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Enhanced Shape Based Color Image Segmentation Using Multilayer Neural Network

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Abstract: In this research study describes the classification and color-based method for image, object segmentation in color 3D pictures. Normally, we procedure certain color-spaced like red, green and blue to segmented pixels as either non-objects using MLNN and 3D clustering using fuzzy c-mean clustering approach. The research study analysis the accuracy limitation of the existing methods using gray scale information. This analysis clearly defined how a new approach to improve the accuracy of the previous color-space create, improve outcomes in developing preparation than single color-space. The segment objects or images added faces, leaves and lips in the color of the pixel and black, white of the image pixel and its closest to being a thing or a non-object in the test-case the training conventional was used to image segment the pixel in the test image into combined features in different kinds of color data that came from dissimilar color modules of the estimated pixel. Various data set researches were evaluated on result and substances to calculate the research techniques: an important result was verified, to showing the performance of the color and some image and text based data to compact with the object segmentation issue. In this study, improves three RGB color channels to enhance the accuracy. The simulation (MATLAB 2016a) results in the large scale image data set identify the proposed algorithm efficiency.

Key words: Image segmentation, RGB color, color space method, FCM, MLNN method, techniques

INTRODUCTION

The main challenge is that a digital color image isn't a direct measurement of the features of physical objects being shown. It is difficult to interact among various physical procedures (Perazzi *et al*., 2012):

- The intensity and division of illuminating radiation
- The physics of the interaction of the radiation with the data compromising the part
- The geometry of projection of the reflected/transmitted radiation from 3D to the 2D of the digital image plane (Blaschke, 2010)

It is the major area of the imaginary analysis and its processing. It is used in various scientific areas, adding objects, face recognition, engineering and medical imaging (Ilea and Whelan, 2011). Image segmentation is defined the sub-division image into their 3 components (red, green and blue) depending on the object of the color found for. Normally, the procedure is based-on dividing a picture into edges or edges that exhibition same in shade according to an existing well-defined area. An image segmentation in simple step an automatic picture design verification and some study tasks (Mohan and Baskaran, 2012). In this research study focus is attempting to recognizing work on human and nature areas like lips, face and leaf segmentation using color information with color space based method and FCM algorithm. The lip segmentation is simple procedure cast-off for binary localization and detects the lip image and face field in 3D images. It is a significant field of research, since, it is a normal phase in various applications such as automatic lip reading and facial expression applications. Lips single could be used for personal identification for security purpose as a stand-alone biometric system. There are various challenges now to be reduced in the area of lip segmentation. The proposed method determines that more accurate could be achieved in production with images of several sizes, colors, expression orientation, complex conditions and extracted features, etc.

Literature review: Nguyen *et al*. (2015) the researcher in their research developed a segmentation approach for object detection. Existing approaches are also developed and worked on the same topic but some limitations are

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also creating major challenges for researchers. Existing algorithms are working on grayscale images for object detection and recognition. The researcher did their research to resolve the problem with segmentation of imaging and detection of various components of the image as RGB. This approach resolves the greyscale limitation and provides high accuracy for color images also. Thilagamani and Shanthi (2013) image segmentation in previous research is always a major issue for the researchers. The researcher also used the pattern matching scheme for a segmented object to verify the detected object. Some pre-processing steps are performed by the researcher to detect an object from the image. The researcher performs the super pixel formation for an accuracy enhancement in this research. Detected region processed with segmentation process and provide final formatted object form a colored image. Li and Shen (2007) in the current scenario the segmentation is very important for the development of any computer system. In this research color image segmentation process performed with the help of an LP-based algorithm. It used to find the area of interest from a picture and another component like background. It worked for all types of colored images (multi-color pictures) (Yang *et al*., 2006). The proposed algorithm is working with pixel-wise processing approach to enhance the accuracy of the system. This approach is working more accurate than other developed algorithms. Researcher compares their results with other existing approaches as HSI in all the results proposed approach achieves high accuracy rate and perform better in all the cases.

MATERIALS AND METHODS

Segmentation has two goals as follows:

- To de-compose the picture into segments for added examination
- To complete an alteration of symbol (Smeulders *et al*., 2000)

The objective behind the proposed research is explained as follows (Kaur and Kaur, 2015; Shammala and Ashour, 2013). The foremost purpose is to develop such a method which considers more than one parameter including color for the purpose of object detection. To introduce the parameter shape irrespective to color for detecting an object in an effective manner. To implement the multi layer neural network instead of artificial neural network due to the advantages of MLANN over ANN like it works on the basis of multiple layers as it uses non-linear separable functions for processing.

RESULTS AND DISCUSSION

The proposed research in image segmentation technique was calculated using the image datasets defined in Table 1. For every image and for all of three dataset like (face, lips and leaves) (Sharma *et al*., 2012; Ganesan *et al*., 2014). We manually selected 30 images were covered from the image area of interest and background. These image's pixels formed the training section and testing section for the individual data set. The subdivision of the set was used to calculate the planned approach to the lip image segmentation issue. Every dataset was divided similarly into binary dataset, single for the training set the color with cluster image pixels which contained of 70% of information, the left 30% data cast-off for analysis section the digital images to region detect the object of area (Hassanat *et al*., 2016; Sun *et al*., 2014) (Fig. 1).

