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Feature Extraction of EEG Signal by Power Spectral Density for Motor Imagery Based BCI

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Abstract

Signals produced from the brain are widely known as Electroencephalogram (EEG) signal interfacing with any communication device creates a unidirectional communicating channel in the absence of neuro-muscular pathways. An effective Brain-Computer Interface (BCI) system basically consists of three operations which are signal recording, feature extraction and classification. Efficient and reliable classification of EEG signal for motor imagery (MI) based BCI system depends on the accuracy of denoising and extracted features of the signal . Extracted features are intended to be lossless key information obtained from a signal that describes a dataset accurately. It is important to minimize the classification complexity and maximize the accuracy. Traditional strategies can be used to process the signal , but the diverseness of the EEG signal conceivably could not be depicted utilizing a linear analytical approach. Hence, this paper adopted the power spectral density (PSD) feature extraction technique to extract the features based on various frequency transformations that enhance the classification performance. Graz BCI competition IV, dataset 2b has been utilized in this paper that consisting of two different classes of motor imagery left-hand and right-hand movement. Overall, 0.61 of Cohen's Kappa accuracy obtained using the LDA classifier. © 2021 IEEE.

Author keywords

BCI ; classification; feature extraction ; LDA; motor imagery ; PSD

References (11)

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1 Malass, M., Tabbal, J., El Falou, W.

EEG Features Extraction and Classification Methods in Motor Imagery Based Brain Computer Interface

(2019) *International Conference on Advances in Biomedical Engineering, ICABME*, 2019-October, art. no. 8940251.
https://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=8119420
ISBN: 978-172812314-1
doi: 10.1109/ICABME47164.2019.8940251

View at Publisher

2 Fang, Y., Chen, M., Zheng, X.

Extracting features from phase space of EEG signals in brain-computer interfaces

(2015) *Neurocomputing*, 151 (P3), pp. 1477-1485. Cited 41 times.
www.elsevier.com/locate/neucom
doi: 10.1016/j.neucom.2014.10.038

View at Publisher

3 Hasan, M.R., Ibrahimy, M.I., Motakabber, S.M.A., Shahid, S.

Classification of multichannel EEG signal by single layer perceptron learning algorithm

(2014) *Proceedings - 5th International Conference on Computer and Communication Engineering: Emerging Technologies via Comp-Unication Convergence, ICCCE 2014*, art. no. 7031650, pp. 255-257.
ISBN: 978-147997635-5
doi: 10.1109/ICCCE.2014.79

View at Publisher

4 Hasan, M.R., Ibrahimy, M.I., Motakabber, S.M.A., Shahid, S.

Classification of Multichannel EEG Signal by Linear Discriminant Analysis

(2015) *Advances in Intelligent Systems and Computing*, 1089, pp. 279-282. Cited 15 times.
http://www.springer.com/series/11156
ISBN: 978-331908421-3
doi: 10.1007/978-3-319-08422-0_42

View at Publisher

5 Ibrahim, S., AlSharabi, K., Djemal, R., Alsuwailem, A.

An adaptive learning approach for EEG-based computer aided diagnosis of epilepsy

(2016) *Proceeding - 2016 International Seminar on Intelligent Technology and Its Application, ISITIA 2016: Recent Trends in Intelligent Computational Technologies for Sustainable Energy*, art. no. 7828633, pp. 55-60. Cited 4 times.
ISBN: 978-150901709-6
doi: 10.1109/ISITIA.2016.7828633

View at Publisher

6 Ivanović, M., Budimac, Z., Radovanović, M., Kurbalija, V., Dai, W., Bădică, C., Colhon, M., (...), Mitrović, D.

Emotional agents — state of the art and applications (Open Access)

(2015) *Computer Science and Information Systems*, 12 (4), pp. 1121-1148. Cited 16 times.
http://www.comsis.org/pdf.php?id=raips-1
doi: 10.2298/CSIS141026047I

View at Publisher

7 Hassan, A.R., Bhuiyan, M.I.H.
An automated method for sleep staging from EEG signals using normal inverse Gaussian parameters and adaptive boosting

(2017) *Neurocomputing*, 219, pp. 76-87. Cited 77 times.
www.elsevier.com/locate/neucom
doi: 10.1016/j.neucom.2016.09.011

View at Publisher

8 Tharwat, A., Gaber, T., Ibrahim, A., Hassanien, A.E.
Linear discriminant analysis: A detailed tutorial (Open Access)

(2017) *AI Communications*, 30 (2), pp. 169-190. Cited 200 times.
http://www.iospress.nl/
doi: 10.3233/AIC-170729

View at Publisher

9 Ivaylov, I., Lazarova, M., Manolova, A.
EEG Classification for Motor Imagery Mental Tasks Using Wavelet Signal Denoising

(2020) *28th National Conference with International Participation, TELECOM 2020 - Proceedings*, art. no. 9299532, pp. 53-56.
http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=9299508
ISBN: 978-172818717-4
doi: 10.1109/TELECOM50385.2020.9299532

View at Publisher

10 Tabbal, J., Mechref, K., El-Falou, W.
Brain Computer Interface for smart living environment

(2019) *2018 9th Cairo International Biomedical Engineering Conference, CIBEC 2018 - Proceedings*, art. no. 8641827, pp. 61-64. Cited 5 times.
http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=8637586
ISBN: 978-153868154-1
doi: 10.1109/CIBEC.2018.8641827

View at Publisher

11 Amjed, S., Ausilah, A., Al-Fraihat, A.
Methods of eeg signal features extraction using linear analysis in frequency and time-frequency domains
(2014) *International Scholarly Research Notices*. Cited 186 times.
Article ID 730218, 7 pages 2014
https://doi.org/10.1155/2014/730218