Electrical & Computer Engineering

S E M I N A R

Louisiana State University

Tracking Rolling Leukocytes from Intravital Microscopic Video Imagery

Nilanjan Ray

University of Virginia

Abstract—Rolling leukocyte velocity is crucial in inflammation research, anti-inflammatory drug discovery and drug testing. Manual method for finding leukocyte speed from microscopic intravital (within living animal) videos is extremely tedious, time consuming and prone to human bias. Therefore an automated method is required. We present three essential components of an automated approach to leukocyte rolling velocity computation — (1) detection of rolling leukocytes, (2) tracking rolling leukocytes, (3) a validation method for acceptance/rejection of automated tracking output. For detection of leukocytes we propose the use of a statistic computed on image directional derivative. For leukocyte tracking we utilize a shape-size constrained active contour to delineate leukocyte boundary, which appears approximately circular/elliptic in intravital video frames. To facilitate the mechanism of active contour tracking we also compute a 2D vector field through a partial differential equation (PDE) obtained via energy minimization principle. The vector field incorporates image gradient magnitude as well as the prior information of leukocyte movement direction. The proposed validation method for automated data acceptance relies on generating a spatiotemporal image indicating the presence or absence of a leukocyte under tracking. Tracking and validation performances have been demonstrated on 100 leukocyte sequences each 91 frames long (3 seconds). The performance of the proposed detection method is compared with some popular techniques such as Hough transform and ERS method.

When: Thursday, **13 May 2004,** 10:30 - 11:30
Where: Room 117 EE Building
Info: `http://www.ece.lsu.edu/seminar`