Evripidis Gkanias

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Education

September 2018 – present
School of Informatics,
The University of Edinburgh, United Kingdom
Bio-robotics (PhD)

Subject: "Memory dynamics in the insect brain"
Supervisor: Prof. Webb Barbara
Abstract: Constrained by biological findings of the insect brain, we come up with a computational model of the insect mushroom body. This is able to acquire, forget and assimilate (transfer from short- to long-term) associative memories, and represent a spectrum of motivations for the animal, driving its behaviour. We examine the capabilities of this model as an olfactory conditioning system or as part of the visual navigation mechanism of insects.

September 2015 – August 2016
School of Informatics,
The University of Edinburgh, United Kingdom
Artificial Intelligence (MSc)

Grade: Distinction
Specialisation: Machine Learning.
Dissertation: "Data-driven adaptation of the evasion behaviour in fiddler crabs"
Supervisor: Prof. Webb Barbara
Courses: *Probabilistic Modelling and Reasoning*, *Machine Learning and Pattern Recognition*, *Reinforcement Learning*, *Neural Computation*, *Neural Information Processing*.
Activities: Member of the Sailing Club (EUSC).

September 2008 – July 2013
School of Informatics,
Aristotle University of Thessaloniki, Greece
Computer Science (BSc)

Grade: First-class honours
Specialisation: Information Systems.
Thesis: "Deep Learning Algorithms for Multi-label Data"
Supervisor: Ass. Prof. Tsoumakas Grigorios
Activities: Member of the Photographic Club.

Teaching posts

2020 **Introduct. Applied Machine Learning**
TUTOR, DEMONSTRATOR & MARKER
The University of Edinburgh

2020 **Reinforcement Learning**
TUTOR
The University of Edinburgh

2020 **System Design Project**
VISION & QUANTITAT. ANALYSIS EXPERT
The University of Edinburgh

2013 **Heterogeneous Parallel Programming**
COMMUNITY TEACHING ASSISTANT
Coursera, Prof. Wen-mei W. Hwu - University of Illinois

Interests

Research	machine/reinforcement learning, insect brain, computational neuroscience, mathematical modelling, time-series, multimodal integration, robotics, computer vision
Other	photography, sketching, music, sailing, travelling, reading

Work experience

March 2017 – August 2018
The University of Sheffield, United Kingdom
Research Associate

I am responsible for investigating the information content of polarised light in relation to animal navigation - using machine learning and information theory - before using the outcomes to develop a technical specification / design for manufacture of a novel robot sensor. This is a joined work of the University of Edinburgh and the University of Sheffield.

September 2016 – February 2017
The University of Edinburgh, United Kingdom
Research Assistant

I focus on trying to imitate the learning mechanism of the larval Drosophila, which creates associations among odours and tastes. The goal is to create such a mechanism in neural level and put it on a robot platform. The robot will try to find the gustatory source following the gradients of the associated odour.
This task is part of the "minimal" project.
(blog.inf.ed.ac.uk/minimal/)

June 2014 – August 2015
CERTH, Thessaloniki, Greece
Research Assistant

My main task was to implement a toolbox, using C# and the WPF subsystem, which could be used to analyse and compare human gestures, tracked using different capturing devices, i.e. Microsoft Kinect, Vicon, WIMUs. I also implemented an extension of it, which was compatible with Unity3D.
This task was part of the "RePlay" project.
(www.fp7-replay.eu)

Publications

2021 **The incentive circuit: memory dynamics in the mushroom body of *Drosophila melanogaster***
Gkanias, E., McCurdy, L. Y., Nitabach, M. N., & Webb, B. bioRxiv

2020 **How do backward walking ants (*Cataglyphis velox*) cope with navigational uncertainty?**
Schwarz, S., Clement, L., Gkanias, E., & Wystrach, A. Animal Behaviour

2019 **From skylight input to behavioural output: a computational model of the insect polarised light compass**
Gkanias, E., Risse, B., Mangan, M., & Webb, B. PLoS Computational Biology

2017 **Predator Evasion by a Robocrab**
Stouraitis, T., Gkanias, E., Hemmi, J. M., & Webb, B. In Conference on Biomimetic and Biohybrid Systems (pp. 428-439). Springer, Cham.

Oral presentations

2021 **How flies acquire, forget and assimilate memories: a computational perspective**
MUSHROOM BODY MEETING
Online

2019 **From skylight input to behavioural output: a computational model of the insect polarised light compass**
INTERNATIONAL NAVIGATION CONFERENCE
Edinburgh, UK

2017 **Predator evasion by a Robocrab**
THE LIVING MACHINES
Stanford University, CA, USA

Poster presentations

2019 **Robustness of a model of the insects' celestial compass in realistic conditions**
INT. CONFERENCE ON INVERTEBRATE VISION
Bäckaskog Slott, Sweden

2018 **Imitating the Drosophila Larval Learning Behaviour on a Robot**
MAGGOT MEETING
University of Edinburgh, United Kingdom

Communication skills

GREEK Native speaker

ENGLISH Oral: fluent – Written: fluent

SPANISH Oral: basic – Written: basic

University theses

2016 **Robocrab: Data-driven adaptation of the evasion behaviour in fiddler crabs (Master Thesis)**
We create a semi-supervised structure of neural network, inspired by the physiology of neurons in fiddler crabs, and train it to adapt the evasion behaviour of fiddler crabs on potential predators, solving a complicated visuomotor problem (developed in Python using the Theano/Tensorflow-based 'keras' library).

2013 **Deep Learning Algorithms for Multi-label Data (Bachelor Thesis)**
We extended a Java library implementing Restricted Boltzmann Machines and Deep Belief Networks and we used it to examine how these models perform in different multi-label task.

Funding & Awards

2019 **Percy Sladen Memorial Fund Grant**
The Linnean Society of London

2018 **Robotics and Autonomous Systems - Centre for Doctoral Training Grant**
Engineering and Physical Sciences Research Council (EPSRC)

2015 **UK/EU Master's Scholarship**
University of Edinburgh

Activities

2016 **Junction Hackathon**
Winning price of the Skype's "Artificial Intelligence Driven Bots" challenge.

2016 **Data Science Game**
24^{th} place out of 143 teams.

2015 **Coastal Sailing Diploma**
2^{nd} best performance in school.

2008 **Linear and freehand drawing**
4^{th} best performance in school.

Technical skills

ADVANCED NumPy, PyTorch, OpenCV, Matlab, Python, C#, C/C++, Git, LaTeX
Probabilistic Machine Learning, Un/Supervised Learning, Reinforcement Learning, Computer Vision, Information Theory

GOOD Keras, Theano, TensorFlow, Simulink, weka, Linux, R, Java