

Salient Region Detection

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Abstract— In computer vision salient region identification is testing issue and critical point. It has a broad variety of uses, for example, object classification and recognition. The entire image is subset of salient region. The bottom up method is use for salient region identification. There are different visual cue are available for salient region detection. Two visual cues are used for salient object. The compactness and local contrast visual cues are use. These two visual cues are reciprocal to each other. The saliency map is addition of compactness and local contrast map. After getting saliency map of object, then approach towards recognition of that object. The geometrical features of salient object are calculated.

Index Terms— Compactness, saliency map, Local contrast, Superpixel

I. INTRODUCTION

The goal of salient region detection is in terms of saliency map, from an image where the detected regions would draw the attentions of people at the principal sight of an image. Saliency identification is utilized to choose consequently the sensory data that is notable to a human vision framework. The visual consideration examination has been divided in two parts i.e., bottom and top down method. Top-down saliency measure is worried with a particular item class and the guide demonstrates where their instances are likely to happen in the scene. The bottom up saliency maps are defined mostly in view of low-level visual stimuli. The proposed system work is planned for the use in image. Here, we propose a saliency map which is more productive and this model uses highlights like compactness and local contrast of an image for producing saliency map. There are different visual cue are used for saliency detection. The uniqueness, background and compactness are visual cues. Salient objects is only the genuine items, henceforth they are assembled. Their yield can be utilized for computer vision issues. The computer vision issues are image order, Object detection. In computer vision undertaking, the salient region detection has been extensively focused on all through the latest couple of years. The quantities of calculations have been proposed for salient area. Most bottom-up salient region detection technique methods consistently separate the salient

object and background. These visual cues incorporate compactness, background and uniqueness. In human visual framework, visual consideration is a critical method. Salient region filters out repetitive visual data and adequately chooses interest of item or subject.

II. SYSTEM OVERVIEW

Following fig shows complete block diagram of our proposed system,

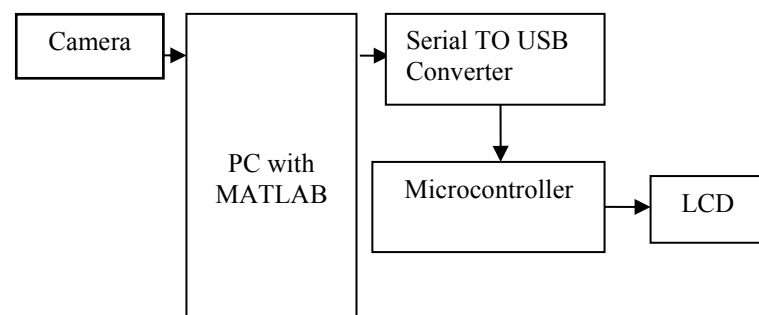


Fig.1. System Block Diagram

In this system camera is use for capturing image. For implementation of system Matlab software is use. To transfer control signal to microcontroller, the serial to USB converter is use. LCD is used for displaying recognize object.

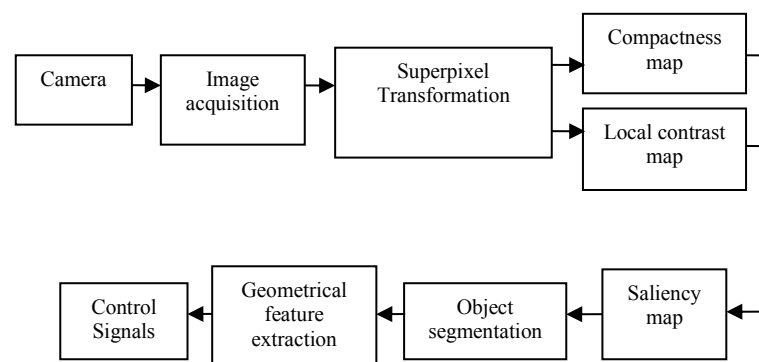


Fig.1. Image Processing Block Diagram

In image processing block diagram different functioning is done on image. I ball camera is use for capturing image.

Image acquisition is first step of the image processing. Then Preprocessing is apply on image for removing noise Here median filter is use for removing noise. Superpixel transformation is applied on image after the preprocess-sing step. The saliency map is getting from compactness map and local contrast.

III. IMPLEMENTATION

The implementation of system is done in MATLAB software.

