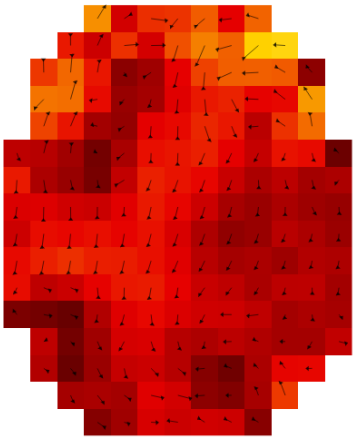
LiveNeuron

Usability Test Questionnaire

Interactive 2D Brain Visualization Tool

Python Package for EEG/MEG Data Analysis



Research Study Questionnaire

McMaster University
September 7, 2025

Introduction

Thank you for participating in the LiveNeuron usability test!
LiveNeuron is a Python tool designed for interactive 2D visualization of EEG/MEG brain data. Your feedback is crucial for improving the user experience and making this tool more accessible to the neuroscience research community.

About This Questionnaire

- **Duration:** Approximately 15-20 minutes
- **Confidentiality:** All responses will be kept confidential and used for research purposes only
- **Voluntary:** Your participation is voluntary and you may withdraw at any time
- **Purpose:** To evaluate the usability and effectiveness of the LiveNeuron visualization tool

Key Features of LiveNeuron

- **Interactive 2D brain projections** (axial, sagittal, coronal views)
- **Butterfly plots** for time series visualization
- **453x faster arrow rendering** using optimized techniques
- **Real-time controls** for time navigation
- **Flexible data input** support
- **Export capabilities** for static images
- **Jupyter notebook support**
- **Customizable colormaps** and options

Instructions: Please complete this questionnaire after attempting the tasks described in each section. Mark your responses clearly with an X or checkmark (✓) in the appropriate boxes.

Part 1: User Background Information

Demographics and Experience

1. What is your profession or field of study?

- ☐ Neuroscience Researcher
- ☐ Data Scientist
- ☐ Software Developer
- ☐ Graduate Student
- ☐ Undergraduate Student
- ☐ Postdoctoral Researcher
- ☐ Other: _____

2. How long have you been using Python for data analysis or visualization?

- ☐ Less than 6 months
- ☐ 6 months to 1 year
- ☐ 1-3 years
- ☐ 3-5 years
- ☐ More than 5 years

3. Have you used other EEG/MEG data visualization tools?
(e.g., MNE-Python, Brainstorm, FieldTrip, Eelbrain, EEGLAB)

- ☐ Yes
- ☐ No

If yes, please list the tools you use most frequently:

_____

_____

4. How would you rate your overall experience with data visualization tools?

- ☐ Beginner (limited experience)
- ☐ Intermediate (some experience with multiple tools)
- ☐ Advanced (extensive experience, comfortable with most tools)
- ☐ Expert (highly experienced, often help others with visualization)

Part 2: Task-Based Evaluation

Instructions: Please attempt the following tasks and answer the questions based on your experience. We recommend starting with the `example.py` script or the code examples in the README.

Task 1: Installation and First Run

Action: Follow the "Installation" and "Quick Start" sections in the `README.md` to install LiveNeuron and run the interactive dashboard with sample data.

5. Was the installation process clear and smooth?

- ☐ Very smooth - completed without any issues
- ☐ Mostly smooth - minor issues but manageable
- ☐ Neutral - some confusion but eventually successful
- ☐ Somewhat difficult - required troubleshooting
- ☐ Very difficult - major issues encountered

Please describe any issues you encountered:

_____

_____

6. Were the instructions to launch the first visualization dashboard (`viz.run()`) easy to follow?

- ☐ Very easy - immediately understood and executed
- ☐ Easy - clear instructions with minimal confusion
- ☐ Neutral - required some interpretation
- ☐ Somewhat difficult - needed additional research
- ☐ Very difficult - instructions were unclear

Task 2: Exploring the Interactive Visualization Interface

Action: In the running dashboard, explore the following features:

