FAST MOTION FLY TRACKING BY ADAPTIVE-LBP AND CASCADED DATA ASSOCIATION

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ABSTRACT

Learning the behavior patterns of fruit flies can inform us about the molecular mechanisms and biochemical pathways that drive human behavior based on analogical human motivations. A glass chamber to house flies was build and their behaviors in time-lapse videos are recorded in this container. Due to several challenges in data analysis such as low image contrast, small object size and fast object motion, we propose an adaptive Local Binary Pattern feature to detect flies and develop a cascaded data association approach with fine-to-coarse gating region control to track flies in the spatial-temporal domain. Our approach is validated on two long video sequences with very good performance especially on fast motion prediction, showing its potential to enable automatic characterization of biological processes.