

Introduction

Electrophysiological data from implanted electrodes in humans are rare. Most recordings that have been performed are with epilepsy patients who have electrocorticographic (ECoG) electrodes implanted in the course of diagnostic localization of seizure focus prior to surgical resection. Only a small group of physician scientists have had the opportunity to work with these patients, and access to ECoG data has remained somewhat exclusive. It is recorded at only a few institutions around the country, often with different amplification setups, sampling rates, and behavioral variations (even within the same institution).

Methods

Therefore, we have compiled a set of 16 benchmark experiments, with over 200 individual datasets made with the same amplifiers, at the same settings, with the same person interacting with the subject and performing the experiment. Depending on where the electrodes were placed for clinical indication, we performed experiments known to be associated with covered brain areas. In every case, electrode positions have been registered to brain anatomy.

Results

All data, anatomic, and analysis files (MATLAB code) are in a common, intuitive file structure. Every study/task has at least 4 subjects with confirmed task-modulated signal change in at least 1 electrode. Our sampling rate and data format were kept uniform, and the anatomic localization was determined rigorously in each case. In the course of analyzing these data, a large number of novel analysis techniques were developed. We have made a publically available code base with the data, in such a way that all figures from published manuscripts describing these data could be directly reproduced. Four of the experiments have not been published.

Conclusions

These data, along with behavioral parameterizations, anatomic localizations, and brain-surface renderings are now available for download worldwide, without restriction on use (other than proper citation), at purl.stanford.edu/zk881ps0522.

Learning Objectives

By the conclusion of this session, participants should be able to:

- 1) Describe the importance of standardization in electrophysiological recordings in the neurosurgical setting.
- 2) Access and utilize the library of data and analyses.

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