Imperial College London

HLC Newsletter

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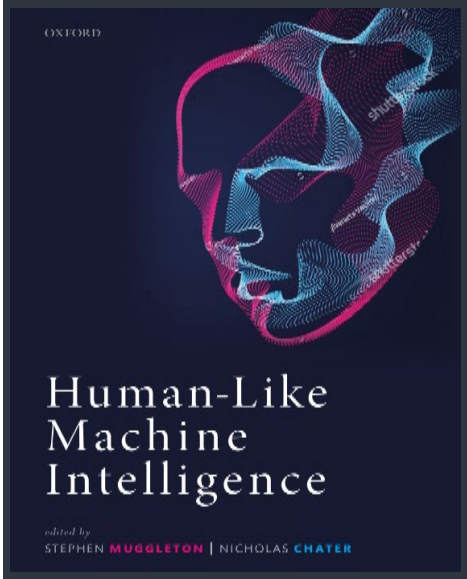
this issue



Machine Intelligence Book

We are pleased to announce that a new book, Human-Like Machine Intelligence, edited by Stephen Muggleton and Nick Chater has now been published.

This book is a hardback book.

Date of Publication: 20 July 2021

544 Pages | 92 line art, 18 combo, and 13 halftones

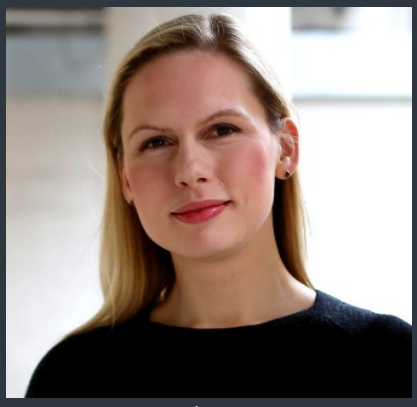
246x171mm

ISBN: 9780198862536

https://global.oup.com/academic/product/human-like-machine-intelligence-9780198862536?cc=gb&lang=en&

Awards & Funding

Alaa Alahmadi



Caroline Jay

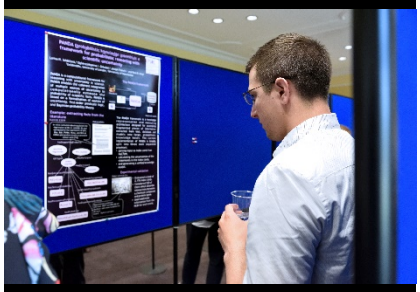
Congratulations to Alaa Alahmadi, from the University of Manchester who was the only Computer Scientist to reach the final in the highly competitive Parliamentary and Scientific Committee/Royal Academy of Engineering STEM for Britain 2021 competition.

Alaa's PhD work, supervised by Caroline Jay, focuses on improving ECG interpretation, using an empirical understanding of how humans perceive signal data. A prototype algorithm that vastly improves automated detection of 'QT-prolongation' (an indicator of potential sudden cardiac death) will be published in the upcoming 'Human-Like Machine Intelligence,' Muggleton & Chater, Eds., Oxford University Press.

Her latest paper, published in Computers in Biology and Medicine, demonstrates that the Human-Like approach to algorithm development is superior to automatic rule generation using statistical machine learning, and is more acceptable in clinical practice.

Here is a link to Alaa's entry on the website: https://stemforbritain.org.uk/wp-content/uploads/2021/03/ALAA_ALAHMADI_2021_POSTER.pdf

Top journals, conference papers and publications



We know of the following papers recently published by members of the network:

- Argumentative Explanations for Interactive Recommendations. Antonio Rago, Oana Cocarascu, Christos Bechlivanidis, David Lagnado and Francesca Toni Artificial Intelligence ---AIJ Paper. https://www.sciencedirect.com/science/article/abs/pii/S0004370221000576?via%3Dihub

- Wang-Zhou Dai and Stephen H. Muggleton. Abductive knowledge induction from raw data. In *Proceedings of the 35th Conference on Artificial Intelligence (IJCAI 2021)*. IJCAI, 2021.