Algorithm

1. Start
2. Input image
3. Preprocessing of image
4. Abstract image into superpixel
5. Graph model
6. Compactness map
7. Local contrast map
8. Saliency map produced by compactness and local contrast
9. Recognize object
10. Geometrical feature extraction
11. Stop

IV. SIMULATION RESULT

The image acquisition is first step of image processing. After the image has been obtained, various methods of processing can be applied to the image to perform the many different vision tasks. This image is input to the preprocessing step.

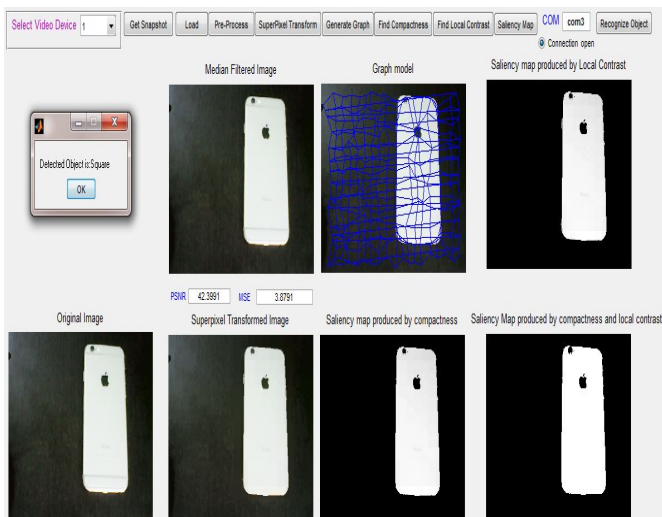


Fig.3. Result of saliency map Image

Image Prepressing is step for removing noise. The input image is from image acquisition step. The median filter is use for removing salt and pepper noise. Here two parameters are calculated that is PSNR and MSE. The value of PSNR and MSE is

PSNR- 42.3991

MSE- 3.8791

In superpixel transform similar intensity of pixel are assign to one desired value. Superpixel is group of similar intensity

vale. These nodes are connected to each other to construct graph. From the constructed graph we found out compact region. Based on this compactness map is detected. Here calculated difference between the intensity of pixel to detect local contrast map. The saliency map is getting from the compactness saliency map and local contrast map.

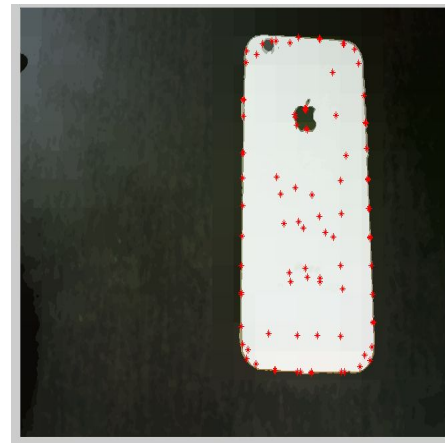


Fig 4.Salient point denoted by red mark

Here we calculate accuracy between ground truth image and saliency map of compactness and local contrast map. For this different parameter is calculated such as True positive, True negative, false positive and false negative.

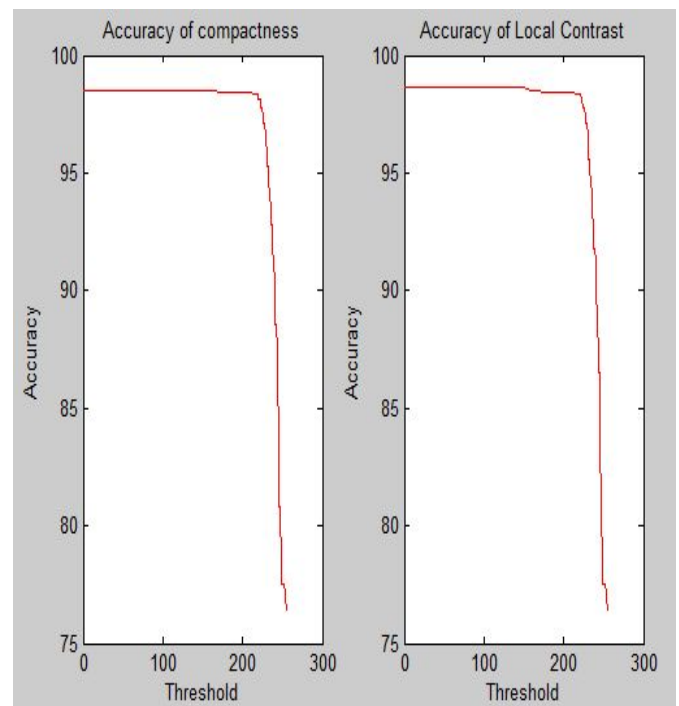


Fig.5.Accuracy graph of compactness and local contrast

The recognize salient object is display on LCD. The shape salient object is display on LCD. The geometrical shape of object is round.

