Context Based Retrieval for Logo Harmonizing and Identification

Aswathy Mohan

***Abstract*— To identify something or someone, the graphic logos play a vital role. We can able to match and identify multiple instances of a multiple reference logos by the design of a system frame work.**

This system is based on context-dependent similarity .The test logos are matched on the basis of reference logos and consisting of some local features. The local features include interesting points, regions etc. For matching the local features we need following functions, it have minimum energy function: fidelity term that process the quality of feature matching, a context criterion that capture feature co-occurrence or geometry, and an entropy term or a regularization phrase that controls the softness of the identical solution.

***Index Terms*— Logo, local features, fidelity, regularization phrase**

I. INTRODUCTION

Graphic logos are a particular class of visual objects enormIously important to identity something or someone. In industry and commerce, they have a vital role to recall in the customer the prospect associated with a particular product or service. This economical significance has encouraged the active contribution of companies in soliciting smart image investigation solutions to scrutinize logo archives to discover unacceptable or non-authorized use of their logo.The duplicate logos have small deviation with the logos from any videos or advertisements. Respect to the originals so to mislead customer analyze confirmation of similar already existing logos, notice either

Logos are graphic productions that deal with some real world object or emphasize a name, or display some unique signs that have a strong perceptual demand.

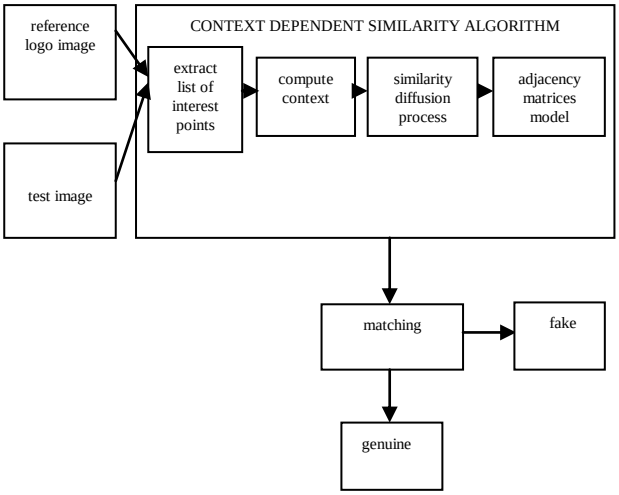
Color may have some significance to review the logo identity. But the uniqueness of logos is additional often specified by a little facts suspiciously studied by graphic designers, semiologists and experts of social communication. The graphic layout is uniformly significant to attract the attention of the customer and communicate the message appropriately and permanently. Different logos may have similar layout with slightly dissimilar spatial disposition of the graphic elements, simple differences in the orientation, size and shape, or in the case of malicious tampering differ by the presence/absence of one or few behavior.

Fig. 1. (a) Examples of popular logos indicating real world objects, text, graphic signs, and complex layouts with graphic details. (b) Pairs of logos with malicious small changes in details or spatial arrangements. (c) Examples of logos displayed in real world images in bad light conditions, with partial occlusions and deformations.

II. RELATED STUDY:

First, The content based image retrieval are used for logo detection and also introduce a page rank for product image search. Another one system for automatic detection and recognition of a advertising te used trade marks in spot videos Matching and object recognition using shape context have different global description of the full logo image either accounting contours or exploiting shape descriptions. The logo detection based on two stages of algorithm, first one is "spatial spectral saliency" and another one is "partial spatial context". One disadvantage of this system is , the images in the logos are fully visible and not subjected to any transformation and not infected by noise. Based on this, The major restriction of this approach is image resolution and their solution has exposed to be very sensitive to occlusions.

III. WORKING:



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Aswathy mohan, Computer Science& Engineering, M. G. University, Pathanamthitta, India, 8547700369.

The system for logo detection and matching which is based on the definition of a context dependant similarity that directly incorporates the spatial context of local features.

A. Interest points Extraction

Interest point detection is a recent terms in computer vision that refers to the finding of interest points for following processing. An interest point is a point in the image it has a well-defined position in image space. Using Scale Invariant Feature Transform, the interest points are extracted.

B. Context computation

The context is defined by the local spatial configuration of interest points. In order to tackle logo detection, Context is used to find interest point correspondence between two images.

C. The similarity diffusion process

The similarity between interest points is recursively and anisotropically diffused from the definition of context. The adjacency matrices $\{P\theta,\rho\}\theta,\rho$, $\{Q\theta,\rho\}\theta,\rho$ related to a reference logo *SX* and a test image *SY* respectively, each of which collects the adjacency relationships between the image interest points for a specific context segment θ, ρ.

