Logos Recognition for Webshop Services

The categorization of websites as webshops is a useful piece of information because, for example, it can help in the identification of online traders of counterfeit goods. A relevant clue to increase the probability of classifying correctly this type of shop is the presence of logos belonging to payment or delivery service companies. For this reason, this project aims to recognize these logos by means of classic image recognition techniques.

Current situation

Nowadays, the number of webshops has grown exponentially increasing the number of illegal online shops. Pertinent information to increase the probability of detecting this type of webshop is the presence of logos belonging to delivery and payment service companies. The objective of this thesis is, in fact, the recognition of these logos.

This work is based on a pre-study, which has highlighted that the Scale-Invariant Feature Transform (SIFT) descriptors (invariant descriptors of interesting points of an image such as angles, gradient changes, etc.) are the best technology to recognize logos.

Problems

Unfortunately, this recognition task is not trivial because logos could be part of larger images. Moreover, the number of SIFT descriptors vary from image to image and therefore, it is difficult to use a machine learning classifier. For this reason, the SIFT descriptors should be incorporated into a more complicated system which allows the creation of a fixed size features vector.

Object recognition

The model used is called Bag of Visual Words (BoW) and it uses a vocabulary of visual words to generate a histogram for each image. This algorithm works perfectly with images that contain a single logo but it does not work well with figures containing multiple logos.
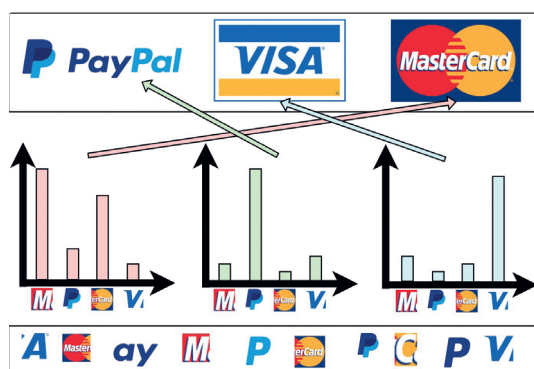
Object detection

To remedy this insufficiency, an object detection algorithm has been used. Among the many available, the Selective Search algorithm has been chosen because of its fast generation of thousands of region proposals and its high sensitivity.

Software

For the implementation of these technologies, an application has been developed. The advantage of this application is its modularity that allows the addition of other algorithms or techniques without difficulty thanks to interfaces and predefined classes.

Results

After the first implementation for the recognition of multiple logos in an image, the results were rather poor (sensitivity 66% and precision 92%). Fortunately, after some improvements (i.e. hard negative mining), the results increased and they reached a sensitivity of 80% with a precision of 100%. The most important value for this project is the precision, therefore, the results can be considered rather good.
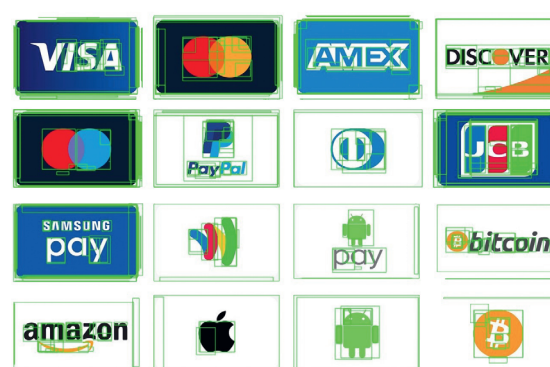
Nolì Manzoni

+41 79 136 42 83

nolimanzoni94@gmail.com

Bag of Visual Words (BoW)

Selective Search