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A novel automated rodent tracker (ART), demonstrated in a mouse model of amyotrophic lateral sclerosis

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Highlights

- Custom-made open-source, automated rodent tracker (ART)
- Tracks rodent locomotion and identifies general behaviours
- Validated against manual tracking and commercial software
- Shows robust differences in locomotion and behaviour in SOD1 mice

Abstract

Background: Generating quantitative metrics of rodent locomotion and general behaviours from video footage is important in behavioural neuroscience studies. However, there is not yet a free software system that can process large amounts of video data with minimal user interventions.

New Method: Here we propose a new, automated rodent tracker (ART) that uses a simple rule-based system to quickly and robustly track rodent nose and body points, with minimal user input. Tracked points can then be used to identify behaviours, approximate body size and provide locomotion metrics, such as speed and distance.

Results: ART was demonstrated here on video recordings of a SOD1 mouse model, of amyotrophic lateral sclerosis, aged 30, 60, 90 and 120 days. Results showed a robust decline in locomotion speeds, as well as a reduction in object exploration and forward movement, with an increase in the time spent still. Body size approximations (centroid width), showed a significant decrease from P30.