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LOGO RETRIEVAL AND RECOGNITION USING DIFFERENT ALGORITHMS

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Abstract - *Logo is very important as it gives identification of source. Sometimes there may be unauthorized use of logos which can make loss to the customers. So that retrieval and matching with original logo become important task. Our contribution in this is detection of original logo by using algorithms like RANSAC and CDS. We will apply these algorithms on flickr 32 database.*

Key Words: *RANSAC, CDS.*

1.INTRODUCTION

Logos are very important in our day to day life as it gives identity of their source. We can recall or recognize the particular product by only looking at the logo so that it can be said that logo plays very important role for any industry or company. Having a good or attractive logo, become a one of a marketing strategy. Logos are in the form of some objects, names or may be simply name. Company or industry try to develop such logos which gives some strong meaning regarding their product through that logo.

But sometime what happens there may be misuse or improper use of logo takes place. That can cause loss to the customers and also to the company. There are slight changes in their appearance which can not be noticeable to the people easily. There may be change of size, dimensions, color or name in original image. So that detection and matching with original image is necessary. Therefore for detecting and matching with original logo we use here some matlab based algorithms like RANSAC algorithm and CDS(context Dependent Similarity) based algorithm.

Related to this field early system developed was Kato's system[11]. In this Kato's system Mr. Kato proposed database architecture for a content based image retrieval. In that it mapped a normalized logo image to a 64 pixel grid, and calculate global feature vector from the frequency distributions of pixels of edge. Then next system was proposed by the Wei et al[3]. He gives different solution for this where global Zernike moments, local curvature and distance to centroid of the logo is calculated.

Other methods used different global descriptors of the full logo either evaluating logo contours or exploiting shape descriptors such as shape context[8] . Phan et al. [13], [14] considered pairs of color pixels in the edge neighborhoods and calculate differences between two pixels at different spatial distances into a histogram of Color-Edge Co-occurrence[13]. This global descriptor allows to perform fast approximate detection of logos, but it is not suited when incomplete information or transformed versions of the original logo. many authors used interest points and local descriptors and is appear much more appropriate to support detection of graphic logos in real world images.

Sivic and Zisserman [20], [21], used the bag of visual words approach to represent affine covariant local regions from a SIFT descriptors, visual words were weighted with tf-idf for large-scale retrieval. They gave good capability to discriminate between objects, and also gave examples of logo matching in unconstrained environments. In their approach they did not considered a relationships between the near keypoints. But it simply defined a spatial proximity criterion, in that they were checking the local context of the 15 nearest neighbors of each feature match.

In [18], logos were described as bag of SIFT features for logo detection and recognition in sequences of sports video. Taking a bag of SIFT points instead of bag of visual words has the advantage that only a few highly distinctive keypoints are searched for matching and can avoid the formation of the visual vocabularies .

Next improvement in this is the RANSAC algorithm. In this algorithm they perform geometric consistency checking in order to discard outliers assuming the presence of affine geometric transformation between query and target images. In [4]RANSAC algorithm is applied to refine the initial set of feature matches. In this way they introduce a geometric verification according to a model (affine transformation).

Further improvement in this field is "Context Dependent Similarity" (CDS) based algorithm. This algorithm is deals with the spatial context of local features [23]. This method is model-free. Context is considered with respect to each single SIFT keypoint

2. RANSAC ALGORITHM

RANSAC is nothing but Random sample consensus. This method is model based method. It performs number of iterations to estimate a mathematical model from a data set that contains outliers. It is a non-deterministic algorithm means that it produces a result only with a certain probability and this probability increases with increase in iterations.

1. Select a subset of the data set randomly.

2. For the selected subset fit a model.

3. Finding the number of outliers.

4. Repeat above steps 3 steps for a prescribed number of iterations.

3. CDS ALGORITHM

CDS is context dependent similarity. "Context Dependent Similarity" is used to identify the logo. It incorporates the spatial context of local features. This method is model-free, i.e. it is not restricted to any a priori alignment model. It is very useful method for detection and matching real world images and also for noisy images.

