

A novel three dimensional probability based classifier for improving motor imagery-based BCI

Adrian Ashley

University of Sheffield, UK

Abstract

Introduction: Motor imagery BCI based assistive robotics solution has the potential to empower the upper mobility independence of a disabled person. The objective of this work was to compare the classification performance of well-established classifiers with a novel prototype classifier.

Approach: Author developed an adaptive decision surface ADS classifier with the future objective to augment an assistive robotic prosthetic hand to open and close to grasp an object in cooperation with LIDAR sensors. The ADS was trained with a training data set from the BCI competition IV dataset 2a from Graz University of Technology.

Main results: The classification accuracy in the offline tests reached 76.06 % class 1 and 81.50 % class 2 using a non-adaptive ADS and 79.55 % class 1 and 99.69 % class 2 using an adaptive ADS classifiers.

Conclusion: Author shows a prototype adaptive decision classifier used with motor imagery datasets.

Biography

Adrian Ashley is a full-time MPhil student at the University of Sheffield, United Kingdom. He completed his MSc Computer Networking in 2012, BSc (Hons) Computer Science (software engineering) in 2005 in addition to a BTEC HND Electrical & Electronic Engineering with Microprocessor Systems with a final year project using a 68000 microprocessor system in 1990 all qualifications from Sheffield Hallam University. Also, a BTEC OND Electrical & Electronic Engineering with computers with a final year project using a 6502 microprocessor system at Chesterfield College of Art & Technology in 1988. He has successfully published several United Kingdom patents and acquired over 30 years of industrial contract experience as a software engineer across the United Kingdom and Germany for companies such as Deutsche Telekom and working for over two and a half years at Rolls Royce Plc, civil aerospace jet engines in Derby, United Kingdom. He will be applying for a new PhD course in 2020.

Publications

<https://ieeexplore.ieee.org/document/8683136>



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