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Enhanced Adaptive Metric Learning for Saliency Detection

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Abstract— In Saliency detection, i.e. Object Detection means finding a specific object in an Image. For example, consider an image of Parrot in a tree in a park. In this image our object is Parrot. Now, we extract only parrot using object detection method. For this object detection "Adaptive metric Learning" is a new approach in which we detect the salient features of an object based on Mahalanobis distance metrics. Mahalanobis distance means measuring the distance between two complex objects including the variance unlike Euclidean distance where the distance between two points is measured in a simple plane objects. This is mainly used to identify the objects which the user will focus. There are lot of applications under this visual saliency, mainly aims at finding the regions on an image that are more visually distinctive or important and often serves as a pre-processing procedure for many vision tasks, such as image categorization, image retrieval, image compression, content-aware image/video resizing, etc. There are a number of existing approaches like Gaussian pyramids, central-surround, fuzzy growing, GML and SML, etc. among these approaches two complementary Mahalanobis distance metrics: 1) Generic metric learning (GML) and 2) Specific metric learning (SML) are very effective. GML mainly aims at the global distribution of the whole training set, while SML considers the specific structure of a single image after fusing the GML and SML together experimentally and the combining result does work well. But there are some drawbacks in this. That are the Time complexity is high because for GML a lot of training sets to be examined and the number of iterations is also not optimum.

Keywords— GML, SML, SFC, MMLS

I. INTRODUCTION

Visual saliency aims at finding the images by applying some image processing methods like Gaussian Pyramids, Central-Surround and Mahalanobis distance etc. First of all some of the images were taken and were treated Image data samples for the image processing of data by applying some of the image processing methods like Euclidean distance and Mahalanobis distance to find the accurate image data sample from the sample set of the image data base taken for testing the images. By separating the salient regions of the image from the non-salient images this above methods are going to measure the differences in between their image features. For detecting the complex images, it is more difficult to detect the object by using Euclidean distance technique and for the further operations involved in order to find the images from the sample set of the image database.

II. RELATED WORK

There are many of the applications under this visual saliency mainly aims at finding the regions on an image that are more visually distinctive or important. Often serves as a pre-processing procedure for many vision tasks, such as image categorization, image retrieval, image compression, content-aware image/video resizing, etc. The existing system has an approach which used two complementary Mahalanobis distance metrics: Generic metric learning (GML) and Specific metric learning (SML). GML mainly aims at the global distribution of the whole training set, while SML considers the specific structure of a single image. They fused the GML and SML together experimentally and the combining result does work well. But there are some drawbacks in this. There are many of applications under this visual saliency mainly aims at finding the regions on an image that are more visually distinctive or important. To overcome the above drawbacks, we implement a novel 'Weighted Guided Image Filtering' method to get more accuracy, we are going to implement SVM (Support Vector Machine) classifier to increase the accuracy of saliency detection, This will decrease the training sets, time complexity and iterations as much as possible.

III. PROBLEM STATEMENT

Generally by using Euclidean distance technique, to find the pattern of the image by collecting some image data samples, it is easier to find and recognize the images which are simple. But by applying Euclidean distance technique it is very difficult to recognize the images from the sample image data set. To overcome this problem an Adaptive metric learning system has been developed for the classification of the images from the gathered image data samples. This Adaptive metric learning system comprises with Generic metric and Specific metric techniques which can easily identify the complex pattern of the images quiet easily.

IV. PROPOSED SYSTEM

A system named Multiple Metric System which consists of multiple flow of mechanism in between the two elements named Generic metrics and specific metrics. These both Generic metrics and specific metrics have inter-linkage with each other and classify the images simultaneously with in the image data set of samples. Here Generic metric learning GML will hold the training data set of images at a time and Simultaneously Specific metric learning SML will classify and identifies the pixel-wise object of the image selected and shows the super pixel-wise object of the image which helps in finding the complex pattern of images from the relational image data base.

