

Visual Image Interpretation in Humans and Machines: Machines that see like us?

One Day BMVA symposium in London, UK on Wednesday 10th April, 2019

Chair: Andrew Schofield

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This symposium was held at the BCS headquarters in London on 10th April 2019. It aimed to explore comparisons between deep learning and biological visual systems.

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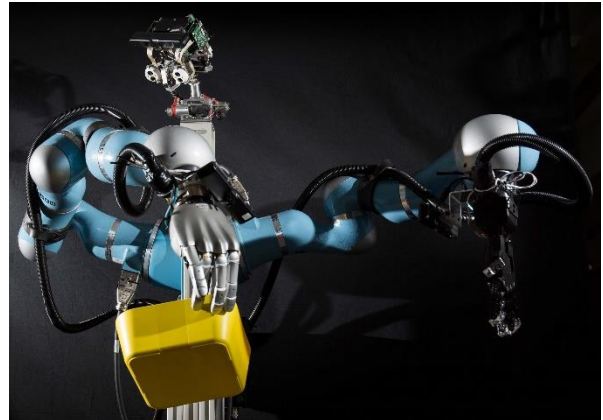
This meeting was well attended with around 90 participants, including three keynote presentations, nine contributed talks and 11 posters. The meeting had an unusual format with long poster and discussion sessions and frequent breaks integrated

into the three main sessions. As well as encouraging discussion, this produced parity between the invited talks and the posters with the posters further promoted through two spotlight sessions. The three talk sessions were broadly themed around: Differences between neural network and biological systems, Synergies between the two, and ways to augment machine vision systems.

Charles Leek opened the first session with his keynote entitled “Deep Neural Networks: The new black box of human vision research?” in which he outlined concerns that while neural networks may match human performance, they may do so while working rather differently from biological vision and thus be a relatively poor model. Followed by talks from Thomas Tanay, Marin Dujmovic and Gaurav Malhotra on, respectively, the vulnerabilities of networks to adversarial images, human performance on images that fool networks, and the contrasting role of shape in humans and neural networks.

The second session featured a keynote from Tim Kietzmann entitled “Understanding vision at the interface of computational neuroscience and artificial intelligence” in which he outlined novel techniques combining deep learning with neuroimaging to understand visual representation in the brain better. Followed by a talk by Kai Kiwitz on the similarities between neural network and human labelling of anatomical brain slices. Ryan Blything then described similarities between humans and neural networks when trying to achieve translational invariance. Lastly, in this session, Javier Vazques Corral showed how neural networks are susceptible to some visual illusions that are known to exist for human vision.

In his talk “Policy networks with and without brains” the third keynote speaker, Andrew Glennerster, made a case for policy networks as a key evolutionary development in biology that should be added to machine learning architectures. This was followed by talks from Julian Forrester, on genetic programming; Marek Pedziwiatr, on meaning maps; and Ethan Harris, on a biologically inspired working memory to augment deep networks.



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These talks were complemented by posters from: Fraser Smith, "Early visual regions in the human brain contain information about occluded parts of human faces"; Laszlo Talas, "Modelling an evolutionarily arms-race with Generative Adversarial Networks"; John Harston, "Body dynamics in ongoing tasks are predictive of visual attention"; Kofi Appiah, "Mimicking the honeybee eyes for visual scene recognition". Maija Filipovica, "Performance and scene area focus of human participants and neural networks in a visual stability discrimination task"; Alex Wade, "A neural correlate of DNN image classification confidence"; Adar Pelah, "Do machines "see" like us? A comparative study on classification of gender from gait between human, bio-inspired and non-bio-inspired learning systems"; Frederick Stentiford, "Visual Recognition without Features or Training Data"; Wenshu Zhang, "Understanding genetic variation by using automated measurement of shape"; Xiaoyue Jiang, "Deep Shadow Detection and Removal"; and Lindsay MacDonald, "Neural Networks for Colour Space Transformations"

I want to thank all the presenters, attendees, and Andrew Gilbert for their contributions to an enjoyable and thought provoking meeting.

Andrew Schonfield