

# AUTOMAC: AUTOMated Mouse behAViour reCOgnition

<https://www.neurodegenerationresearch.eu/survey/automac-automated-mouse-behaviour-recognition/>

## Principal Investigators

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### Country

United Kingdom

## Title of project or programme

AUTOMAC: AUTOMated Mouse behAViour reCOgnition

## Source of funding information

EPSRC

## Total sum awarded (Euro)

€ 134,035

## Start date of award

18/04/2016

## Total duration of award in years

1

## Keywords

### Research Abstract

Context of the research

Neurodegenerative diseases are characterised by motor deficiencies. For many of them, there are no successful neuroprotective or neuroregenerative therapies clinically available. In order to address this problem, the development of valid animal models for motor disorders has become active growing and vibrant field in preclinical research. Behaviour analysis of laboratory animals has been recognised as a useful tool to assess therapeutic efficacy. The entire process consists of animal tracking and motion categorisation. Despite tremendous efforts made within the research community, there is no system which can perform reliable recognition of complex

animal behaviours and interactions. In this project, a fully automated and trainable computer vision system is proposed to monitor and analyse complex mouse behaviours and interactions using video data recorded by calibrated cameras.

### Aims and objectives

#### Scientific:

- (1) To develop a system of combining multi-camera tracking and a Hidden Markov Model.
- (2) To improve the multi-camera tracking performance combining covariance descriptors and probabilistic data association.
- (3) To accelerate K-means clustering using an approximate nearest neighbour algorithm.

#### Practical:

- (1) To improve the performance and scalability of the existing behaviour analysis systems.
- (2) To widen the scope of the applicability of the developed tracker and the behaviour recognition system.
- (3) To associate healthcare applications with the image and vision computing community.

### Potential applications and benefits

- (1) This project will help researchers in the healthcare/medical community to significantly reduce annotation time/errors and hence improve medical research quality. The research outcomes of the proposed multidisciplinary project can reach both ICT and healthcare communities by our attendance at conferences in different domains. In the meantime, the research communities will benefit from our publications in journals and publicly accessible tools/databases for sharing skills and experiences.
- (2) The proposed research may be commercialised in the form of software tools. The UK hosts many companies that offer services related to the treatment of neurodegenerative diseases, e.g. GSK, and Orion pharmaceutical companies. These companies and their clients stand to profit from improvements in disease modelling and diagnosis/treatment techniques that depend on animal modelling using a system like that proposed in this project. Significant scientific improvements in this field will have a transformative effect on these businesses.
- (3) The technologies developed in this project can be directly transferred and applied in physical security, human computer interface and virtual reality. The tools developed in the proposed research can be used to monitor moving objects (e.g. humans and animals) in different set-ups (e.g. authentic and virtual environments). The software package produced in the proposed research can easily find its customers in manufacture and design, basic science, communication engineering, media and entertainment. As a result, there is great potential for wealth creation and boosted economic prosperity from the developed software package for a wider range of applications.

### Further information available at:

#### Types:

Investments < €500k

#### Member States:

United Kingdom

#### Diseases:

N/A

#### Years:

2016

**Database Categories:**

N/A

**Database Tags:**

N/A