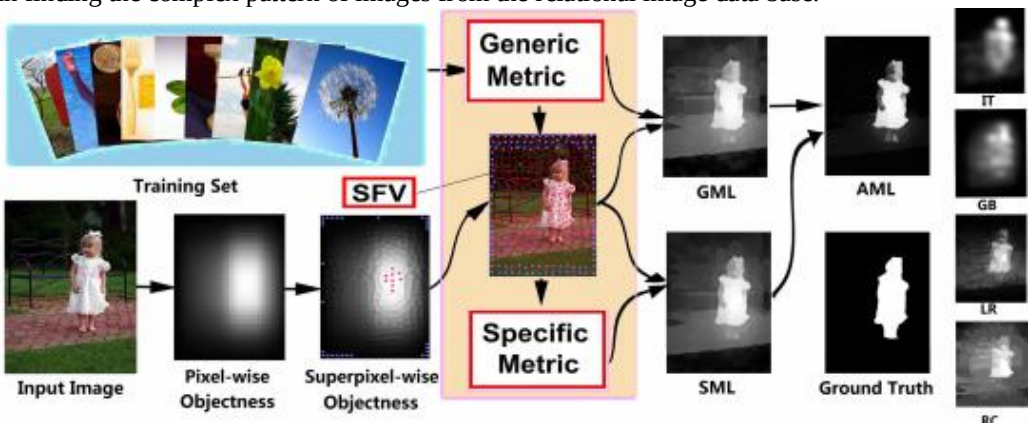

Figure 4. Multiple Metric System Over View

4.1 Super pixel-wise fisher vector coding (SFC)

The Super pixel-Wise vector coding will effectively extracts the important information and terminates redundancies and thus it improves the performance of the salient detection of the images from the sample image data sets. It will also capture first-order and the second-order difference in between the local image features and also helps in resizing the image. Instead of averaging of the low-level pixels it statistically analyzes each and every single set of pixels. To overcome the drawbacks the Multiple Metric system uses another new approach. This system is going to increase the accuracy of saliency detection and also decrease the training sets by using SVM classifier and also we are going to incorporate Super pixel wise Fisher vector coding approach precisely into the proposed system and we will reduce the iterations as much as possible. So we can overcome all the low level features and finally we can see the high dimensional and true image.

4.2 Adaptive metric learning

This Adaptive metric learning is the metrics which helps in learning about the Fixed metrics of the image data samples and also breakdowns the present irrelevant and unreliable features. This approach is also known to find the integration of the supervised distance of the sample data in GML and SML, which are complementary to each other. And also the adaptive metric learning considers the global distribution of the data samples of the whole training data set of images.

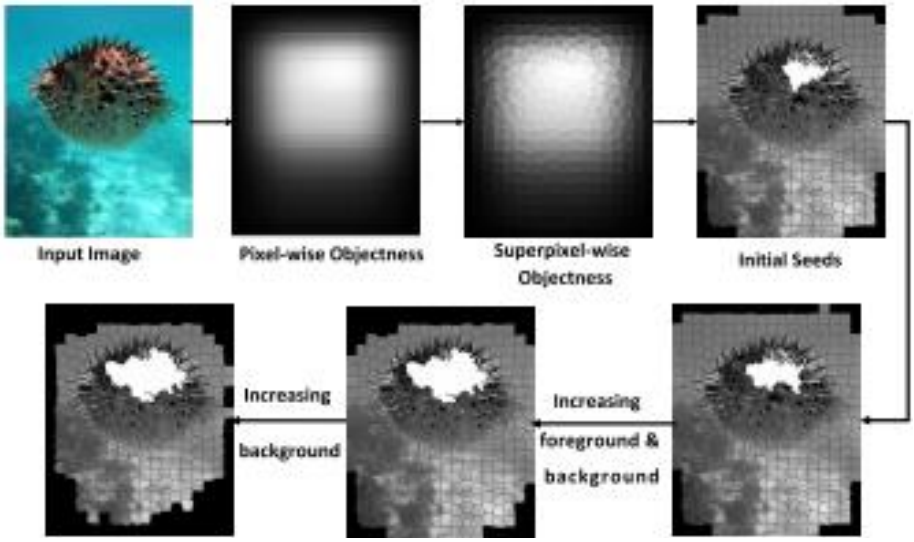

Figure 4.2 Work Flow of AML

4.2.1 Generic metric learning (GML)

The metric learning has been commonly applied for the vision tasks, but it was not used for the saliency detection of the image data samples from the training data set of image data. This Generic machine learning process is infeasible for single processing of the images; it is better feasible for multiple processing of the image data.

4.2.2 Specific Machine Learning (SML)

By adding constraints to the specific machine learning and by applying Triple-SVM to the saliency detection which will give better results with less training time. Therefore it will be suitable and feasible to train the test case images. So by adding the constraints and by applying the Triple-SVM to the saliency detection will be able to display better results.

