A Simple Design of a Matlab-Based Function for Topographical Presentation of FNIRS Data

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Abstract Functional Near-Infrared Spectroscopy (fNIRS) has aggrandized the domain of Neurophotonics and Imaging research to reach its apex. With enhanced spatial resolution with the pre-existing temporal resolution, fNIRS can be more promising for the functional analysis of the brain. Hardware integrated software for fNIRS analysis is affluent as well as limited for users. The analysis based on MATLAB is done with the Graphical User Interface (GUI) that are difficult to use because they involve numerous steps, coefficients, and related files. This is a simple MATLAB-based study that includes the generation of the brain activation patterns based on oxygenation and de-oxygenation of hemoglobin and enhancing spatial resolution for the better identification of brain functionality. Brain activation pattern based on the recorded fNIRS data is created in the form of a color-coded map. The map is registered to the brain surface image which provides better visuality of the activation scheme of the brain with an anatomical view. This research intends to encourage prolific researchers in this research area to conduct simplified and cost-effective analyses of the fNIRS study.

Keywords Functional Near-Infrared Spectroscopy (fNIRS) · Brain activation · Topograph · Interpolation · Registration

1 Introduction

Functional Near-Infrared Spectroscopy is regarded as one of the most adroit techniques of detecting cognitive activities throughout the brain. It applies near-infrared ranged light (700–900 nm) as biological tissues are transparent in this wave range and detect changes in concentration of oxygenated hemoglobin and deoxygenated [1].

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