This project discusses the potential of functional near-infrared spectroscopy (fNIRS) to identify an individual using only her brain data.

These results suggest that we can detect a specific brain signature unique to each individual even during resting state, which would be used in biometrics.

Highlight:
- User Identification From fNIRS Brain Data Using Deep Learning
- Denisa Qori McDonald & Erin Solovey

Introduction

Deep Learning has been successfully used to classify data obtained using fNIRS\(^1,2\).

FNIRS has also been used as a user identification and authentication tool using SVM and Naive Bayes classifiers\(^3,4\).

This study focuses on user identification within a larger group of 30 subjects during resting state, and uses deep learning for classification.

Results and Plan

**Results:**
- Maximum user identification accuracy achieved: 63%, while random chance is 3.3%
- Best results achieved for a time window of 1 second

**Future Work:**
- User classification using CNN with random kernels
- User classification using CNN with fNIRS-specific kernels
- Authentication and Privacy of brain data

Methods

- Data obtained while at rest
- Raw data processed using Homer 2\(^5\)
- Features created over time window
- Dataset classified using MLP

Highlights

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2. Hwa, S. et al. 2016. Analyzing Brain Functions by Subject Classification of Functional Near-Infrared Spectroscopy Data Using Convolutional Neural Networks Analysis. Computational Intelligence and Neuroscience