

Logo Recognition in a Cluttered Scene Using Point Feature Matching with SURF Techniques

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ABSTRACT

Logo recognition is very important to verify the branded logo and save the people from fake brands. The main idea of this research paper is to find out the accurate logos of different brands in images or videos.

In this research paper we will get that how to recognize the original logos of different brands in cluttered images.

Keywords: Logo Recognition, Point Feature Matching, SURF.

INTRODUCTION:

Logo recognition is an interesting and important topic for research in modern Science. Now we have lot of brands in overall world. So it is very difficult to recognize, which is Original and which is duplicate logo of different brands when you are going to buy some products. For those kinds of situations, we should have a logo recognizer tool, which will help you to identify the Original and Duplicate logos. We can use this to recognize Original and Duplicate notes also, which will be very helpful.

Here we are going to detect the feature of the logo from cluttered image. In this feature detection process we will detect the unique features/objects from the image/logo and we will compare with the cluttered image.

We should check and detect unique features from different angle by rotating the image. It should work from all angles.

There are different types of shapes in a single logo that may be square, circle, rectangle, etc... It is very easy to prepare a duplicate logo with normal symbols like square, circle, rectangle, etc... So original image or logo should have some additional hidden features, which should not be visible to normal eyes but we should detect those unique features from the logo. Then only logos will be more secure, which can't be copy by others.

Here we are going to identify the logo from a cluttered image, which will detect the logo from every angle.

SCIENTIFIC RESEARCH METHOD:

Researchers can give conclusion after completing or studying the solvable problem or issue and on getting their outputs or results. In this scientific research method researcher should resolve the problems using scientific equations or methods which have multiple number of steps. Those steps or methods should prove by other senior scientist or any scientific organization or community. We should have basis for or scientific research and basis should be strong.

POINT FEATURE MATCHING:

Using this algorithm or method we can detect a specific object using unique points or by finding the points between reference logo or image and target logo or image. By using point feature matching algorithm or method, we can detect or find any type of logo or image by rotating the target image.

Point feature matching method doesn't work in coloured images. Hence first we have to convert an image into grey scale then only we can detect the feature points of objects by finding the points using this method.

NOTE: Point feature matching algorithm or method has written to detect or finding out the specific image or object from a cluttered image. E.g. Dairy milk logo in the reference image, rather than any dairy milk logo. This method use SURF technique to identify or detect the feature points to detect the objects like face, logos or brands etc...

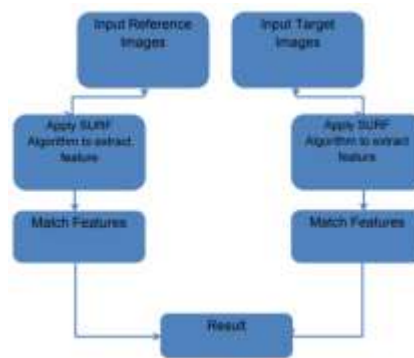


Figure: Architecture Diagram

SURF:

In computer science or computer vision, Speed Up Robust Features (SURF) helps to detect the features of the objects in an image and describe the features of the objects. SURF technique can be used for different tasks like object recognition, classification of images or image registration etc...

This SURF method has come from Scale-invariant feature transform (SIFT) descriptor. The SURF method is very faster than SIFT method. To detect the points, SURF (Speeded Up Robust Features) uses an integer approximation of the determinant of Hessian blob detector. This can be calculated with three different integer operations using a pre-computed integral image.

SURF's feature descriptor is based on the addition of the Haar wavelet output/response around the point of interest.

We can use SURF detector or descriptor to detect the objects, faces or people, to reconstruct 3D scenes, to track the objects and extract points of interest.

SURF was first developed or presented by Herbert Bay, et al., at 2006 European Conference on Computer Vision. A better or upright version of SURF (called U-SURF) is not invariant to image rotation. Hence faster to compute and better result for application where the camera remains more or less horizontal.

The image is converted into coordinates, using the multi-resolution pyramid technique. Then to copy the actual image with Pyramidal Gaussian or Laplacian Pyramid shape to obtain an image with the same size but with reduced bandwidth. This acquires a special blurring effect on the original image, which is known as Scale-Space and ensures that the points of interest are scale invariant.

