

Semi-Automated Tracking of Vibrissal Movements in Free-Moving Rodents Captured by High-Speed Videos

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Abstract : Quantitative analysis of mouse whisker movement can be used to study functional recovery and regeneration of facial nerve after an injury. However, it is challenging to accurately track mouse whisker movements, and most whisker tracking methods require manual intervention, e.g. fixing the head of the mouse during a study. Here we describe a semi-automated image processing method that is applied to high-speed video recordings of free-moving mice to track whisker movements. We first track the head movement of a mouse by delineating the lower head contour frame-by-frame to locate and determine the orientation of its head. Then, a region of interest is identified for each frame, with subsequent application of the Hough transform to track individual whisker movements on each side of the head. Our approach is used to examine the functional recovery of damaged facial nerves in mice over a course of 21 days.

Keywords : mystacial macrovibrissae, whisker tracking, head tracking, facial nerve recovery

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