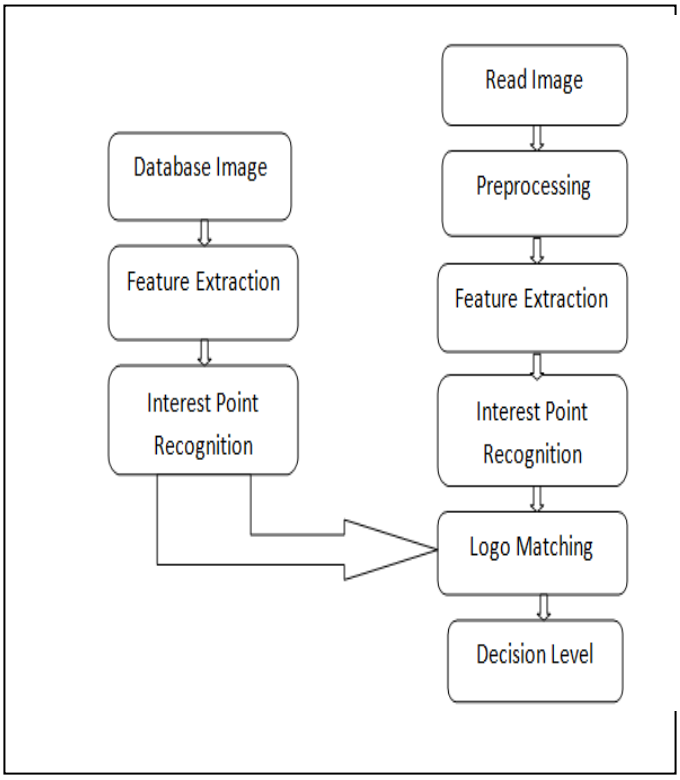

Fig1: Block diagram of CDS algorithm.

Figure above shows block diagram of CDS. Pre-processing is an important technique which is usually done to filter out the noise and to improve the quality of the image before any processing. Then feature extraction is carried out. It considers Color i.e calculate percentage of color present in image. Text i.e. Find an unique underlying characteristics of textures and Edges correspond to large discontinuities in the image. After that Interest point recognition in that Intersection point between two or more edge segments is carried out. The context and orientation of the interest points are considered. Context is nothing but the 2D spatial coordinates and Orientation refers to the angle of the interest points. Interest point recognition is based on the edge and curvature of the logo images. And finally Logo matching is done by detecting the same feature points independently in both logo images. Localization is used to find where exactly is the point.