- An explainable algorithm for detecting drug-induced QT-prolongation at risk of torsades de pointes (TdP) regardless of heart rate and T-wave morphology. Alaa Alahmadi, Alan Davies, Jennifer Royle, Leanna Goodwin, Katharine Cresswell, Zahra Arain, Markel Vigo and CarolineJay. https://www.sciencedirect.com/science/article/abs/pii/S0010482521000755

- Pseudo-colouring an ECG enables lay people to detect QT-interval prolongation regardless of heart rate. Alaa Alahmadi, Alan Davies, Markel Vigo and Caroline Jay https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0237854

- The paper Logical English Meets Legal English for Swaps and Derivatives by Robert Kowalski and Akber Datoo has been accepted for publication in the Journal of Artificial Intelligence and Law. https://www.doc.ic.ac.uk/~rak/papers/Logical%20English%20meets%20Legal%20English.pdf

Awards & Funding

Congratulations to Neil Bramley, University of Edinburgh who has had a grant success with an application that was endorsed by the HLC group and which very much fits in the Humanlike Computing topic.

Read more: https://gow.epsrc.ukri.org/NGBOViewGrant.aspx?GrantRef=EP/T033967/1

It's an EPSRC New Investigator Grant to explore the algorithmic basis of humanlike learning, value £649,875, title: "Computational constructivism: The algorithmic basis of discovery"

It's allowed Neil to hire two postdocs at Edinburgh to work on these topics for the next three years.

Co-investigator: Chris Lucas

Postdoc: Aba Szollosi who is coming from UNSW in Sydney

Postdoc: Tadeg Quillian who is coming from UCSB in California

Neil Bramley

Chris Lucas

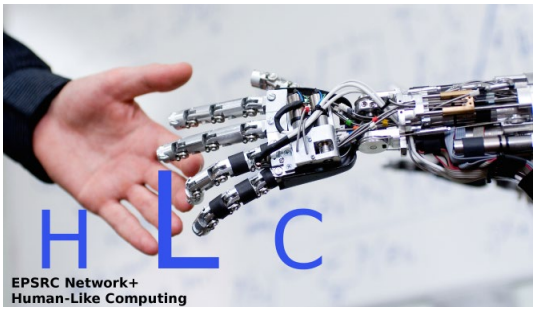
Aba Szollosi

Tadeg Quillian

Congratulations to Robert Kowalski, Fariba Sadri and Marek Sergot of Imperial College London who were awarded the inaugural CodeX Prize in acknowledgment of their groundbreaking work on the application of logic programming to the formalization and analysis of the British Nationality Act.

The CodeX Prize is an annual award given to an individual or individuals for a noteworthy contribution to computational law — an idea, article, book, computer application, computer tool, organization, etc., that has had a significant and enduring positive impact on the field.

Read more: https://law.stanford.edu/press/new-codex-prize-awarded-to-computational-law-pioneers-during-9th-annual-codex-futurelaw-conference/



HLC Network+ Year 4 Call Results

Kick-Start Awards 2021

Andrew Cropper, Oxford University

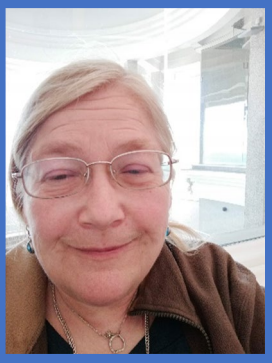
Aldo Faisal, Imperial College London

Ali Shafti, Imperial College London

We are pleased to announce the outcome for our Year 4 Call as follows:

- Andrew Cropper, Oxford University has been awarded £80K for his Kick-Start proposal entitled “Explainable Drug Design”
- Aldo Faisal and Ali Shafti, Imperial College London have been awarded £80K for their Kick-Start proposal entitled “Human-like AI and Human Collaboration: Human in-the-loop learning for interpretable human-robot collaboration agents”.
- Ruth Aylett, Heriot-Watt University has been awarded £2K for her travel proposal entitled “Social Signals for Social Agents”

