Computer vision supported analysis for Intravital Microscopy

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Abstract
Intravital microscopy is a technique that permits observation of live events in intact tissues. A major application is to quantify inflammatory responses to different stimuli by measuring blood cell-vessel wall interactions. These parameters can be then used to determine underlying mechanisms of disease, or test the anti-inflammatory potential of pharmaceutical agents. However, the analysis of these parameters is labor-intensive, subjective and limited to broad categories of blood cell-vessel wall interactions. Therefore development of algorithms to both aid in analysis and expand the information that can be derived from any single experiment would be very beneficial, and should improve our understanding of the nature of vascular responses to harmful stimuli. We will show how we successfully integrated the aspects of life and computer sciences with computer vision to stabilize, identify and track numerous features such as platelets moving along a blood vessel of a living mouse. These algorithms have the potential to help us obtain the information faster than previously possible and with the evolution of microscopy techniques, they could be developed further for the measurement of many other difficult to track parameters.