4. RESULTS:

Fig2: Original Image which is stored in database

Fig3: Input image which is to be tested

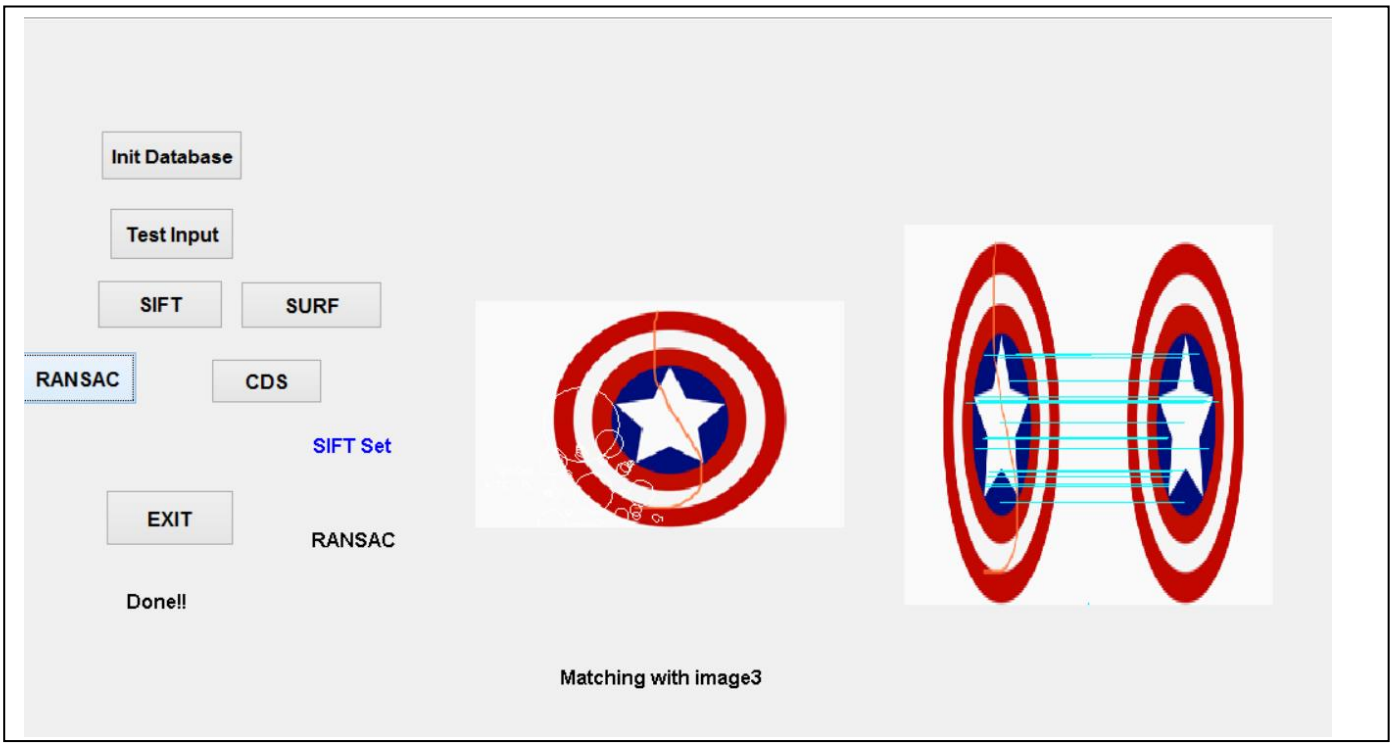

Fig4: Result of RANSAC Algorithm

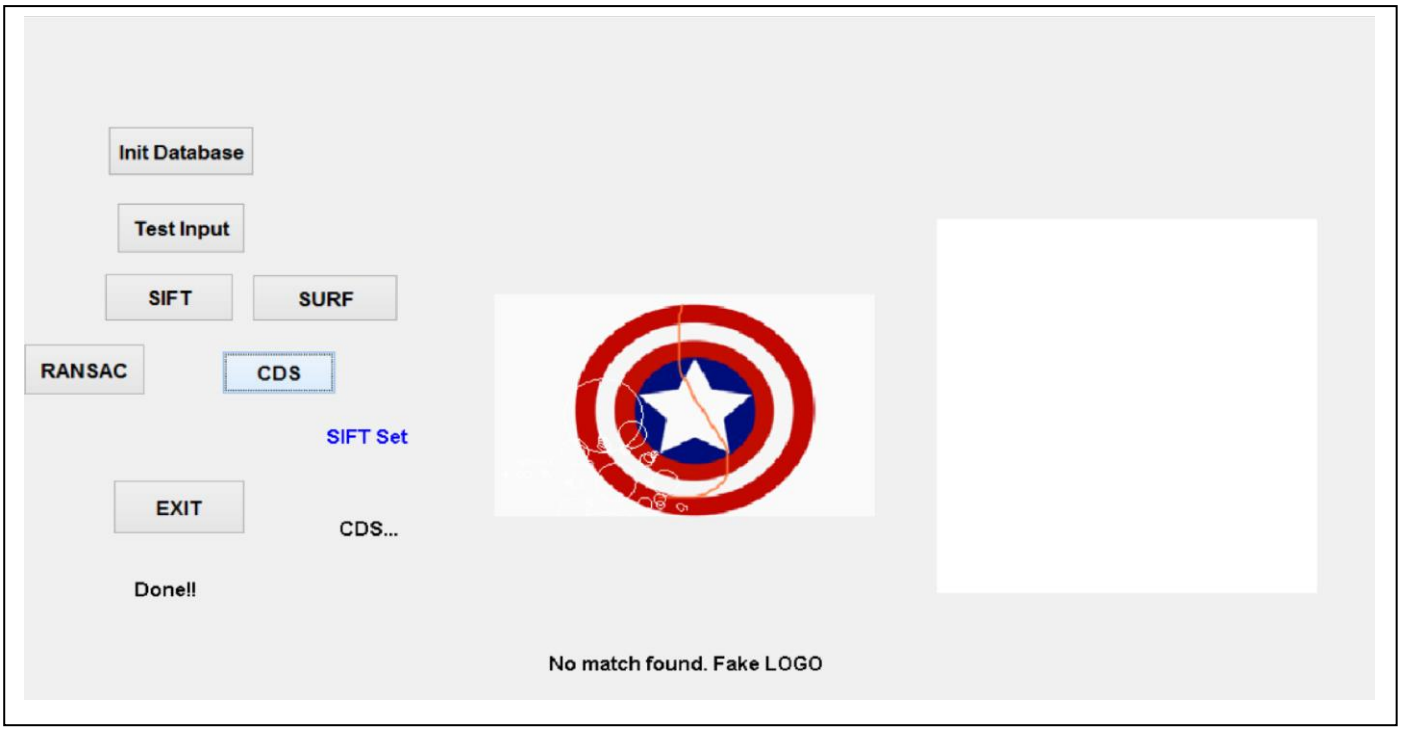

Fig5: Result of CDS Algorithm

Fig-2 shows the original logo of captain America. Fig-3 shows the image which is to be tested. This image is input to the RANSAC algorithm. Then fig-4 shows the output of RANSAC algorithm. Even though there is small changes with respect to original image RANSAC gives matching output. This same input is given to the CDS algorithm. But in case of CDS algorithm it gives non matching output. So we can say that CDS gives accurate result than RANSAC algorithm.

3. CONCLUSIONS

To find original logo we have proposed RANSAC and CDS algorithm.
The basic concepts in this paper are as follow:
First, database of original logos is made.
Second, input is taken and both RANSAC and CDS algorithm is applied on input image. And find original image using both algorithms.
And last is comparing results of RANSAC and CDS algorithms.

It is conclude from the result that CDS algorithm gives better and accurate performance than RANSAC algorithm.

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