V. EXPERIMENTAL RESULTS

To perform saliency detection of the selective images this system named Multiple metric learning system uses multiple processing elements such as GML and SML. This GML and SML will work simultaneously in the saliency detection of the image from the training data set. The experimental results are shown below.

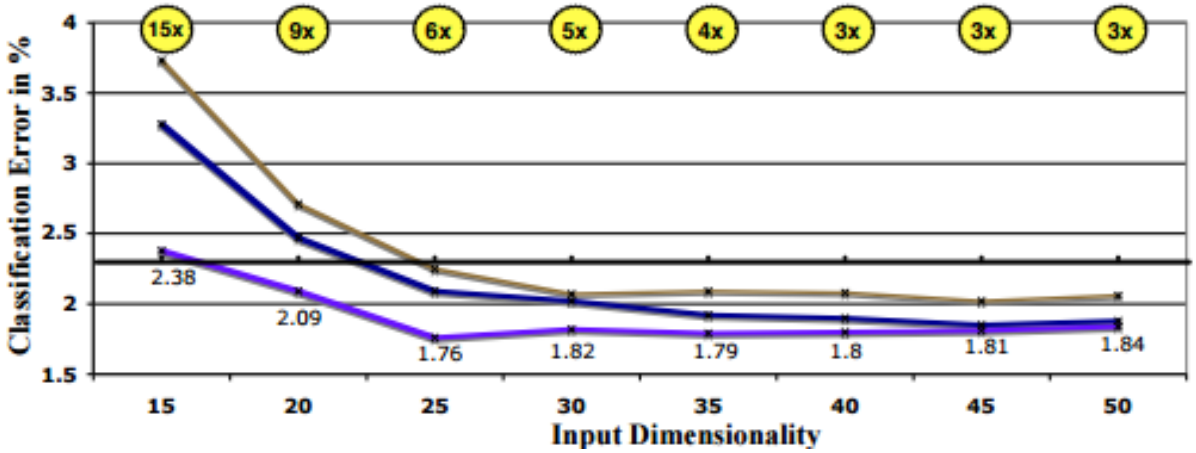

Figure.5 Saliency detection graph

VI. CONCLUSION

We are going to implement SVM (Support Vector Machine) classifier to increase the accuracy of Saliency Detection, so this will decrease the training sets, time complexity and iterations as much as possible. The multiple metrics learning system will give better accurate results for the selective images to perform Saliency detection within the training image data sets. The two levels inter linkage framework in between SML and GML will helps the Multiple Metric Learning System (MMLS) in order to predict accurate results in Saliency Detection.

REFERENCES

[1] Shuang Li, Huchuan Lu, Senior Member, IEEE, Zhe Lin, Member, IEEE, XiaohuiShen, Member, IEEE, and Brian Price "Adaptive Metric Learning for Saliency Detection" 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] C. Yang, L. Zhang, H. Lu, X. Ruan, and M.-H. Yang, "Saliency detection via graph-based manifold ranking," in Proc. IEEE Conf. Comput. Vis. Pattern Recognit., Jun. 2013, pp. 3166–3173.

[4] K. Q. Weinberger, J. Blitzer, and L. K. Saul, "Distance metric learning for large margin nearest neighbor classification," in Proc. Adv. Neural Inf. Process. Syst., 2005, pp. 1473–1480.

[5] H. Jiang, J. Wang, Z. Yuan, Y. Wu, N. Zheng, and S. Li, "Salient object detection: A discriminative regional feature integration approach," in Proc. IEEE Conf. Comput. Vis. Pattern Recognit., Jun. 2013, pp. 2083–2090.

[6] Y. Wei, F. Wen, W. Zhu, and J. Sun, "Geodesic saliency using background priors," in Proc. 12th Eur. Conf. Comput. Vis. (ECCV), 2012, pp. 29–42. [26]

[7] B. Jiang, L. Zhang, H. Lu, C. Yang, and M.-H. Yang, "Saliency detection via absorbing Markov chain," in Proc. IEEE Int. Conf. Comput. Vis., Dec. 2013, pp. 1665–1672.

[8] Y. Xie and H. Lu, "Visual saliency detection based on Bayesian model," in Proc. 18th IEEE Int. Conf. Image Process., Sep. 2011, pp. 645–648.

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