Matthew Bennett

Research and Data Scientist

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Experience

UCLOUVAIN | Postdoctoral researcher
2019 - present

During this post I have collaborated on several projects requiring advanced data collection, preprocessing and statistical modelling of human brain data. An international collaboration used deep neural networks to better understand the results of the above projects. I presented the results at international conferences.

UNIVERSITY OF GLASGOW | Postdoctoral researcher
2017 - 2019

Furthered my Ph.D. work, lectured on brain imaging software and mentored several Ph.D., masters, and bachelors of science students.

Professional Work Projects

SPIKING DEEP NEURAL NETWORKS | Python 3 | link

➔ My latest scientific work has been on face recognition in an unsupervised convolutional spiking neural network implemented in SpykeTorch (which itself is based on PyTorch).

➔ Specifically, we study the link between known properties of human vision regarding face recognition and whether these properties also emerge in the network.

➔ The learning rule is biologically plausible and allows for convergence with a much smaller number of training images than is typical of real-valued CNNs driven by back-propagation.

➔ I experimented with the number of layers, receptive field size, orientation tuning and virtual lesioning (i.e. knockout) on network performance.

HUMAN BRAIN IMAGING AND MACHINE LEARNING | Python 3, Matlab, R

➔ Applied machine learning techniques to classify patterns of brain activity (i.e. 'mind reading') to better understand information flow in the human visual system.

➔ Fitted linear mixed effects models to human brain data.

MANAGING LINUX SERVER FOR GOFFAUXLAB | Unix, bash

➔ Installed (and currently manage) a Linux server, along with various specialised software, on which our lab depends for data analysis.

➔ Use a wealth of Unix functionality daily (e.g. user permissions, remote access protocols between Unix and non-Unix machines, automated remote backups).

➔ Set up a RAID system which successfully prevented data loss and downtime (due to a faulty HDD).

Skills

KNOWLEDGE

Data collection • Data preprocessing

Statistical modelling

Machine learning • Neural networks

Presenting and communicating data

Linear algebra • Statistics

Open source software

Unit testing

PROGRAMMING

8+ years:
Matlab

4+ years:
Python 3

2+ years:
R

2+ years:
Bash

TOOLS

Git • Unix system tools • LaTeX • SPSS • Microsoft Office

Education

UNIVERSITY OF GLASGOW
Ph.D. in Computational cognitive neuroscience
2013 - 2017

UNIVERSITY OF LEICESTER
MSc. in Psychological research methods
2011 - 2012

DE MONTFORT UNIVERSITY
BSc. in Human psychology
2008 - 2011

Personal Learning Projects

BUILDING NUMPY FROM SCRATCH | Python 3 | link

➔ This was a project I undertook to better learn how to write Python 3 libraries, classes, and methods.

➔ Using only standard library routines, I was able to implement an array of methods to carry out linear algebra operations (e.g. fitting least squares models such as polynomial curves to data).

BUILDING AN OPEN SOURCE PLUGIN FOR VIM TEXT EDITOR | Vimscript | link

➔ This project taught me about maintaining software that others depend on (e.g. creating documentation, maintaining backwards compatibility, releasing new versions).

➔ I also improved my understanding of version control (git) and unit testing.