

A generalised framework for detailed classification of swimming paths in the Morris Water Maze

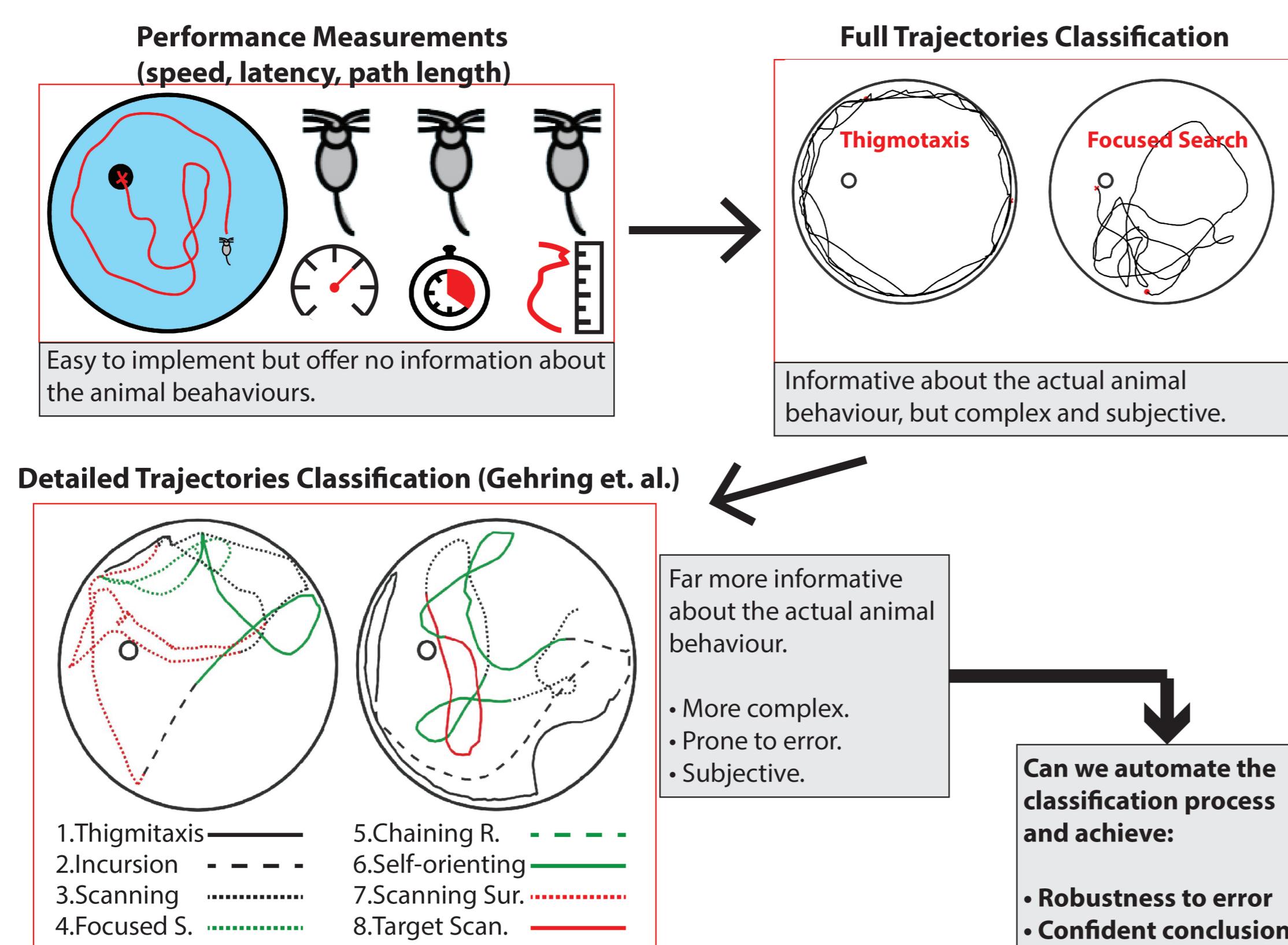
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1. Introduction

The Morris Water Maze (MWM) is one of the most commonly used tasks in behavioural neuroscience for studying spatial learning and memory. In this experiment a rodent is placed inside an arena full with opaque water and is tasked to find a hidden platform. After a number of trials the rodent should find the platform in less time since it has 'learnt' its location. Many studies have examined how rodents behave inside the arena in order to discover general principles about learning that can be applied to other species, including humans.



