

Trackmate Social (V 0.9): Beta Software for the Automated Measurement of Rodent Social Behaviour

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ABSTRACT

Many commercial software packages now exist to allow video tracking and automated analysis of behaviour in individual rats and mice across a variety of behavioural paradigms. However, automated analysis of social behavior in pairs, triplets or quads of rodents is technically much more challenging and has proved difficult to successfully achieve due to the inherent challenges presented by developing algorithms capable of successfully distinguishing between, and tracking multiple subjects simultaneously. At the same time, there is increasing interest in psychopharmacology, psychology and neurobiology to characterise the effects of gene manipulations, stressful interventions and drug treatments on sociability in rodents. *Trackmate Social* is a new program under development as a collaboration between Motion Mensura Ltd and the University of Sydney Psychopharmacology Laboratory and is being used to automate data gathering and analysis of social interaction in rats and mice. It has successfully overcome some of the challenges presented by this type of tracking through use of sophisticated algorithms that allow simultaneous tracking of multiple subjects. *Trackmate Social* is written in the *Labview™* programming environment and can be run on any adequately powered PC. Users are required to install *Labview RunTime™* software and Apple *Quicktime™*, both of which are free downloads. The only other requirement is an appropriate USB video grabbing device, many of which are available at very low cost. We typically run the software on *MacMini™* computers (2.8 MHz, 4GB RAM, 320 GB hard disk) with *KWorld DVD Maker 2™* USB interfaces. *Trackmate Social* can be used to analyse social behaviour in groups of 2-4 rats or mice (see Figure 1). For each animal in the group, a blob (corresponding to the body of the

animal) is detected as well as the centre of mass and head direction of each individual rodent. The distance between blobs over time is automatically computed allowing proximity measures and time spent in dyads, triplets or quads to be derived. Various regions of interest can also be defined in the test environment, allowing time spent by social groups in specific regions to be measured. *Trackmate Social* logs an exhaustive array of test results to Excel compatible spreadsheets and also allows hard disk recording of raw video footage to be made in real time for archival purposes. Ongoing research and development is aimed at automating the detection of specific social behaviours such as adjacent lying, anogenital sniffing (see Figure 1), head to head exploration and chasing/following. *Trackmate Social* has recently been used in a variety of experiments, including (1) demonstrating increased huddling behaviour in groups of rats exposed to predator odor and other stressors, (2) showing decreased social interaction in adolescent rats given chronic paroxetine, and (3) showing increased anogenital investigation in unfamiliar compared to familiar rats in the social interaction test.

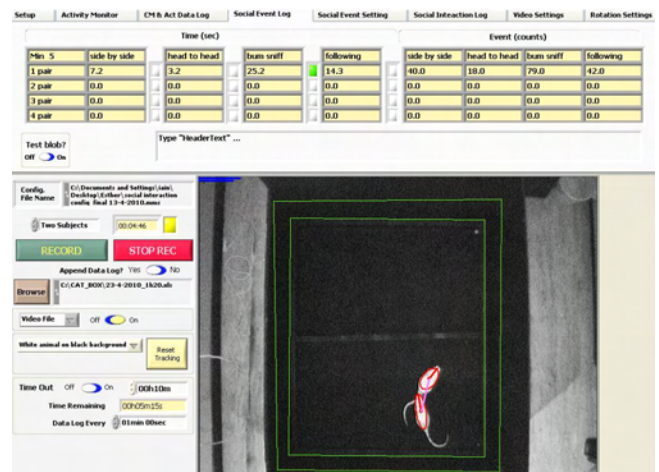


Figure 1. Screenshot of Trackmate Social logging anogenital investigation in an unfamiliar pair of rats.

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