Davide Valeriani

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Research Interests

My research interests are in the area of EEG-based brain-computer interfaces (BCIs), with a main focus on augmenting decision making. During my PhD, I have developed collaborative BCIs to augment group decision making in visual and auditory tasks. In particular, I have used neural, behavioural and physiological signals to estimate the decision confidence of the users and weigh their responses accordingly to improve group decisions. My current research is focused on using a similar approach to also augment individual decision making in multisensory environments, with the aim of developing a closed-loop BCI able to adapt to the user in real-time to maximise his/her performance.

Education

Oct 2013 – Jul 2017	PhD in Computing and Electronic Systems, University of Essex, UK. *Improving Group Decision Making with Collaborative Brain-Computer Interfaces.* Supervisors: Professor Riccardo Poli and Dr Caterina Cinel.
Sep 2010 – Mar 2013	Laurea magistrale (equivalent to MEng) in Computer Engineering (*summa cum laude*), Università di Parma, Italy. *A 3D Perception System for Mobile Robot Navigation and Object Detection.*
Sep 2007 – Dec 2010	Laurea (equivalent to BEng) in Computer Engineering (*summa cum laude*), Università di Parma, Italy. *Development of a Software Library for Programming the Comau Smart Six Robot Manipulator.*

Professional Memberships

Associate Fellow of the Higher Education Academy (UK), chartered Engineer (Italy), IEEE & EMBS Graduate Student member.

Research Experience

Feb 2017 – today	**Senior Research Officer** *School of Computer Science and Electronic Engineering, University of Essex, UK.* Conducting research in the MURI project "Closed-Loop Multisensory Brain-Computer Interface for Enhanced Decision Accuracy".
Nov 2016 – Dec 2016	**Research Consultant** *Institute for Analytics and Data Science, University of Essex, UK.* Research consultancy for Hood Group Ltd on the application of machine learning and big data analytics techniques in relation to insurance schemes.
Oct 2016 – Dec 2016	**Visiting Researcher** *John A. Paulson School of Engineering and Applied Sciences, Harvard University, Cambridge, MA, USA.* Working on state-space modelling with Professor Demba Ba.
Apr 2016 – Jun 2016	**Senior Research Officer** *School of Computer Science and Electronic Engineering, University of Essex, UK.* Writing a literature review and a full grant proposal on neuroscience technologies to enhance group decision making to be submitted to the Defence Human Capability Science & Technology Centre, MoD.
Sep 2015 – Jul 2016	**Research Officer** *School of Computer Science and Electronic Engineering, University of Essex, UK.* Investigating brain-to-brain communication via EEG signals and transcranial direct-current stimulation.
Oct 2015 – Nov 2015	**Research Consultant** *Institute for Analytics and Data Science, University of Essex, UK.* Research consultancy for Objective Computing Ltd on the application of machine learning and big data analytics techniques in relation to marketing strategy.

Research Grants

Jan 2017 - Mar 2019	Co-Investigator of a research project entitled *Brain-computer-interface-assisted confidence estimation for group decision making, group selection and personnel training* (approx £390,000) funded by the UK Ministry of Defence through the Defence Human Capability Science and Technology Centre (DHCSTC).
May 2015 - Jul 2015	Co-Investigator in a departmental Research Innovation Fund grant (£4,990 - code DC10758) for supporting the participation of the Essex team to the Cybathlon 2016.

Teaching Experience

Oct 2013 – Mar 2016	**Graduate Laboratory Assistant (GLA)** *School of Computer Science and Electronic Engineering, University of Essex, UK* Holding lab activities and marking assignments in the following courses: Large Scale Software Systems and Extreme Programming, Mobile & Social Applications Programming, Introduction to Programming, Data Structures and Algorithms, Applied Mathematics, Professional Development.
Jan 2012 – Dec 2012	**Laboratory Assistant** *Department of Information Engineering, Università di Parma, Italy* Holding lab activities in the following courses: Computer Architectures, C++ Programming.

Awards

Oct 2016	Bronze medal with the Essex Brainstormers team in the BCI race of the Cybathlon 2016.
May 2016	Winner of the IET Present Around The World local network competition.
Apr 2015	Best paper award, 7th International IEEE EMBS Neural Engineering Conference (NER'15), Montpellier (France).
Mar 2015	London Science Museum Award for winning HackTheBrain UK.
Oct 2013	Student travel grant, 4th International Conference on Robotics in Education, Lodz (Poland).
Sep 2012	Member of the winning team of the Sick Robot Day 2012.

