International Journal of Current Research and Modern Education (IJCRME)
ISSN (Online): 2455 – 5428 & Impact Factor: 3.165
Special Issue, NCFTCCPS - 2016

IMAGE ENHANCEMENT ON RANDOMIZED SPATIAL CONTEXT ON OBJECT SEARCH IN IMAGES

D. Bharathi*, M. Mythili & K. Soundarya*****
B.Tech Student, Department Of Information Technology, V.S.B Engineering College, Karur, Tamilnadu

Abstract:

Image processing is a method to convert an image into digital form and perform some operation. To analysis and manipulation of digitized images especially in order to improve the quality of images. Searching visual objects in large image or images in a video datasets is a challenging problem, because it requires efficient matching and accurate localization of query objects that often occupy a small part of an image. Although spatial context has been shown to help produce more reliable detection than methods that match local features individually, how to extract appropriate spatial context remains an open problem. Instead of using fixed-scale spatial context, we propose a randomized approach to deriving spatial context, in the form of spatial random partition. The effect of spatial context is achieved by averaging the matching scores over multiple random patches. Our algorithm lends itself to easy parallelization and also allows a flexible trade-off between accuracy and speed through adjusting the number of partition times.

Key Words: Object Search, Spatial Context, Random Partition, Matching & Partition

Introduction:

Image Processing:

The analysis of a picture using techniques that can identify shades, colors and relationships that cannot be perceived by the human eye. A technique in which the data from an image are digitized and various mathematical operations are applied to the data, generally with a digital computer, in order to create an enhanced image that is more useful or pleasing to a human observer, or to perform some of the interpretation and recognition tasks usually performed by humans. Also known as picture processing.

Types:

There are two types of methods used for image processing namely,

- Analogue Image Processing
- Digital Image Processing

Image processing basically includes the following three steps:

- Importing the image via image acquisition tools;
- Analysing and manipulating the image;
- Output in which result can be altered image or report that is based on image analysis.

Existing System:

The matching of local visual features plays a critical role in the state-of-the-art systems for visual object search and detection. The fundamental problem is to measure the similarity between an object (query) and a sub-region of an image. Sub-regions with the highest similarity scores are identified as the detection or search results. One category of methods represents each image as a collection of local features, and assumes that they are independent from each other. Thus the matching score of the whole or sub image can be calculated as the summation of the matching scores of its individual features. Such a Naive-Bayes assumption.

E.g., Naive-Bayes Nearest Neighbor classifier has led to successes in visual object recognition, detection and search. However, as local features are in fact not spatially independent, rather than matching local features individually, some methods propose to consider the spatial context for matching. For example, a group of co-located visual features can be bundled together and matched as a whole. The benefits of introducing such a feature group for visual matching have been proven to generate more reliable and discriminative results than matching individual features, thus leading to a higher precision in visual matching and search.

Despite previous successes in employing spatial context for more discriminative visual feature matching, e.g. visual phrases or bundled features. One problem remains unsolved: How to select the appropriate spatial context when matching local features?
In general, there are two ways to select the spatial context.

- The first category of methods relies on image segments or regions to determine the spatial context, where local features located in the same image region or segment are bundled together and matched as a whole. Although such spatial context is reasonable, this approach is highly dependent on the quality of image segmentation or region detection results, which require a time consuming pre-process to obtain and are usually unreliable.
- The second category of methods selects the spatial context at a relatively fixed scale. The most common way is to bundle each local point with its k spatial nearest neighbors, namely k-NN group.

Algorithm:

Spatial Random Partition for Object Search

Input: An image database D = {Ii} the query object Q+ (sometimes the negative query Q− is also given to model the backgrounds),

Output: Sub images {Lg}, which contain the retrieved object.

Partition: ∀Ii ∈ D, partition it into M ×N patches for K times randomly, and obtain a pool of patches Pi = {Pi} containing M × N × K patches (Sec. III-B).

Matching: ∀Pi ∈ Pi Q+ (or both Q+ and Q−), and assign it a weight proportion to its similarity to the query object Q+ (Sec. III-C).

