ENHANCING LOCAL FEATURE MATCHING BETWEEN CSLM IMAGES BY HISTOGRAM MODELING

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By using local feature extraction/description techniques such as SIFT [1] or SURF [2], a set of invariant features can be extracted from images of the same object or scene, obtained at different acquisition parameters and can be matched without any prior information (Fig. 1). For this reason invariant features are currently considered very powerful tools in various computer vision applications such as object recognition, classification, tracking, image mosaicing, image registration, and others.

The experiments presented in [3,4] have shown that local feature detection and description are influenced by usual modifications of the Confocal Scanning Laser Microscopy (CSLM) specific acquisition parameters such as pinhole aperture, PMT amplification, laser beam power, or electronic zoom. In this presentation we show that the limitations faced when matching image pairs collected under different values of the CSLM specific acquisition parameters can be compensated by using prior histogram modeling. By histogram modeling, the histogram of an image is reshaped, one method for doing this being the exact histogram specification algorithm introduced in [5]. We show that by specifying particular histograms to a pair or to a set of images, the number of matched local features can be increased and the quality of the matches can be enhanced.

Fig. 1. Matched local features between two CSLM images of Photonic Quantum Ring Lasers collected under different magnifications.