The Lifecycle of EEG Data: Acquisition, Analysis, and Future Prospects

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Abstract:

The landscape and ecosystem surrounding modern EEG is rapidly evolving, in tandem with the wider technological advancements seen in the healthcare and broader technology industries. Expanding computational and storage capabilities are enabling researchers to study EEG datasets at formerly unprecedented scale and levels of efficiency. For many patients and their families, the recommendation and referral for a clinical EEG assessment is just the beginning of what may well prove to be a lifetime journey of clinical coordination or disease state management. As any parent or patient will attest – this population deserves the very best that the human collective has to offer, and the industry solution providers must now lean-in with conviction to enable the academic researchers who are pushing those limits.

In this presentation, we'll begin by briefly examining the lifecycle of EEG data, from its acquisition and storage to its eventual analysis and presentation in a variety of clinical use cases. Specifically, we will take a diagrammatical look at the journey of the data itself, including how this data is represented at rest and in-flight. We will follow up by addressing several nuances of clinical EEG data collection as well as its subsequent analyses.

From here we will focus on a handful of touch points throughout the data flow diagram where opportunities for clinical presentation arise. These opportunities range in complexity from simple on-board impedance checking interfaces and computer-based representations of the raw data, to complex visualizations of data trends and even cross-sectional comparisons to data segments collected from other patients, as seen most recently in a collection of academic research initiatives.

A concrete goal of this presentation is to provide a modern understanding of where EEG data flows, how it is represented, and what opportunities arise for both immediate research and new forms of clinical presentation.

With the changing tides of the clinical EEG landscape in mind, we will specifically showcase how academic researchers can begin leveraging and contributing to both real-time and completed study SDKs in collaboration with members of the Research and Advanced Development team at Natus Neuro, to enable next-generation breakthroughs in clinical research.

Biography:

Jesse Salazar is a Senior Scientist and Software Engineer in the Research and Advanced Development group at Natus Medical. He began his post-graduate career developing closed-loop Embedded Systems for consumer-grade EEG devices to enhance slow-wave sleep performance in chronically sleep restricted populations, as well as developing and validating clinical decision support solutions. More recently he has expanded into research and development roles supporting future clinical solutions at Natus Neuro.