2. Methodology

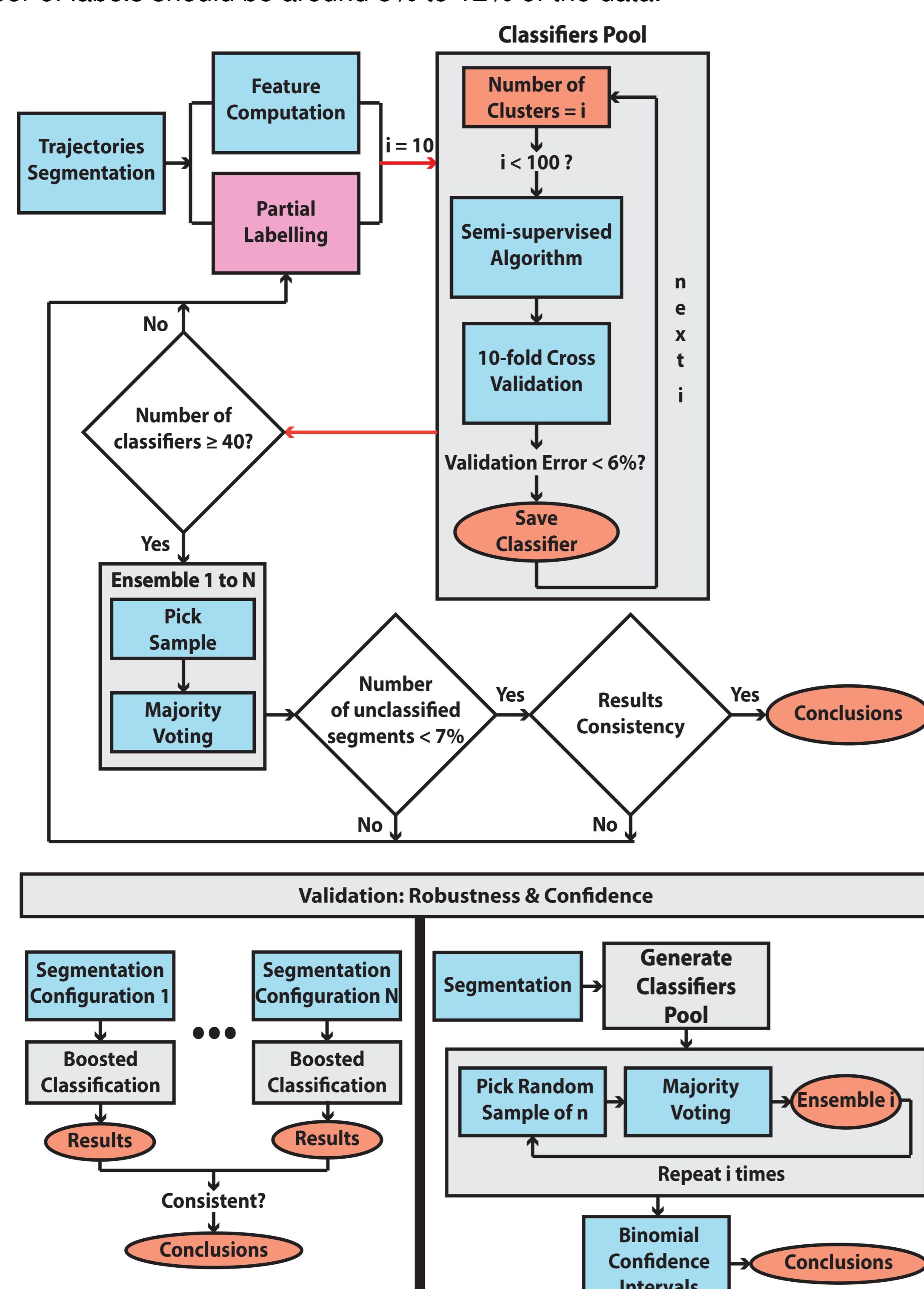
Animal swimming paths are segmented and a small amount of the segments needs to be manually labelled. Afterwards an automatic classification procedure classifies all the remaining segments. The result is a detailed overview of the animal learning behaviours throughout the experiments and the detection of significant differences in learning between animal groups.