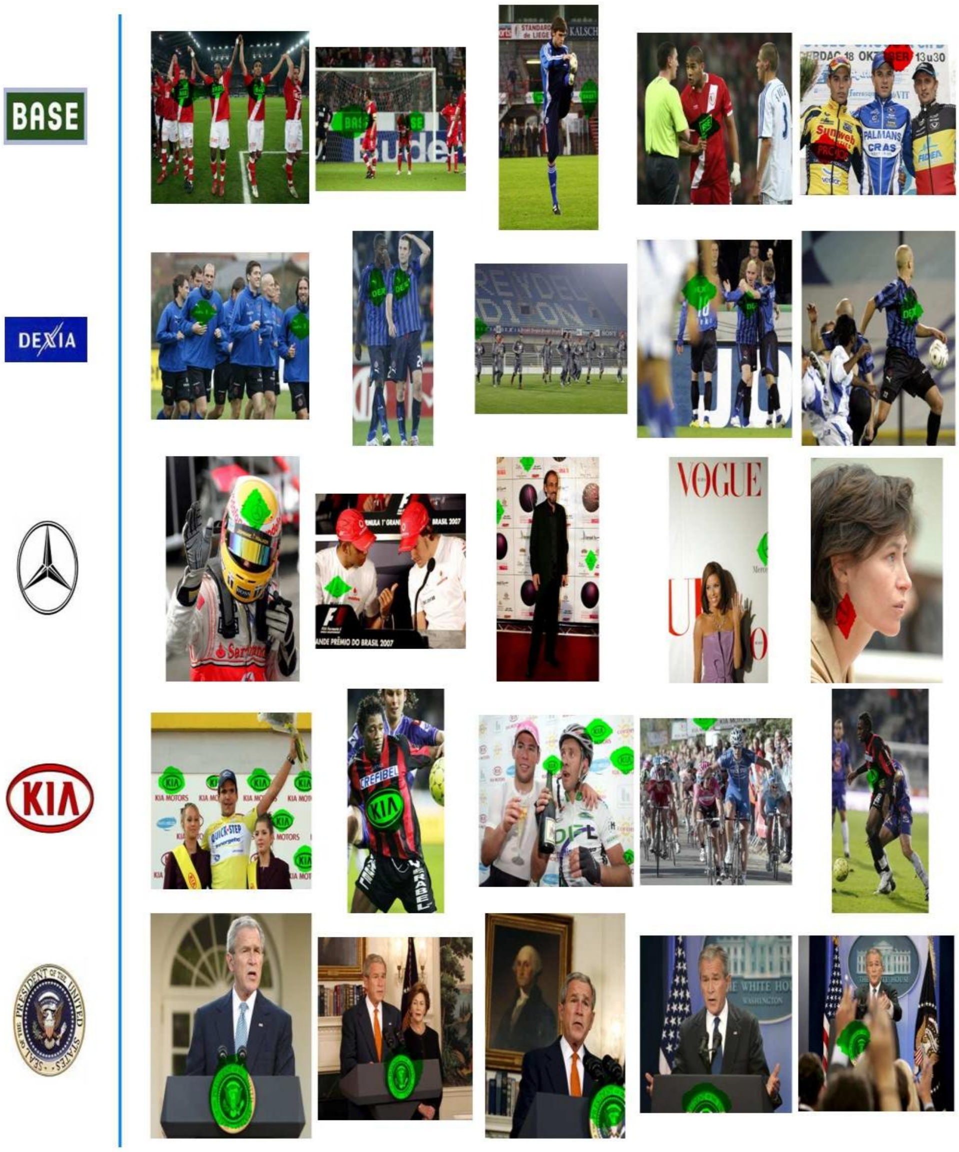
Voting: ∀Pi ∈ Pi pixel it contains, and a pixel-wise confidence map is generated for each image Ii (Sec. III-C).

Localization: ∀Ii ∈ D, segment out the dominant region Li from its confidence map as the object location (Sec. III-D), match it against the query object, distribute its voting weight to each examples of our search results on the BelgaLogos database for 5 logos: Base, Dexia, Mercedes, Kia and President (from top to bottom). Queries from Google are in the first column. The selected search results are in the right columns. The correct detections are denoted in green while the wrong detections are in red. We can see that our random partition approach is able to produce satisfactory results even for challenging images, such as non-rigid deformation (row 1, column 5) and bad partial occlusion (row 3, column 5). Moreover, it can handle the multiple objects case (row 4, column 2).

