
Abstract
We present the results of a study on the application of registration and pixel-level fusion techniques to retinal images. The images are of different modalities (color, fluorescein angiogram), different resolutions, and taken at different times (from a few minutes during and angiography examination to several years between two examinations). We propose a new registration method based on global point mapping with blood vessel bifurcations as control points and a search for control point matches that uses local structural information of the retinal network. Three transformation types (similarity, affine, and 2nd order polynomial) are evaluated on each image pair. Fourteen pixel-level fusion techniques have been tested and classified according to their qualitative and quantitative performance. Four quantitative fusion performance criteria are used to evaluate the gain obtained with grayscale fusion.

Keywords : Medical imaging, ophthalmology, image registration, image fusion