HDF5-based data format for EIT data

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Abstract: Many devices, both research and commercial, have been made for EIT and bioimpedance applications. We propose a new, flexible data format which can allow data interchange, based on the HDF5 data standard.

1 Introduction

EIT and bioimpedance applications are growing. For research applications, there is an increasing complexity of configurations in which complex configurations and multi data streams are used. We have previously proposed an openEIT data format[1], which received little traction because of the difficulties of using XML as a data container.

1.1 Protocol

Multiple data sets can be stored in one file, and each measurement information are stored into fields that start with Stim and specify the kind of excitation after a dot. Similarly, measurement information are stored into fields that start with Meas.

1.2 Measurements

Measurements normally correspond to stimulations, but this is not required e.g. for biopotential measurements, where Meas.V.freq(Hz)=0. Measurement data are stored as a matrix $N_{frames} \times L_{frame}$, with an extension indicating the type (.Abs, .Real, .Imag). Times (if known) can be stored as shown. Optional / vendor-specific information (e.g. /instrument, or /datainitialize) can be stored. Additional recordings with their own protocols are stored with different /data/{Data set name}.

3 Discussion

We describe an HDF5-based data format for EIT data. It documented with code examples at [3]. The data format is supported in EIDORS [2] and will be part of the next software release.

References

[3] A. Adler et al., sf.net/p/eidors3d/code/HEAD/tree/trunk/dev/HDF5_tools/
“HDF5 tools”, 2023

Figure 1: Structure of the proposed HDF5 file (Version 2023.4). All data sets must contain a protocol defining the configuration for each measurement in a frame. Frame data is a single file (e.g. Meas.V.abs). Times for measurements or frames are provided if available. Items in italics have example names (can be named differently).