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Project Title: Instinctive visual decisions in mice

Project Details: Our laboratory aims to understand how neurons in the visual pathway provide information that can be used to guide rapid action. Our work focuses on mice, using techniques that include multi-electrode recordings and imaging in combination with innate and learned visually-guided behaviours. The proposed project below indicates the line of work we are interested in studying with MSc CoDeS students. We are happy to discuss alternative behavioural projects along similar lines. Depending on capacity and interest, the student may also participate in parallel electrophysiological recordings from key areas of the mouse brain.

In the example project the student will establish how mice decide where to seek refuge during potential threat. This would involve video-tracking of mouse movements in custom-made open environments, during and after presentation of overhead visual stimuli. The first question is if mice use the location of sudden overhead threats to direct their choice of escape direction. The second question is if prior cueing of mice to the likely location of overhead threats improves their decision-making.

These projects require some computational skill (the analyses are primarily in Matlab) and prior computational experience would be beneficial. The results of these experiments will inform us of whether mice naturally use vision to instruct decisions, and guide experiments in to understanding the neural mechanisms that allow this.