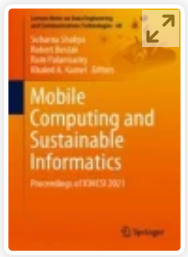

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Keyword Recognition from EEG Signals on Smart Devices a Novel Approach

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Conference paper | First Online: 23 July 2021

Part of the Lecture Notes on Data Engineering and Communications Technologies book series (LNDECT,volume 68)

Abstract

Technological advancement in the field of electroencephalography (EEG) based on brain activity classification extends a variety of significant applications, namely, emotion recognition, muscular moment analysis, neurological disorders identification, the prediction of the intensions, machine controlling in smart devices, and healthcare devices. In this article, a novel approach is introduced for EEG-based digit and keyword recognition for smart devices like mobile, tablets,

etc. EEG signals recordings of 10 subjects (i.e., 7 male and 3 female) were acquired from the age group 20–25 years, and volunteered to imagine digits and keywords. An multiple feature extraction algorithms were employed such as short-time Fourier transform (STFT), discrete cosine transform (DCT), and discrete wavelet transform (DWT) to extract the feature from EEG data. The dimension of the feature space was reduced by employing linear discriminant analysis (LDA). The normalized features were passed through diverse nature of multiple classifiers, namely, support vector machine (SVM), k-nearest neighbor (KNN), random forest (RF), Naïve Bayes (NB), multi-layer perceptron (MLP), and convolution neural network (CNN) to perform classification analysis. By analysis and comparison of the classifiers, the MLP outperformed to claim over the rest of the classifiers in both digit and keyword classification with 96.43% and 92.36% recognition accuracy, respectively.

Keywords

BCI **EEG signals** **Keyword recognition**

Emotive **Smart devices**

- DOI: 10.1007/978-981-16-1866-6_3
- Chapter length: 21 pages

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Cite this paper

Bedre, S.P., Jha, S.K., Patil, C., Dhopeshwarkar, M., Gaikwad, A., Yannawar, P. (2022). Keyword Recognition from EEG Signals on Smart Devices a Novel Approach. In: Shakya, S., Bestak, R., Palanisamy, R., Kamel, K.A. (eds) Mobile Computing and Sustainable Informatics. Lecture Notes on Data Engineering and Communications Technologies, vol 68. Springer, Singapore. https://doi.org/10.1007/978-981-16-1866-6_3

.RIS .ENW .BIB

DOI
https://doi.org/10.1007/978-981-16-1866-6_3

Published	Publisher Name	Print ISBN
23 July 2021		

Springer, Singapore 978-981-16-1865-9

Online ISBN 978-981-16-1866-6

eBook Packages Intelligent Technologies and Robotics

Intelligent Technologies and Robotics (R0)