To consider the color structure image and to evaluate the implemented combine technique with the use of only single color structure, we discussed in the related study, we implemented a collect of tests where the system was proficient and testing section of a color (RGB) components of only single color-space. Every color components are RGB channels R, G and B in Fig. 2 and Table 2.

The face detection is based normally on the color data. These advantages and disadvantages has the similar interval period. The advantages add detect the face no-issue a posture that is the pic of the face is identified simply with-out the required for unusual trained images. Furthermore, facial images could be identified too in including to multiple face identification in twice situations, separated image size of the facial ID is larger than 1000 pixels. The study and implemented some techniques to evaluate the performance, we use other artificial intelligence approach classifiers, namely ANN and MLNN algorithms. Describing that the performance of the MLNN is affected by the metric used and the ANN (target), we used twice distance metrics.The proposed characteristics with a decrease average accuracy of 98% saved using the ANN and increase average is 98.7% saved using the MLNN. It might also consider the MLNN method saved the increase accuracy for partial of the databases used and evaluate the performance nearly the similar as MLNN. The major reason for this high accuracy is due to the nearest of the color space method and texture method data of the similar regions. The similar classes , we could same category consider higher density with the MLNN and the improves the accuracy and reduce the error rate.

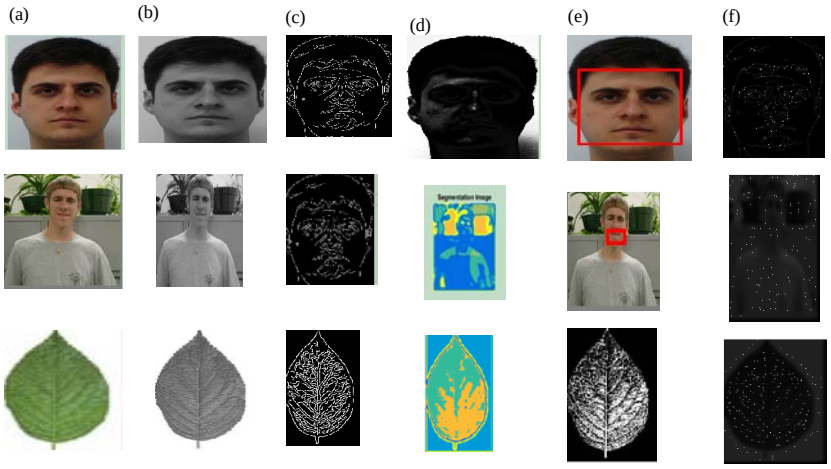

Fig. 1: The image segmentation outcomes using individual image pixel for training section and testing section images are reduced of the image: a) Original image; b) Gray image; c) Shape image; d) Clustering image; e) Detected image and f) Feature extracted image

Fig. 2: Lip detection in different -2 samples in Aberdeen dataset, BOA dataset and leaves dataset

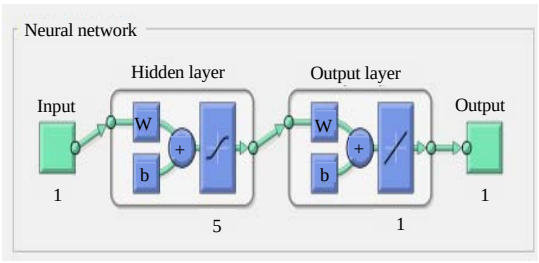

Fig. 3: Multi layer neural network

Table 1: The dataset image used for calculation of the proposed technique

Data set name	Unique features	Image size	Background image size
BAO face	500	260*360	360*260
Aberdeen face (Lip)	100	162*156*3	512*512
Leaves	300	130*240	240*130

Table 2: The proposed technique's accuracy of detecting face, lip and leaves using MLNN on various data set

Dataset name	Images	Trained images	Test images	Accuracy (%)
BOA face	20	100	50	98.7
Aberdeen	3	3	30	97.6
Leaves	6	6	22	98.9
Average	-	-	-	98

Figure 3 describe the performance of the image retrieval system, training module generate, classification. The multi layer neural network uses the inbuilt function like levenberg marquard and find the average of the error in Table 3.

Figure 3 shown that the mean square error rate means it measure the centroid of the separation shall be connected with some error measure. Figure 4 shown false

Table 3: Mean square error in proposed research

Dataset images	MSE	FAR	FRR	Accuracy
	0.000141	0.0019	0.00026	59
	0.00043	0.0049	0.00044	78
	0.00073	0.0098	0.00074	98.6

acceptance rate is also called as the second type of error is an error or exception occasionally created by to enhance the security systems. The figure shows that the false rejection rate is measurement cast-off to extent authentication, presentation when working on the identification job and it typically calculated as the fraction of periods the organization produces a false reject. This performance defined that the accuracy of the image segmented system. However, other performance parameters can become important for some requests (Table 4).