1. Examine the three brain projection views (axial, sagittal, coronal)
2. Click on different time points in the butterfly plot
3. Observe how the brain projection views change when you interact with the butterfly plot

7. Is the interface layout (three brain views + butterfly plot) intuitive?

- ☐ Very intuitive - immediately understood the layout
- ☐ Mostly intuitive - quickly figured out the components
- ☐ Neutral - took some time to understand
- ☐ Slightly confusing - unclear relationships between components
- ☐ Very confusing - difficult to understand the interface

8. How smooth was the interaction of selecting a time point on the butterfly plot to update the brain views?

- ☐ Very smooth and responsive - immediate updates
- ☐ Mostly smooth - quick updates with minimal delay
- ☐ Acceptable - noticeable but reasonable delay
- ☐ Laggy - slow updates affecting usability
- ☐ Unresponsive - often failed to update or very slow

9. Is the information presented clearly? (e.g., axes, color bars, time indicators)

- ☐ Very clear - all elements well labeled and understandable
- ☐ Mostly clear - minor ambiguities but generally good
- ☐ Neutral - some elements clear, others less so
- ☐ Somewhat unclear - several confusing elements
- ☐ Very confusing - difficult to interpret the visualizations

Task 3: Customizing the Visualization

Action: Try the code from the "Advanced Usage" section in the `README.md` to perform the following:

1. Change the colormap (`cmap`)
2. Apply a brain parcellation (`region='aparc+aseg'`)
3. Toggle the display mode of the butterfly plot (`show_max_only`)

10. Were the code parameters for customizing the visualization easy to understand and use?

- ☐ Very easy - parameter names and usage were obvious
- ☐ Easy - clear documentation and straightforward syntax
- ☐ Neutral - required some experimentation
- ☐ Somewhat difficult - unclear parameter effects
- ☐ Very difficult - confusing parameters and documentation

11. Do you find the provided customization options sufficient for your typical needs?

- ☐ Completely sufficient - covers all my visualization needs
- ☐ Mostly sufficient - covers most important use cases
- ☐ Neutral - covers basic needs but missing some features
- ☐ Somewhat insufficient - missing several important options
- ☐ Completely insufficient - lacks many essential features

What other customization features would you like to see?

_____

_____

Task 4: Exporting Images

Action: Use the `viz.export_images()` function to export the visualization at a specific time point as static images.

12. Did the image export feature work as you expected?

- ☐ Yes, exactly as expected - perfect functionality
- ☐ Mostly as expected - minor issues but functional
- ☐ Partially - some features worked, others didn't
- ☐ No, encountered errors or incorrect results

Please describe any issues you encountered:

_____

_____

Part 3: Overall Impressions and Suggestions

Performance and Usability

13. What is your impression of LiveNeuron's performance (especially arrow rendering and interaction speed)?

- ☐ Very fast - excellent performance throughout
- ☐ Fast - good performance with minimal delays
- ☐ Average - acceptable performance for most tasks
- ☐ Slow - noticeable delays affecting workflow
- ☐ Very slow - performance issues significantly impacted use

14. How would you rate the documentation (`README.md`)?

- ☐ Very detailed and helpful - excellent guidance
- ☐ Mostly helpful - good coverage with minor gaps
- ☐ Neutral - adequate but could be improved
- ☐ Lacked information - missing important details
- ☐ Confusing - unclear or misleading information

What areas of the documentation could be improved?

_____

_____

Open-Ended Questions

15. What do you think is the most valuable feature of LiveNeuron?

_____

_____

_____

16. What was the biggest difficulty you faced while using the tool?

_____

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_____

17. How likely are you to recommend LiveNeuron to a colleague or friend?

1	2	3	4	5	6	7	8	9	10

(Unlikely) (Very Likely)

18. Do you have any other suggestions or ideas for improving LiveNeuron?

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Thank you for your valuable time and feedback!

Your responses will help us improve LiveNeuron and make it more useful for the neuroscience research community.

Contact Information:
LiveNeuron Development Team
McMaster University
Project Repository: https://github.com/liang-bo96/LiveNeuron