

# Revisiting Supervised Image Classification using Image Patches

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## 1 Image Classification Using Image Patches

An image can be seen as the juxtaposition of different image patches which fully characterize it. Given a set of images one can memorize the patches making up each image which can be viewed as a dictionary of image patches. In that context, supervised image classification consists in comparing the patches making up the image with each of the patches contained in the dictionary. However, the dictionary of patches needs to be very large to be used for image classification which implies an enormous number of comparison at each time instant. What makes this procedure unrealistic is basically that the comparison between the patches have to be carried out sequentially.

## 2 New chips technologies comes in

The paradigm often acknowledged in image processing that the comparions between patches have to be carried out sequentially can now be seriously questioned by new chips' technology. Indeed, one is now able to design chips that can compare a given pattern to millions of others simultaneously. A new type of chip is indeed able to provide, in real time, a similarity measure between a patch and millions of others. However, this similarity measure to be computed in real time is constrained by the technology.

## 3 Objectives of the internship

The goal of the internship is thus to translate into a mathematical formulation the similarity measure that is programmed on the chip and then to find out for a given image what are the most relevant patches with respect to the proposed similarity measure. Then a second part of the internship will consist in building a relevant dictionary of patches and then perform supervised classification based on this dictionary. Finally, the candidate will investigate the possibility of extending this approach to a multiscale setting.