JASA ACS Reproducibility Initiative - Author Contributions Checklist Form

Commented [1]: see http://ctuning.org/ae/

The purpose of the Author Contributions Checklist (ACC) Form is to document the artifacts associated with a manuscript (e.g., code and data supporting the computational findings), and describe how to reproduce the findings. The final version of this document will be included as online supplemental material with the published paper and referenced in the abstract.

As of Sept. 1, 2016, the ACC Form must be included with all submissions to JASA ACS.

This document is the template that will be provided to authors; please replace the (non-bold) text below that provides guidance on how to fill out each item with the actual information for your manuscript.

Data

Abstract (Mandatory)

The purposes of this paper are to present a new statistical approach for analysis of intracranial electroencephalographic (iEEG) data and to use our approach to uncover the normal and abnormal directional brain networks of epileptic patients over the course of seizure development. iEEG data are high-dimensional multivariate time series recordings of many small regions' neuronal activities at a high temporal resolution (millisecond scale) and spatial resolution (about 10 mm in diameter) and with a strong signal-to-noise ratio, in contrast to popular functional magnetic resonance imaging (fMRI) with a low temporal resolution and scalp EEG with a low spatial resolution. As such, iEEG data provide valuable information about directional brain networks.

Availability (Mandatory)

iEEG data used in the paper were collected from an epileptic patient who received epilepsy diagnosis and treatment at the University of Virginia (UVA) Hospital. The authors analyzed the de-identified iEEG data of the patient. The de-identified data from the UVA hospital are stored on a password protected server, which is managed by UVA Health System IT. The authors are not allowed to share the data with a third party.

Restrictions (if data will not be made publicly available, justify why it cannot be made available or indicate the process by which others can request access to the data in cases (e.g., Census data) where the authors do not have the authority to make the data available)

The UVA hospital owns all the iEEG data. The third party can request the data directly from the UVA Health System. For questions regarding the data, please contact the co-author Mark Quigg via email at MSQ6G@hscmail.mcc.virginia.edu .

Description (Mandatory if data available)

- Author permissions (demonstrate that author has legitimate access to data)
- Licensing information or terms of use
- Link to data/repository (e.g., *dataverse.org*, *datadryad.org*, *zenodo*, *Github* [only feasible for small datasets]; this need not be the final link at time of submission but if not, it should indicate where the data will be deposited if the manuscript is accepted)
    - Dataverse is a good choice as it supports large datasets and has a JASA-specific dataverse (*dataverse.harvard.edu/dataverse/jasa*) for data repositories associated with JASA articles; data can be deposited in the JASA Dataverse after acceptance, in which case the dataset will officially be part of the JASA Dataverse, or it can be deposited in the general Harvard Dataverse and will be linked to from the JASA Dataverse after acceptance.
- Data provenance, including identifier or link to original data if different than above
- File format
- Metadata (including data dictionary)
- Version information

Optional Information (complete as necessary)
Unique identifier / DOI

Code

Abstract (Mandatory)
We build a state-space multivariate autoregression (SSMAR) for iEEG data to model the underlying directional brain network system. We identify connected brain regions (i.e., mapping the brain network) through estimating the SSMAR parameters that denote directional connectivity. In contrast to most existing network models that were developed mainly for observed network edges, we develop a Bayesian framework to estimate the proposed high-dimensional model, infer directional connections, and identify clusters for the unobserved network edges. The computing codes are to implement the proposed Bayesian method.

Description (Mandatory)

- How delivered (R package, Python package, Shiny app, etc.)
  We developed a MATLAB software package for implementing our proposed method.

- Licensing information (default is MIT License)
  The MATLAB used in our work has a Total Academic Headcount License purchased by the University of Virginia.

- Link to code/repository (e.g., *github.com*, *bitbucket.org*; this need not be the actual link at time of submission but if not, it should indicate where the code will be deposited if the manuscript is accepted)
  https://github.com/StatDeptZhang/A-Bayesian-State-Space-Approach-to-Mapping-Directional-Brain-Networks

- Version information (e.g., for a Git repository, the number or branch+commit)
- Supporting software requirements (e.g., libraries and dependencies, including version numbers for R and Python packages)

  We used two MATLAB toolboxes, including Curve Fitting Toolbox and Statistics and Machine Learning Toolbox.

Optional Information (complete as necessary)

- Hardware requirements (e.g., operating system with version number, access to cluster, GPUs, etc.)
- Unique identifier/DOI

Instructions for Use

Reproducibility (Mandatory)

- What is to be reproduced (e.g., "All tables and figure from paper", "Tables 1-4", etc.)

  Figures 2-3 are to be reproduced.

- How to reproduce analyses (e.g., workflow information, makefile, master script, wrapper scripts)
  We will provide MATLAB code files for generating the simulated datasets and code files for analyzing the data by our proposed method and competing methods.

- Expected run-time of the workflow (and information about particularly slow steps in workflow, if any). If possible, give the approximate time to run on a standard desktop machine.

  It takes around 2 hours to run our method.

Replication (Optional)

How to use software in other settings (or links to such information, e.g., R package vignettes, demos or other examples)

Notes

Other relevant information, in particular how reviewers can access the data and code if not yet made publicly available.