Travel Award 2021



Ruth Aylett, Heriot-Watt University

Final Report – HLC Year 1 Kick-start "Social Sensing"

Prof. Patrick G.T. Healey,
Queen Mary University of London

There are many contexts in which it would be useful to have a better understanding of human interaction 'in-the-wild'. In particular there is clear evidence that frequency and quality of social interaction are critical factors in determining physical and mental health outcomes (including a substantial impact on mortality (Landis-Holt, 2010). However current methods for assessing social engagement are coarse grained and rely heavily on subjective self-report. This project assessed the feasibility of developing unobtrusive, quantitative methods for capturing the frequency, quality and context of everyday social interactions. The aim was to identify new ways of enabling machines to perceive, recognise and engage with basic patterns of human interaction to enable more effective communication and collaboration. The approach used is based on results obtained from work on optical motion capture of live conversation that people move in characteristic ways during face-to-face conversation (Battersby and Healey, 2010; Healey, Plant, Howes and Lavelle 2015). In particular, speaker's hand movements during increase during conversation whereas their addressees move their hands significantly less than normal. This leads to the hypothesis that the frequency and degree of engagement interaction might have distinct motion signatures. If correct, this would provide a way to sense patterns of social interaction without requiring explicit self-report or potentially intrusive audio or video recordings. While a great deal of attention has been paid to sensing physical activity using motion sensors it has not been applied to capturing the quality of social activity in this way. For example, the Avon Longitudinal Study of Parents and Children (ALSPAC) and UK Biobank have wrist-worn accelerometer data but do not contain significant information on social interaction and have not been analysed to detect this (Willets et. al. 2018, Mattocks et. al. 2008).

Follow-on Grant Applications:
- Healey (PI) QMUL / Ove Arup Partners "Sensing Social Ecologies" Bid to Alan Turing Institute Urban Analytics Calls. 1 Apr 2020 - 30 Sep 2020. (£50k FEC) Unsuccessful.
- Healey (PI) QMUL / UCL / CITY / Britsol. "Social Health" Bid to EPSRC Healthcare Techologies Call. Outline Stage. 1 Sep 2020 - 31 Aug 2025. (£7.3m FEC) Unsuccessful.

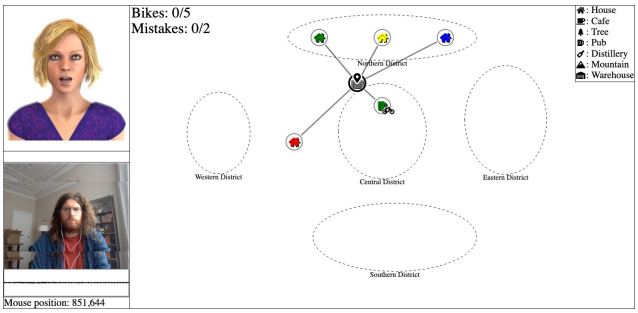
Conference Presentations:
- Healey, P.G.T. Theodorou, L. and Haddadi, H. (2019) "Social Health: Mapping the quality of social interactions in the wild" Invited Talk, Human-Like Computing Machine Intelligence Workshop (MI21-HLC), 30th June – 3rd July Cumberland Lodge, Windsor, UK.
- Healey P.G.T., Theodorou, L. and Haddadi, H. (2019) "The Dynamics of Hand Movements in Dialogue" 29th Meeting of the Society for Text and Discourse July 9th - July 11th, 2019 New York City, United States.

Publications:
- Healey P.G.T. (forthcoming) "Human-Like Communication" in Human-Like Machine Intelligence edited by Stephen Muggleton and Nick Chater. Oxford University Press.
- Healey, P.G.T., Theodorou, L., H ä nsel, K., Cavallaro, A. Tokarchuk, L., Haddadi, H. and Katevas, K. (in prep) "Hand Movements Signal Social Engagement". For submission to Nature Human Behaviour.

