Maestría en Ingeniería en Sistemas y Computo Inteligente

Title

Automatic image recognition system to identify trademark logos

Author

Miguel Angel Medina Nieto

Contributor

Jorge de la Calleja

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Automatic Image Recognition System to Identify Trademark Logos

Miguel Angel Medina Nieto, Jorge de la Calleja
Maestría en Sistemas y Cómputo Inteligente
{miguel.medina, jorge.delacalleja}@uppuebla.edu.mx
Tercer Carril del Ejido Serrano S/N, San Mateo Cuanalá, Juan C. Bonilla, Puebla, México

INTRODUCTION

Logo recognition from real images is a challenging problem that deals mainly with image variability. Trademark logos on images from a live video have low resolution making the recognition task more challenging.

By taking advantage of new mobile devices, computer vision applications have been deployed on them. And mobile devices, because of their characteristics, are inherently means of advertising distribution. These are the remarks in what this system is based on.

When the system recognizes a logo, an advertising message will be presented to the user. The message will contain marketing information about the logo that has been recognized.

OBJECTIVES

General Objective

Developing a system to automate the recognition trademark logos task by using computer vision with the purpose to present advertising messages to the user

Specific Objectives

- To determine the appropriate computer vision techniques to deal with image variability.
- To develop an automatic identifier for trademarks logos.
- To build a test scenario to evaluate identifier performance.
- To establish the features of the advertising messages.

METHOD

1. Logo selection
2. Image generation
3. Classifier training
4. Test scenario performance
5. System implementation

LOGOS

From the most popular Mexico's malls a list of the stores was obtained. An analysis was done to determine which of these stores appear the most over the malls.

Figure 1. Selected logos to be recognized by the system.

IMAGE GENERATION

An image set is generated for each logo in order to support the classifier with variations of the original images.

Figure 2. Image generation from an specific logo. Rotation and skewness effects are applied.

DETECTION

The classifier is trained over images like the ones shown in Figure 2. The training takes two sets of images. One set has positive examples and the other one has negative examples. The detection and validation process runs over the two sets. Figure 3 demonstrate the logo recognition over a real imaged extracted from the positive examples set.

Figure 3. Detection of Ferrioni logo over a real image.

RESULTS

Equation 1 presents the accuracy metric used to evaluate each classifier.

$$Accuracy = \frac{tp + tn}{tp + tn + fp + fn} \qquad \text{Eq. (1)}$$

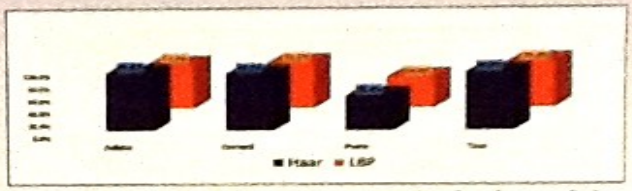

Figure 4. Obtained accuracy results for four of the logos with two different classifiers: Haar and LBP.

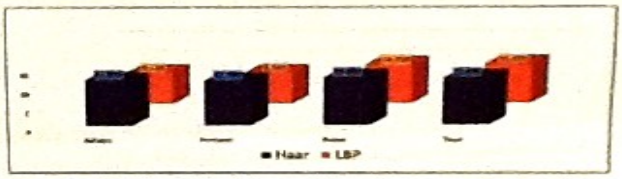

Figure 5. Obtained detection time results for four of the logos with two different classifiers: Haar and LBP. Values are in milliseconds.

Figure 6. Working system on test scenario. Walking through a virtual mall. Immersive environment developed with Unity and deployed for Oculus Rift DK1.

Figure 7. Me, porting the system running on a mobile device.

CONCLUSIONS

Our preliminary results shows that the whole framework was proved to be effective in real images. Two different classifiers has been applied over the same kind of images. The experimental results demonstrate that Haar-like features obtains the best average recognition performance, yielding 94.8% recognition accuracy. We also believe the obtained recognition processing time have a great application prospect in marketing applications using augmented reality.

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