WALSHE, R. CALEN

Visual & Computational Neuroscientist

CONTACT

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Austin, TX
J1 (EB2-NIW Pending)

SKILLS

Vision Science
Bayesian Perception
Eye movements
Psychophysics
Ideal Observer Analysis
Signal Detection Theory
Signal Processing
Fourier Analysis
Image Quality Assessment

Data Science and Machine Learning
Maximum Likelihood Estimation
Discriminant Analysis
Deep Learning
Reinforcement Learning
Bayesian Regression
Least Squares Regression
Logistic Regression
Generalized Linear Model
Bayesian Decision Theory
Bayesian Hierarchical Regression
Support Vector Machines
Monte Carlo Methods
Data Visualization

Software
Keras/TensorFlow
CUDA
Anaconda
ggplot/dplyr (tidyverse)
Eyelink
Linux
LaTeX
Psychtoolbox
Google Cloud Services
Google G Suite
Adobe Creative Suite

Programming
R
MATLAB
Python
Markdown
HTML/CSS
SQL

ABOUT ME

My work as a scientist has taken me in many directions that all have a common theme: to understand how the brain converts visual perception into intelligent action. The primary set of methods that I use in my research combines behavioral experiments and machine learning. The goal of the work is to develop algorithms that solve perceptual tasks such as object recognition and visual search in similar ways to humans. In basic research I have consistently delivered on funding awards by generating peer reviewed scientific publications, giving talks and presenting conference posters. In my work as an applied scientist I have helped stakeholders identify key insights for business and product development. Please don't hesitate to get in touch if you would like to know more about my background and skills!

WORK EXPERIENCE

Center for Perceptual Systems, The University of Texas at Austin, USA.

Postdoctoral Researcher | August 2015 – Present

- Developed a signal processing tool to simulate the retina
- Developed machine learning tools to detect objects in natural scenes
- Used human behavioral imitation to improve state of the art deep learning methods
- Used computer vision tools to process large datasets of images
- Conducted eye tracking and psychophysical experiments

Accelerate Internship, Enquiro Search Solutions, Vancouver, Canada.

Research Intern | September 2009 – September 2010

- Worked with stakeholders to identify key research objectives and potential value
- Worked with a clinical population to identify neural signatures of brand preferences measured through EEG techniques
- Generated written reports that guided future product design and business development

EDUCATION

The University of Edinburgh, Edinburgh, Scotland

Ph.D. in Psychology, Cognitive Neuroscience | Sept 2011 - May 2015

- Developed state of the art algorithms to detect rapid eye movements with low error
- Applied machine learning techniques to predict human eye movement behavior
- Taught courses in R programming and advanced statistics
- Awarded competitive scholarships totaling $120,000 over four years

Simon Fraser University, Burnaby, BC, Canada

M.A. in Experimental Psychology, Cognitive and Neural Science | Sept 2009 – August 2011

B.A. in Cognitive Science | Jan 2005 - Feb 2009

- Applied machine learning methods predict human eye movements
- Measured human behavior in eye tracking studies
- Measured neural activity in human subjects using EEG methods
- Prepared exams and invigilated exams for 8 courses over 2 years as a TA

ACADEMIC CONTRIBUTIONS

- Ruohan, Z., Walshe, R.C. et al. (2019). Atari-HEAD: Atari Human Eye-Tracking and Demonstration Dataset. preprint arXiv. arXiv:1903.06754 (Under review at AAAI'20).
- Walshe, R. C., Sebastian, S., & Geisler, W. (2018). Ideal observer for detection of occluding targets in natural scenes in the fovea and periphery. Journal of Vision, 18(10), 629-629.
- Walshe, R.C. & Nuthmann, A. (2015). Mechanisms of saccadic decision making while encoding naturalistic scenes. Journal of Vision, 15(21).
- Walshe, R.C. & Nuthmann, A. (2014). Asymmetric control of fixation durations in scene viewing. Vision Research, 100, 38-46.