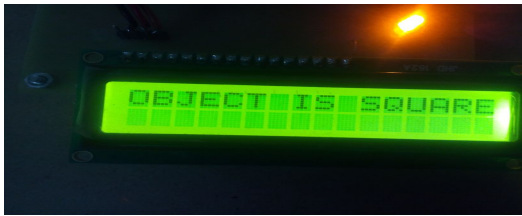


Fig .6. Geometrical shape display on LCD

The geometrical feature of object is evaluated. The area, perimeter and eccentricity of real time image are calculated.

Table I. Geometrical feature object

	Area	Perimeter	Eccentricity
Real Time Image	0.2211	1.2366	0.8601

V. CONCLUSION

Salient region detection is essential theme in computer vision. It has application such as object recognition and object classification. For Salient region detection, we proposed a bottom-up method. Salient regions Detection of images is using integrating two complementary visual cues. Image is used as input. Then to improve quality of image we used median filter. At the same time, we calculate the two parameters that is peak to noise signal and Mean Square Error. Two parameters gives value that specify how much noise is remove from image. The abstract image into superpixel transforms. The node of superpixel is connected to one to another to construct a graph. The variance and standard deviation of pixel is calculated .This method of calculating variance and standard deviation is help for selecting compactness map. The difference between of intensity of pixel is calculated for local contrast. The saliency map is getting from two visual cue .The visual cue are compactness map and local contrast map.

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REFERENCES

- [1] Li Zhou, Zhaohui Yang, Qing Yuan, Zongtan Zhou, and Dewen Hu, " Salient Region Detection via Integrating Diffusion-Based Compactness and Local Contrast," IEEE Transactions On Image Processing, Vol. 24, No. 11, November 2015.
- [2] L. Itti, C. Koch, and E. Niebur, "A model of saliency-based visual attention for rapid scene analysis," IEEE Trans. Pattern Anal. Mach. Intell., vol. 20, no. 11, pp. 1254–1259, Nov. 1998.
- [3] Y. Zhai and M. Shah, "Visual attention detection in video sequences using spatiotemporal cues," in Proc. 14th Annu. ACM Int. Conf.Multimedia, 2006, pp. 815–824.
- [4] V. Gopalakrishnan, Y. Hu, and D. Rajan, "Salient region detection by modeling distributions of color and orientation," IEEE Trans. Multimedia, vol. 11, no. 5, pp. 892–905, Aug. 2009.
- [5] Radhakrishna Achanta, AppuShaji, Kevin Smith, AurelienLucchi, Pascal Fua, and Sabine S'usstrunk"SLIC Superpixel Compared to

- State-of-the-art Superpixel Methods,"Journal Of Latex Class Files, Vol. 6, No. 1, December 2011
- [6] C. Guo and L. Zhang, "A novel multiresolution spatiotemporal saliency detection model and its applications in image and video compression,"IEEE Trans. Image Process., vol. 19, no. 1, pp. 185–198, Jan. 2010.
- [7] N. Bruce and J. Tsotsos, "Saliency based on information maximization", inProc. Adv. Neural Inf. Process. Syst., 2006, pp. 155–162.
- [8] R. Achanta, F. J. Estrada, P. Wils, and S. S'usstrunk, "Salient region detection and segmentation," in Proc. 6th ICVS, 2008, pp. 66–75.
- [9] Congyan Lang, Guangcan Liu, Member, IEEE, Jian Yu, and Shuicheng Yan, Senior Member, IEEE, "Saliency Detection by Multitask Sparsity Pursuit," IEEE Transactions On Image Processing, Vol. 21, No. 3 March 2012.
- [10] L. Zhu, D. A. Klein, S. Frintrop, Z. Cao, and A. B. Cremers, "A multisize superpixel approach for salient object detection based on multivariate normal distribution estimation," IEEE Trans. Image Process., vol. 23, no. 12, pp. 5094–5107, Dec. 2014.