SPECIAL SESSION

EXPLAINABLE ARTIFICIAL INTELLIGENCE FOR UNVEILING THE BRAIN: FROM THE *BLACK*-BOX TO THE *GLASS*-BOX (XAIB)

18th September 2021, 14:00-16:00 UK time (GMT+1)

Google Meet joining info
Video call link: https://meet.google.com/trf-nkxv-wgf
Live Stream: https://stream.meet.google.com/stream/d4c2c21a-8de7-4649-81b8-9a6540e126d7

PROGRAM

14:00

Dr. Alessia Sarica

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Assistant Professor, Neuroscience Research Center, Magna Graecia University of Catanzaro, Italy

Presentation of the Special Session

Nowadays, Artificial Intelligence (AI) and Machine Learning (ML) are widely used for the exploration of the Brain and their application ranges from the processing and analysis of neuroimages to the automatic diagnosis of the neurodegenerative diseases. However, without an explanation of the ML findings, the automatic medical and clinical decisions are still hard to be trusted. Indeed, the black-box nature of most algorithms, although providing high accuracy, makes the interpretation of the predictions not immediate. Thus, in recent years the need of interpretable and explainable AI, especially in Healthcare, got stronger, as well as the need of glass-box models able to show a trade-off between intelligibility and optimal performance.

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14:10-14:40

Dr. Rich Caruana

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Senior Principal Researcher, Microsoft Research Lab - Redmond

Glass-box Machine Learning for Healthcare

Dr. Rich Caruana is a senior principal researcher at Microsoft Research. Before joining Microsoft, Rich was on the faculty in the Computer Science Department at Cornell University, at UCLA's Medical School, and at CMU's Center for Learning and Discovery. Rich's Ph.D. is from Carnegie Mellon University, where he worked with Tom Mitchell and Herb Simon. His thesis on Multi-Task Learning helped create interest in a new subfield of machine learning called Transfer Learning. Rich received an NSF CAREER Award in 2004 (for Meta Clustering), best paper awards in 2005 (with Alex Niculescu-Mizil), 2007 (with Daria Sorokina), and 2014 (with Todd Kulesza, Saleema Amershi, Danyel Fisher, and Denis Charles), co-chaired KDD in 2007 (with Xindong Wu), and serves as area chair for NIPS, ICML, and KDD. His current research focus is on learning for medical decision making, transparent modeling, deep learning, and computational ecology.

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Question time
(5 min)

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14:45-15:15

<u>Dr. Michele Ferrante</u>

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NIH Program Director: <u>Computational Neuroscience</u> | Computational <u>Psychiatry</u>

Funding Opportunities and New Research Directions for XAI, Computational Neuroscience, and Computational Psychiatry

Dr. Ferrante is a Program Officer at US National Institute of Mental Health where he oversees grants and crafts funding opportunities related to computational neuroscience and computational psychiatry. He provides advice to applicants and grantees, makes funding recommendations, oversees grantees' progress, facilitates scientific opportunities in areas of high program priority. Dr. Ferrante is part of the RDoC Unit, the BRAIN Initiative, and the Collaborative Research in Computational Neuroscience program. Dr Ferrante manages projects where cutting-edge data- and theory-driven computational methods are well-integrated with neurobehavioral technology. His academic work focused on utilizing computational and experimental methods to study how biophysical properties of hippocampal and cortical neurons may affect their computational properties. Dr. Ferrante obtained a MS in clinical/experimental psychology with Dr. Michele Migliore at the Italian National Research Council; a PhD in computational neuroscience with Dr. Giorgio Ascoli at George Mason University; a Postdoc in experimental electrophysiology and modeling with Dr. Michael Hasselmo at Boston University.

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Question time
(5 min)
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15:20-15:50

<u>Dr. Dimitris Pinotsis</u>

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Associate Professor at University of London -- City and Research Affiliate at the Department of Brain and Cognitive Sciences at MIT

Combining machine learning and biophysical modeling to solve Computational Psychiatry problems

Dimitris is a theoretical neuroscientist with a PhD in Mathematics and an MSc in Theoretical Physics from the University of Cambridge in England where he worked with Thanasis Fokas. After graduating, he published more than fifteen papers in mathematics and physics journals and then decided to pursue a career in neuroscience, his true passion. Dimitris worked with Peter Grindrod and then spent six and a half years at University College London (UCL) working with Karl Friston in machine learning and developing mathematical methods for the analysis of brain data; then continued at the Massachusetts Institute of Technology (MIT), where he worked with Earl Miller on using predictive coding and deep neural networks to address fundamental questions in cognitive neuroscience. In 2018, he joined the Center for Mathematical Neuroscience and Psychology at City—University of London as an Assistant Professor (Lecturer). He is now an Associate Professor (Senior Lecturer) at the same university and a Research Affiliate at MIT's Brain and Cognitive Sciences Department.

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