Administration

2015 – today	Co-Founder and Director of EyeWink Ltd.
2013 – today	Member of the Student Conduct Panel, University of Essex, UK.
2015 – 2015	Programme Chair of the 7th Computer Science and Electronic Engineering Conference.
2014 – 2014	Programme committee member of the 6th Computer Science and Electronic Engineering Conference.
2014 – 2015	Postgraduate Research Students representative, Faculty of Science and Health, University of Essex, UK.
2013 – 2015	Research Students and GLA/GTAs representative, School of Computer Science and Electronic Engineering, University of Essex, UK.
2009 – 2013	Student Representative in the Senate, Students' Council, Department of Information Engineering Council, Computer Engineering Council and Evaluation Committee, Università di Parma, Italy.

Publications

1. **D. Valeriani**, C. Cinel, & R. Poli. Group Augmentation in Realistic Visual-Search Decisions via a Hybrid Brain-Computer Interface. *Scientific Reports*, pages 1–13, 2017

2. **D. Valeriani**, C. Cinel, & R. Poli. A Collaborative BCI Trained to Aid Group Decisions in a Visual Search Task Works Well with Similar Tasks. In *Neuroadaptive Technology Conference (NAT'17)*, 2017

3. **D. Valeriani**, C. Cinel, & R. Poli. Augmenting Group Performance in Target-Face Recognition via Collaborative Brain-Computer Interfaces for Surveillance Applications. In *8th International IEEE EMBS Neural Engineering Conference*, 2017

4. **D. Valeriani** & A. Matran-Fernandez. Past and Future of Multi-Mind Brain-Computer Interfaces. In C. S. Nam, A. Nijholt, & F. Lotte, editors, *Brain-Computer Interfaces Handbook: Technological and Theoretical Advances*, chapter 36. CRC Press, 2017

5. **D. Valeriani**, C. Cinel, & R. Poli. Hybrid Collaborative Brain-Computer Interfaces to Augment Group Decision Making. In *1st International Neuroergonomics Conference*, 2016

6. **D. Valeriani**, C. Cinel, & R. Poli. Improving Speech Perception with Collaborative Brain-Computer Interfaces. In *38th Annual International IEEE EMBS Conference*, 2016

7. **D. Valeriani**, R. Poli, & C. Cinel. Enhancement of Group Perception via a Collaborative Brain-Computer Interface. *IEEE Transactions on Biomedical Engineering*, 64(6):1238–1248, 2016

8. A. Matran-Fernandez, **D. Valeriani**, & R. Poli. In P. Salvo & M. Hernandez-Silveira, editors, *Wireless Medical Systems and Algorithms*, chapter 9

9. **D. Valeriani**, R. Poli, & C. Cinel. A Collaborative Brain-Computer Interface to Improve Human Performance in a Visual Search Task. In *7th International IEEE EMBS Neural Engineering Conference*, pages 218–223, 2015

10. **D. Valeriani**, R. Poli, & C. Cinel. A Collaborative Brain-Computer Interface for Improving Group Detection of Visual Targets in Complex Natural Environments. In *7th International IEEE EMBS Neural Engineering Conference*, pages 25–28, 2015

11. **D. Valeriani**, A. Matran-Fernandez, D. Perez-Liebana, J. Asensio-Cubero, C. O'Connell, & A. Iacob. A Comparison of Ensemble Methods for Motor Imagery Brain-Computer Interfaces. In *European Conference on Data Analysis 2015*, 2015

12. **D. Valeriani** & A. Matran-Fernandez. Towards a Wearable Device for Controlling a Smartphone with Eye Winks. In *7th Computer Science and Electronic Engineering Conference (CEEC15)*, pages 41–46, 2015

13. R. Poli, **D. Valeriani**, & C. Cinel. Collaborative Brain-Computer Interface for Aiding Decision-Making. *PLOS ONE*, 9(7):e102693, Jul 2014

14. M. Cigolini, A. Costalunga, F. Parisi, M. Patander, I. Salsi, A. Signifredi, **D. Valeriani**, D. Lodi Rizzini, & S. Caselli. Lessons Learned in a Ball Fetch-And-Carry Robotic Competition. *Journal of Automation, Mobile Robotics & Intelligent Systems*, 8, 2014

15. **D. Valeriani**, D. Lodi Rizzini, F. Oleari, & S. Caselli. A Viewpoint Planning and Navigation Algorithm for Mobile Robots using Depth Images. In *Australasian Conference on Robotics and Automation (ACRA2013)*, Sydney, 2013

16. P. Mesejo, S. Cagnoni, A. Costalunga, & **D. Valeriani**. Segmentation of histological images using a metaheuristic-based level set approach. In *Proceedings of the 15th annual conference companion on Genetic and evolutionary computation*, page 1455, Amsterdam, The Netherlands, jul 2013. ACM Press

17. M. Cigolini, A. Costalunga, F. Parisi, M. Patander, I. Salsi, A. Signifredi, **D. Valeriani**, D. Lodi Rizzini, & S. Caselli. Lessons Learned in a Ball Fetch-And-Carry Robotic Competition. In *IV International Conference on Robotics in Education*, Lodz, 2013

References

References provided upon request.