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AI-guided long-term monitoring of epileptic mice

We present a pipeline for analyzing long-term video monitoring data from a mouse model of epilepsy. Mice were constantly monitored for 5 consecutive days, generating a large amount of high-resolution video data. Subsequently, we apply markerless pose estimation of user-defined body parts using deep neural networks (DNNs) to extract exact 2D motion data. To automatically identify behavioral episodes indicative of epileptic seizures, we utilize A-SOID (Tillmann, Hsu, et al. 2022), allowing data-efficient supervised behavior classification. Note that the workflow we present here is not limited to the analysis of epileptic seizures but holds the potential to study various behavioral phenotypes. Thus, we introduce an efficient, unbiased, and reliable method for detailed behavioral analysis in small rodents across long observation periods (days of constant monitoring). In general, automated data analysis techniques - like the one we present here - are particularly beneficial when dealing with large quantities of data, as they allow an unbiased, efficient and accurate analysis. In the future, we aim to develop and utilize automated workflows to streamline data analysis processes.

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