Classification boosting:

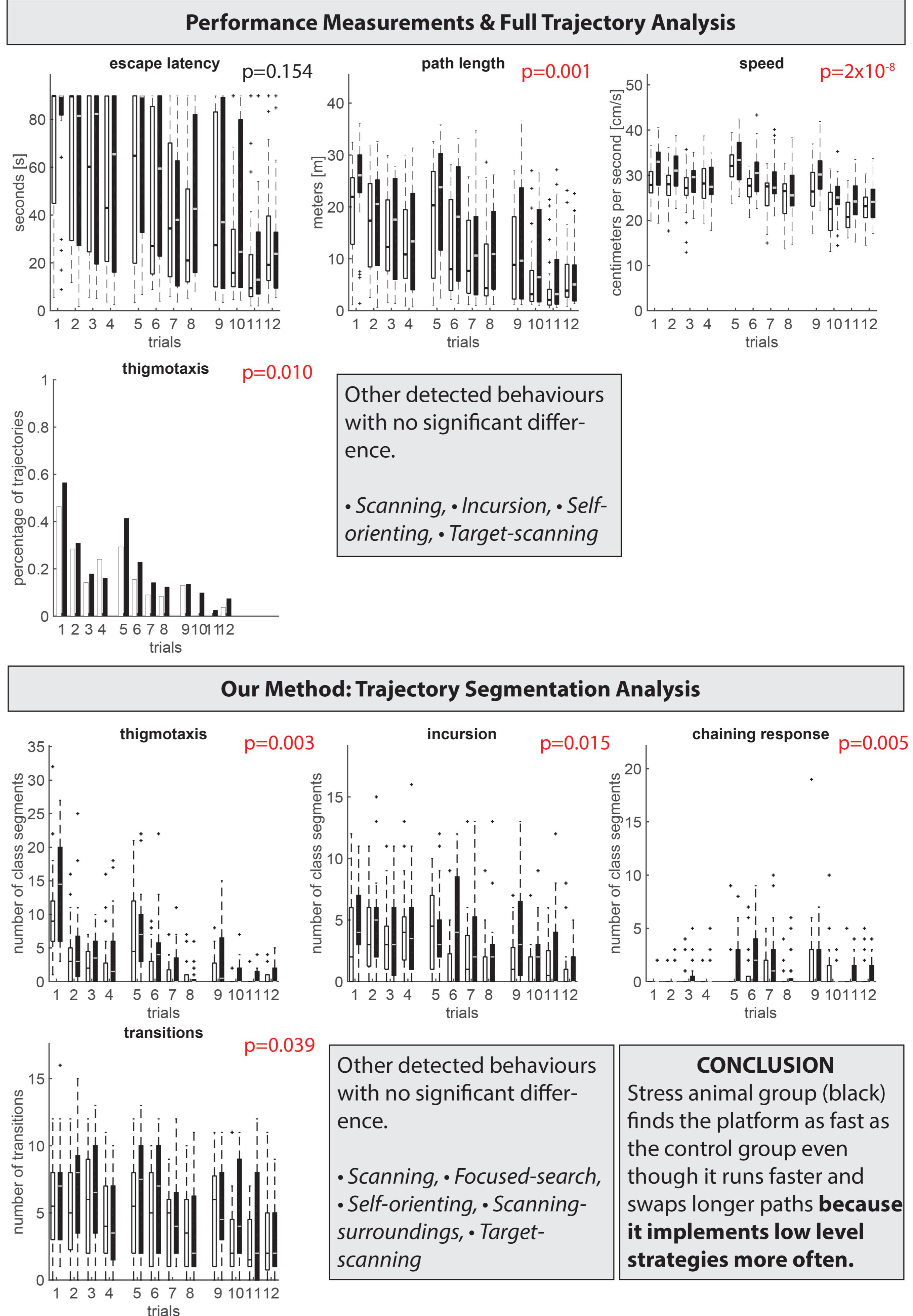
- Classification problem too complex.
- Single algorithmic classification solutions are unable to achieve high performance.
- An ensemble of weak classifiers can be used to form a strong classification by combining each individual's opinion.