Start Making Sense during COVID-19

The Start Making Sense project (grant EP/R031045/1) is a joint Human-Like Computing project between Heriot-Watt University and the University of Edinburgh. Led by Dr R. Petrick and Dr R. Hill, researchers Dr S. Dalzel-Job, Dr A. Lindsay, and Dr B. Craenen, are investigating cognitive and affective confidence measures for explanation generation using epistemic planning.

Accurate prediction of user affective state relies on real-time analysis of various predictors, which can require specialist equipment and calibration. However, the worldwide COVID-19 lockdown has meant that many intended lab-based experiments have now been moved online, making such real-time analysis impractical. Instead, we have developed a website to support an online data gathering experiment [1].



The website hosts an interactive task, where the user is guided by an agent. The picture shows the user's view of the system, with the agent in the top left corner and a map filling most of the screen. The website captures mouse position, task performance, a video stream (for post-interaction facial expression analysis) and sound, providing rich observations of the users as they interact with the agent and its plan. The system also captures subjective information from the user in-between tasks, to gather their view on the nature of the task, the direction guidance, and the AI.

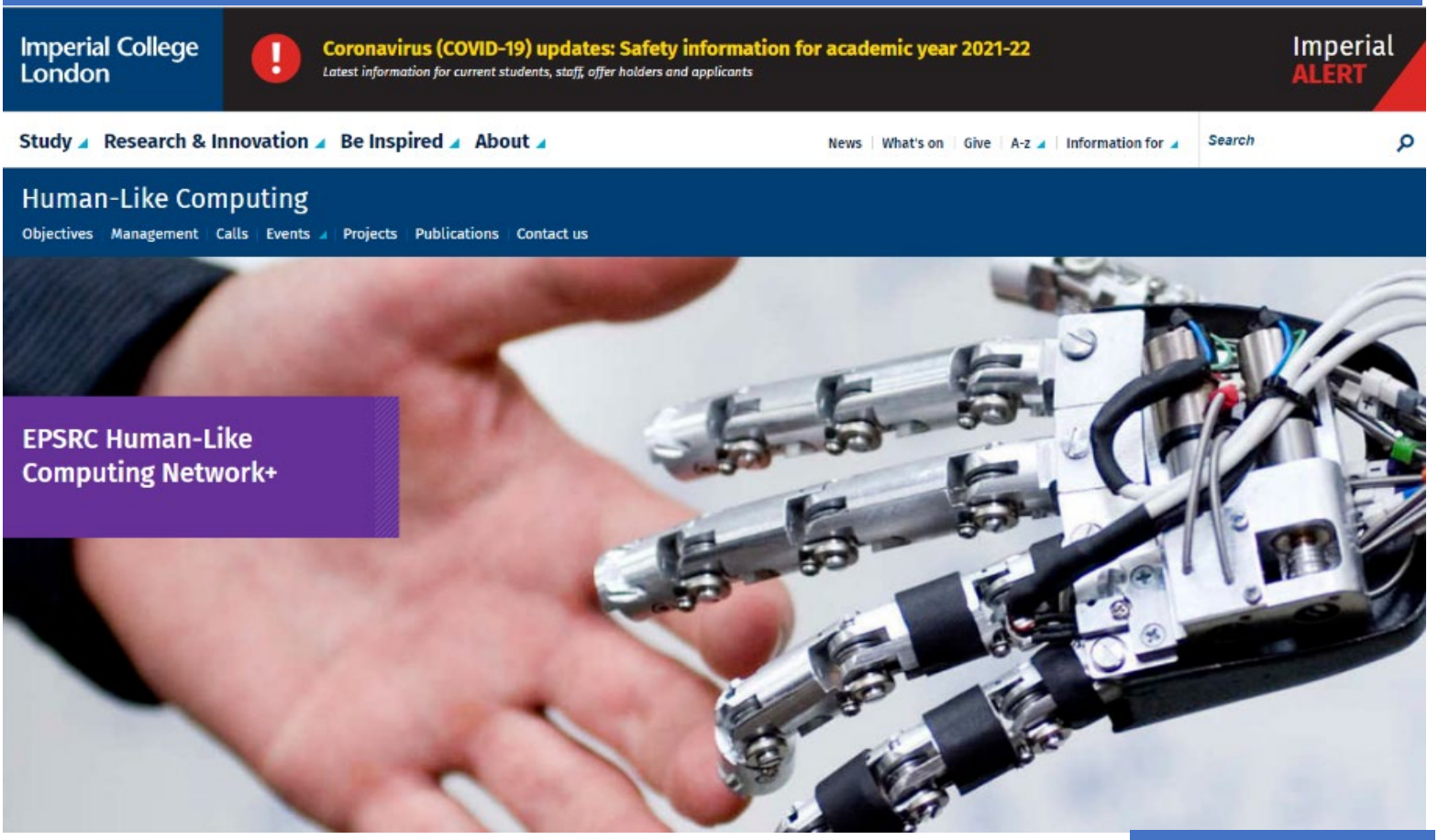
The task is based in a bike share setting, and involves the user finding several bikes and returning them to the warehouse. The AI agent provides verbal directions, helping the user to find the bikes. Its behaviour is based on a strategy, which is generated offline using an automated AI planning system. Pauses in the user's interaction with the map are taken as indicating confusion, and may result in better instructions, or more direction given. The system was designed to be extendable and customisable, and supports different maps, agent strategies and virtual agents, which has made configuration of randomised trials straightforward.