Proposed System:

Implement SVM classification approach to match various features and extract the features using SURF features. Implement Spatial Random Partition for Object Search approach to track visual objects. And KNN algorithm to search the objects in image databases.

Identifying an (identical) object in a database of images is a challenging problem because the object can have a different size and pose in the target and query images, and also the target image may contain other objects (Bclutter) that can partially occlude the object of interest. However, successful methods now exist which can match an object's visual appearance despite differences in viewpoint, lighting, and partial occlusion. Typically, an object is represented by a set of overlapping regions each represented by a vector computed from the region's appearance.



The region extraction and descriptors are built with a controlled degree of invariance to viewpoint and illumination conditions. Similar descriptors are computed for all images in the database. Recognition of a particular object proceeds by nearest neighbor matching of the descriptor vectors, followed by disambiguating or voting using the spatial consistency of the matched regions, for example by computing an affine transformation between the query and target image. The result is that objects can be recognized despite significant changes in viewpoint, some amount of illumination variation and, due to multiple local regions, despite partial occlusion since some of the regions will be visible in such cases. Examples of extracted regions and matches are shown in figure.

We have to improve the quality of an image and this image is divided in to backgrounds image and foreground image and give quality improvement in an image. Our approach offers three benefits:

1. The aggregation of the matching scores over multiple random patches provides robust local matching
2. The matched objects can be directly identified on the pixel wise confidence map, which results in efficient object localization
3. Our algorithm lends itself to easy parallelization and also allows a flexible tradeoff between accuracy and speed through adjusting the number of partition times. Both theoretical studies and experimental comparisons with the state-of-the-art methods validate the advantages of our approach.

Conclusion:

In this paper, we propose a scalable visual object search system based on spatial random partition. Our main contribution is the introduction of randomized spatial context for robust sub-region matching. We validate its advantages on three challenging databases in comparison with the state-of-the art systems for object retrieval. It is shown that compared with systems using only individual local features or fixed-scale spatial context, our randomized approach achieves better search results in terms of accuracy and efficiency. It can also handle object variations in scale, shape and orientation, as well as cluttered backgrounds and occlusions. We also describe the parallel implementation of our system and demonstrate its performance on the one million image database. Moreover, we can use discriminative patch matching and interactive search to further improve the results.

Acknowledgement:

We would like to acknowledge the guidance of Assistant Professor Mr. S. Sam Peter for his insightful support and inspiration throughout the various stages of this project. We sincerely appreciate the help and advice given by his which went a long way in helping us understanding the key concept of this project.

References:

1. J. Deng, A. C. Berg, and L. Fei-Fei. Hierarchical semantic indexing for large scale image retrieval. In Proc. IEEE Conf. on Computer Vision and Pattern Recognition, 2011.
2. R. Girshick, J. Donahue, T. Darrell, and J. Malik. Rich feature hierarchies for accurate object detection and semantic segmentation, 2014.
3. J. He, R. Radhakrishnan, S.-F. Chang, and C. Bauer. Compact hashing with joint optimization of search accuracy and time. In Proc. IEEE Conf. on Computer Vision and Pattern Recognition, 2011.
4. Y. Jiang, J. Meng, and J. Yuan. Grid-based local feature bundling for efficient object search and localization. In Proc. IEEE Conf. on Image Processing, 2011.
5. Y. Jiang, J. Meng, and J. Yuan. Randomized visual phrases for object search. In Proc. IEEE Conf. on Computer Vision and Pattern Recognition, 2012.
6. R. Behmo, P. Marcombes, A. Dalalyan, and V. Prinet. Towards optimal naive bayes nearest neighbor. In Proc. European Conf. on Computer Vision, 2010.
7. O. Boiman, E. Shechtman, and M. Irani. In defense of nearest-neighbor based image classification. In Proc. IEEE Conf. on Computer Vision and Pattern Recognition, 2008.