In this Fig. 5 accuracy in the facial image detection of the facial area and evaluate the performance of the

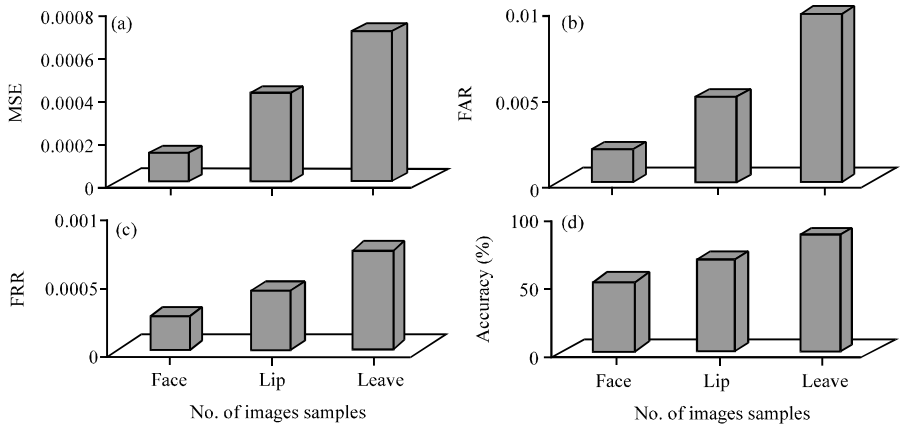

Fig. 4: Means square error rate, false acceptance rate, false rejection rate and accuracy in proposed research: a) MSE-proposed; b) FAR-proposed; c) FRR-proposed and d) Accuracy-proposed

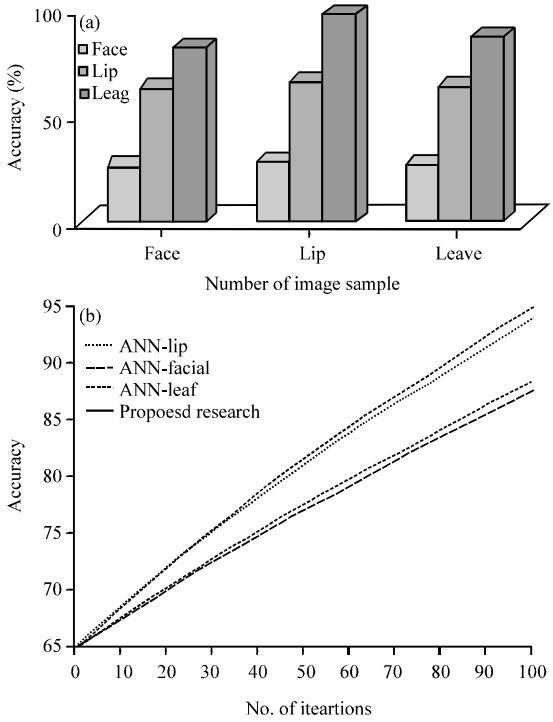

Fig. 5: Existing work accuracy in base paper: a) Face, lip and leaf) and b) Comparison between proposed and existing work

Table 4: Accuracy in base study (Facial)

Accuracy in base paper (face)	Accuracy in base paper (lip)	Accuracy in base paper (leaf)
26	28	27
63	66	63
82	98	87

accuracy performance of the parameters. The accuracy in the facial image detection of the lip area and evaluate the performance of the accuracy performance of the parameters. Accuracy in the leaf image detection of the multiple edges detected in ANN approach and evaluate the performance of the accuracy performance of the parameters. The comparison between the existing work with ANN and proposed approachin MLNN. We improve the performance of the accuracy with MLNN.

CONCLUSION

In this study, the proposed that the segmenting lips, face and leaf based-on their color. This approach added training section a characteristic in key points of each designated digital image object-pixel with its closest using the color shade with FCM info increased from dissimilar shade, structure and measuring the pixel and its closest permits the classifier to consider some text data. Our existing method of evaluating proposed method to be used for segmenting and perceiving the face, lips and leaves. The color info having various restrictions in terms of image segmentation and detecting of the face, lip and leaves, it however has some benefits in resolving the issues in difficult conditions where the most innovative approaches for face recognition, lip detection and leave detection. Some issues added, detecting any segment area of the face, dissimilar rotations, scaling and rotation of the targeted object. This research is required in this concern in adding to searching the structures other than the color-space, motionless, n't easy and not necessarily difficult evaluations to improve the accuracy rate with planned approach and without swelling the over-all time difficulty of the approach. The discovery phase is additional important that requires additional work, namely to search improved techniques for identifying the object afterward segmentation and this is important command to optimize the FAR, MSE and FRR error rates.

RECOMMENDATIONS

The future research, we can implement the machine learning algorithms like fuzzy logics and LDA classifier. This algorithm will use to enhance the performance of the error rate and clear object segmentation.

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