Segmentation and Labelling:

- Segment length: 2R to 2.5R. Lower will create segments too small to be assigned to a class; larger will cause the segments to fall under multiple classes.
- Number of labels should be around 8% to 12% of the data.

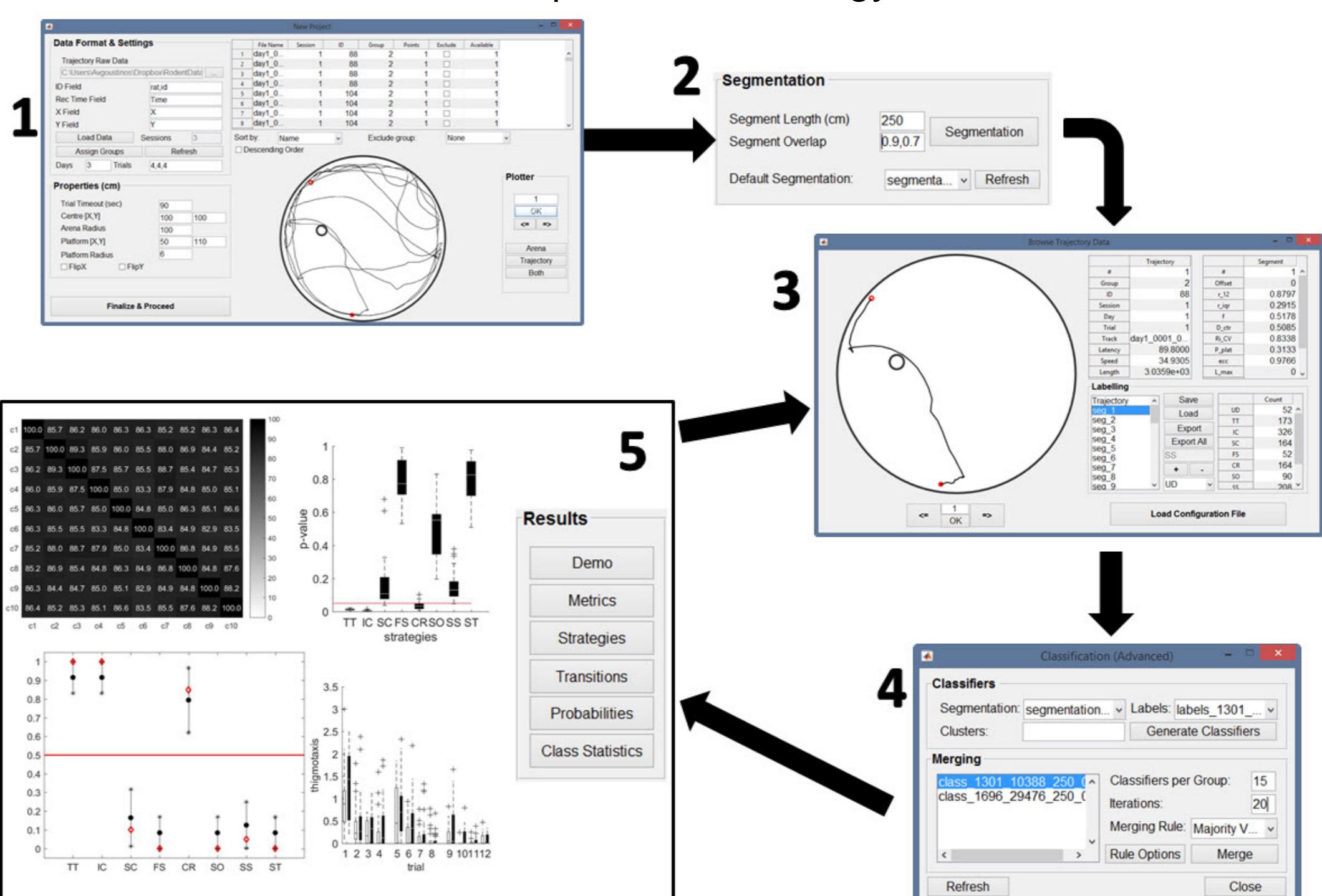


3. Results



4. The RODA Software

Our analysis framework is packaged into a fully working software which is currently in use by researchers of the Nencki Institute of Experimental Biology in Warsaw, Poland.



5. Future Work