Algorithm and features:

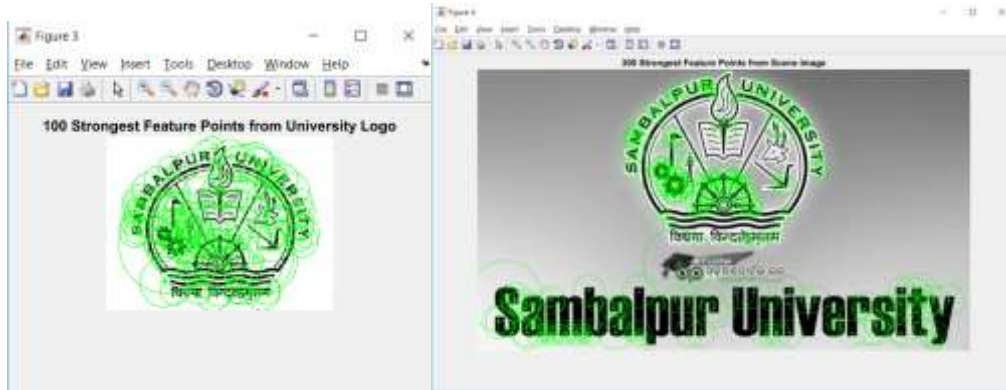
The Speeded Up Robust Features algorithm is based on the equal principles and steps as SIFT, but details in each step are not similar.

The SURF algorithm/method has 3 parts:

1. Interest point detection
2. Local neighbourhood
3. Description and matching

Experiment:





LITERATURE SURVEY:

This paper analyses the various articles on Logo Recognition which help understand the topic in a new perspective.

Sl.No	Author	Year	Method used	Result
1.	FanmanMeng, Hongliang Li	2013	MRF, SIFT	They presented work on web logo detection by using MRF method in used to segment the logo from images and then SIFT method is used to match the feature with logo as per his opinion it gives good result.
2.	Remya Ramachandran, Andrews Jose	2014	SURF	The performance is evaluated and compare the results with SIFT descriptors. SURF algorithm is better than the SIFT algorithm and will give better matching
3.	Prof. Mrunalinee Patole, Meera Sambhaji Sawalkar	2014	CSD	They presented novel solution for logo matching and recognition based on Context-Dependent Similarity (CDS) kernel is proposed and it's able to match and recognize multiple instances of multiple reference logos in image archives. Query logo and target logo images consist of spatial context of local features like interest points, regions.
4.	B.SaiPrasanthi, D. Rajesh Setty	2015	SUM	They extracted six features from images by using sum technique. This mechanism involves an amount of components with image processing, edge detection, image segmentation, characteristic extraction, comparing images.
5.	C. Constantinopoulos, E. Meinhardt-Llopis, Y. Liu, and V. Caselles	2011	SURF	They have presented a method for detecting appearance of logo contain in low-resolution videos sequence. The method is based on matching the SIFT descriptors, plus several heuristics. The logos must come from small databases of possible logo. The emphasis is not on the speed but it is on reliability, although the method can be executed in real time using a parallel computer.
6.	Mustafa S. Kadhm, Lim Shu Yun	2015	OpenCV	This is complete tool for detecting Vehicle Brand of logo or as part for image noise removal technology it is a very important in computer vision applications. By developing this framework it is better to test and match the logo it gives very nice result for detecting logo Vehicle Brand
7.	Vaijinath V. Bhosle and Dr. Vrushsen P. Pawar	2017	SIFT and SURF	This paper pass different images of different institution with different size like 3500 x 2500 to the module and this module return only extracted logo from large images. And the logo size is 400x400 with full accuracy. This paper applies SURF method to extract and match the logo. Spatial density method is also used to extract the logo from images. But surf method is better than this method.
8.	Remya Ramachandran, Andrews Jose	2014	SURF	The performance is evaluated and compare the results with SIFT descriptors. SURF algorithm is better than the SIFT algorithm and will give better matching

CONCLUSION:

The purpose of this paper is to extract the logo from different images, match the feature of logo with original image or any other document if it is match then it display the position of the logo. Segmentation based on multiple techniques such as Gaussian filter, content-based image retrieval, edge detection, thresholding and histogram-based methods. All these techniques are strong points for logo segmentation also planned to design a novel approach for region detection

and segmentation for the document images. This paper presents the module to extract the logo automatically from different images. Idea is that it should find the valid logo is belongs to which product company or brand. Proposed work is used to apply different parameters to check originality of product like logo on product.

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