on histogram. From this we calculate the features such as angular second moment, homogeneity, dissimilarity, mean, variance and contrast by using the formulae given below. Based on these features we categorize different kinds of fishes.

Let P be a $n \times n$ matrix with I, j as indexes.

Mean = $1/n\Sigma p\ (i, j)$ where $i, j = 0$ to n

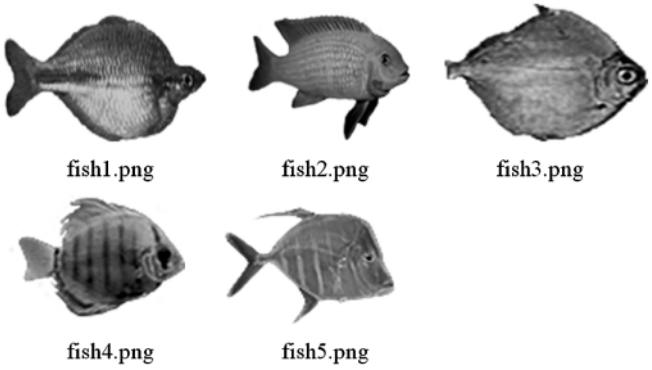
Variance = $\Sigma P_{i,j}(i - m_i)^2$ where μ is mean

Angular second moment = $\Sigma P^2_{i,j}$

Contrast = $\Sigma P_{i,j}(i - j)^2$

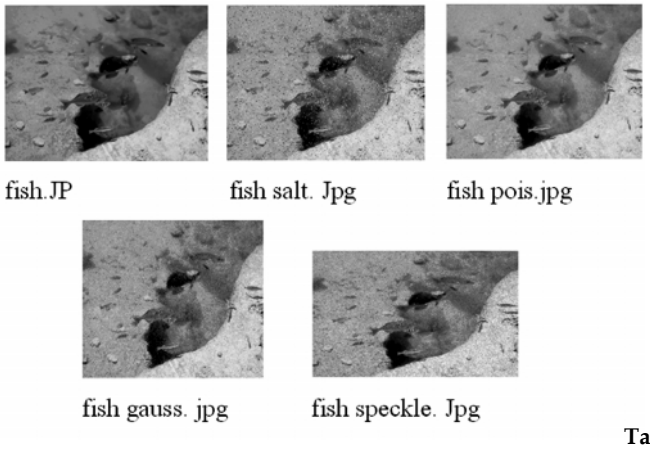
Homogeneity = $\Sigma P_{i,j}/1-(i - j)^2$

Dissimilarity = $\Sigma P_{i,j} \mid i - j \mid$



Experimental Results

This method is applied on data base of 10 images belonging to two groups. The original images are added different kinds of noises. The table values give the extracted features of different fish images. Graphs are plotted for the entire extracted feature values. the graph with dissimilarity values is able to show the difference between different kinds of fishes. So based on the dissimilarity graph we can clearly classify different kinds of fishes.



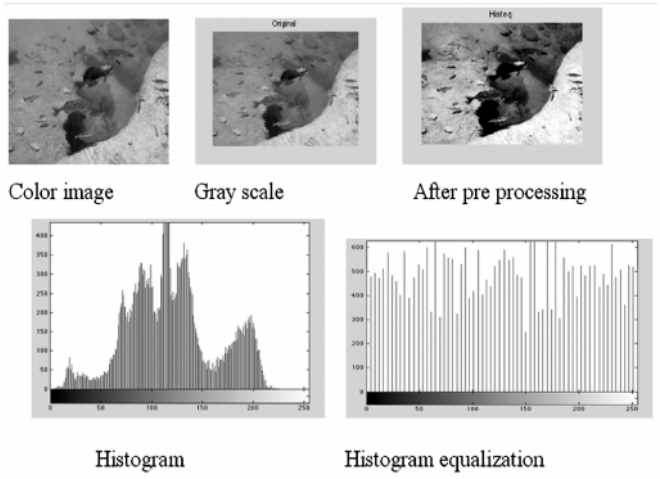
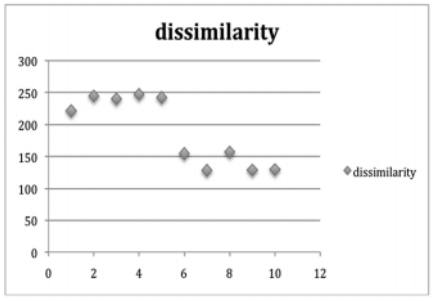


Table 1

	Mean	*Variance*	*ASM*	*Contrast*	*Homogeneity*	*Dissimilarity*
FISH.JPG	119.867	103.7433	233.8112	224.327	237.2737	221.1535
fish salt.jpg	183.1417	67.6488	254.2571	245.543	249.9348	244.6258
fish pois.jpg	182.7358	64.7663	249.7378	241.9968	246.447	240.0756
Fish gauss.jpg	183.616	70.0552	254.9783	247.7773	251.7069	247.2005
fish speckle.jpg	182.9389	68.9559	254.1178	243.0163	247.5792	242.2123
fish1.png	63.2049	76.4738	165.9239	154.378	159.3725	154.2782
fish2.png	47.6247	59.3229	141.1034	128.8931	134.3213	127.9672
fish3.png	71.8267	76.9839	169.7137	157.287	163.896	156.8625
fish4.png	48.0092	69.0961	151.2649	130.2465	143.5219	128.5418
fish5.png	54.7647	67.5998	148.0171	129.278	141.6603	129.2598



Graph 1

CONCLUSION AND FUTURE SCOPE

In this paper, we extracted various features for different kinds of fishes and finally basing on dissimilarity the classification is successfully done. In this method we are using shape, color and size etc. to implement this system rather than text information. This proposed method is the main principle used in the content based image retrieval techniques for retrieving similar kinds of fish images from the database. In future we want to design an image-content based search engine that uses the proposed method for identity check of fish.

REFERENCES

[1] http://www.mathworks.com/image processing

[2] http://www.wikipedia.org/cbir

[3] https://www.ohloh.net/matlab-cbir

[4] http://linkinghub.elsevier.com/retrieve

[5] Fundamentals of Digital Image Processing by A.K. Jain.

[6] Digital Image Processing using MATLAB by R.C. Gonzalez & R.E. Woods

[7] B. M.Mehtre, M.Kankanhalli, and W. F. Lee, "Shape Measures for Content based Image Retrieval: A Comparison," *Information Processing and Management*.

[8] Theo Givers and Arnold W.M.Smeulders: Combining Color and Shape Invariant Features for Image Retrieval.