The platform has since been successfully deployed and is currently being used to collect and collate data for further study. More details about the study are reported in [2], demonstrating that it is still possible to conduct Human-Like Computing experiments when in-person experiments are not possible.

[1] Alan Lindsay, Bart Craenen, Sara Dalzel-Job, Robin Hill and Ron Petrick. Supporting an Online Investigation of User Interaction with an XAIP Agent. In Proceedings of the ICAPS Workshop on Knowledge Engineering for Planning and Scheduling (KEPS), 2020.

[2] Alan Lindsay, Bart Craenen, Sara Dalzel-Job, Robin Hill and Ron Petrick. Investigating Human Response, Behaviour, and Preference in Joint-Task Interaction. In Proceedings of the ICAPS Workshop of Explainable AI Planning (XAIP), 2020.

HLC website update



We are delighted to announce that HLC Network+ has a new website at Imperial College London which is accessible from the following link:

https://www.imperial.ac.uk/human-like-computing/

Information on the HLC supported projects (Kick-Start Projects) as well as relevant publications by the HLC members are now available from the HLC website.

If you have any publications which you think are relevant to HLC then please send the details (ideally with a link to the publication) so that we can include them in the publication list. Please also let us know any corrections to the current list of publications.

Details should be sent directly to Alireza Tamaddoni-Nezhad at a.tamaddoni-nezhad@imperial.ac.uk

Meetings and events

Hooke Meeting, 26-27 September 2022

The Royal Society Hooke Meeting on Cognitive Artificial Intelligence, organised by Profs Bundy, Chater and Muggleton, will be held at the Royal Society London premises. The meeting will involve presentations from leading international scientists in AI and Cognitive Science.

IJCLR2022, 28-30 September 2022

The Hooke will be followed by the second International Joint Conference on Learning and Reasoning, held at Cumberland Lodge, chaired by Prof Muggleton. This meeting will bring together established workshops and conferences including the 31st International Conference on Inductive Logic Programming (ILP), the 16th International Workshop on Neural-Symbolic Learning and Reasoning (NeSy), the 11th International Workshop on Approaches and Applications of Inductive Programming (AAIP) and the 3rd International Workshop on Human-Like Computing (HLC). Read more:

https://ijclr22.doc.ic.ac.uk/

https://www.cumberlandlodge.ac.uk/

Cumberland Lodge, Great Windsor Park