D. Matching Process

Designed similarity may be interpreted as a joint distribution (probability distribution function) which point out the probability that two interest points t from $S_x \times S_y$ match. Also guarantee that this resemblance is actually a pdf, a partition function is used as a normalization factor taken through all the interest points in $S_x \times S_y$. Logo detection is achieved by finding for each interest point in a given reference logo S_x its best match in a test image S_y; if the number of matches is larger than $\tau \mid S_x \mid$ (for a fixed $\tau \in [0, 1]$), then the reference logo will be confirmed as present into the test image.
Given input and expected output:

Input images are reference and test logo images and the output is interest points extracted images. Input image is interest points extracted images and output is extraction of context. Input is context image and the output is extraction of similarity between the reference and test images. Input is total number of similarities between the reference and test image. Output is identifying whether the logo is genuine or fake.

IV. PROPOSED SYSTEM ALGORITHM:

Context-dependent similarity algorithm:
Let SX = {x1, . . . , xn}, SY = {y1, . . . , ym} be respectively the list of interest points given from a reference logo and a test image (the value of n, m may vary with SX , SY).
Context

The context is defined by the local spatial configuration of interest points in both SX and SY. spatial information, an interest point xi ∈ SX is defined as xi = (ψg(xi),ψf (xi),ψo

$$\mathcal{N}^{\theta,\rho}(x_i) = \{x_j : \omega(x_j) = \omega(x_i), x_j \neq x_i \text{ s.t. (i), (ii) hold}\}$$

with

$$\frac{\rho - 1}{N_r}\,\epsilon_p \le \|\psi_g(x_i) - \psi_g(x_j)\|_2 \le \frac{\rho}{N_r}\,\epsilon_p \qquad \text{(i)}$$

and

$$\frac{\theta - 1}{N_a}\pi \le \angle\big(\psi_o(x_i), \psi_g(x_j) - \psi_g(x_i)\big) \le \frac{\theta}{N_a}\pi \qquad \text{(ii)}$$

Let $Dx,y = d(x, y) = \|\psi f(x) - \psi f(y)\|_2$

Using this notation, we can get the similarity k between the two object SX and SY by the minimization problem.

$$\min_{\mathbf{K}} \quad \mathrm{Tr}\big(\mathbf{K}\,\mathbf{D}'\big) + \beta\,\mathrm{Tr}\big(\mathbf{K}\,\log\,\mathbf{K}'\big) - \alpha\,\textstyle\sum_{\theta,\rho}\mathrm{Tr}\big(\mathbf{K}\,\mathbf{Q}_{\theta,\rho}\,\mathbf{K}'\,\mathbf{P}'_{\theta,\rho}\big)$$
$$\text{s.t.} \quad \begin{cases} \mathbf{K} \ge 0 \\ \|\mathbf{K}\|_1 = 1. \end{cases}$$

Here $\alpha, \beta \ge 0$ and the operations log (natural), ≥ are applied individually to every entry of the matrix.

Solution:

Let's consider the adjacency matrices $\{P\theta,\rho\}\theta,\rho$, $\{Q\theta,\rho\}\theta,\rho$ related to a reference logo *SX* and a test image *SY* respectively

$$\zeta = \frac{\alpha}{\beta}\sum_{\theta,\rho}\|\mathbf{P}_{\theta,\rho}\mathbf{u}\mathbf{Q}'_{\theta,\rho} + \mathbf{P}'_{\theta,\rho}\mathbf{u}\mathbf{Q}_{\theta,\rho}\|_\infty$$

.

Where $\|.\|_\infty$ is the "entry wise" L_∞ norm
Similarity Design:

We define *k* as a function which, given two interest points *(x, y)* ∈ *SX* × *SY*, provides a similarity

Let $d(xi,y\,j) = \|\psi f(xi) - \psi f(y\,j)\|^2$ measure the dissimilarity between two interest point features. measure between them. Provided that we put some (arbitrary) order on *SX*, *SY*, we can view function *k* as a matrix K,

V. CONCLUSION:

This approach for logo detection and matching similarity is based on context-dependent similarity algorithm. The strength of the proposed method have several aspects: (i) It include the information about similarity in spatial configuration and also the visual features. (ii) properly handling the energy function by regularization. (iii) the acceptance tof different features like partial occlusion, ability to detect both near-duplicate logos as well as logos with little difference, and (iv) the theoretical roundedness of the matching framework which indicate similarity between test logo with reference logo and its percentage of matching.

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