

DARE25-030 - Waveform Adaptation, Visualization, Export & Standardization framework: Toolkit for Analytics & Reuse

Abstract

While many centers have the infrastructure to record high-resolution waveform data (with up to 500 datapoints/s) in theory, actually processing of this data is complicated due to proprietary formats, missing identifiers and overall lack of availability of computational frameworks or standardized data pipelines. Meanwhile, the scientific community's ever-growing demand for high-resolution data is satisfied by only a few publicly available datasets (such as the MIMIC Waveform Database) which originate from only a few centers, providing US focused data from large, mostly academic hospitals with an inherent lack of diversity. Moreover, most high-resolution datasets lack clinical context such as medication, lab results, clinician notes and demographic data. The WAVESTAR project aims to overcome this limitation by providing a comprehensive software framework that covers the entire high-resolution medical waveform data pipeline: The proposed WAVESTAR development provides a framework that converts data from open and proprietary software formats into a common, central data standard, that has recently been established by the med-tech industry: ISO/IEEE 11073-10207 (BICEPS, published in 2019). Additionally, WAVESTAR identifies and annotates BICEPS datasets. This identification is backed by Electronic Health Record (EHR) databases compatible with common data models such as OHDSI OMOP Common Data Model, HL7/FHIR or the European Health Record exchange Format (EHRxF). Subsequently, the framework further facilitates scientific analysis by providing converters into various formats. Moreover, WAVESTAR will include tools for visualizing datasets and descriptive statistics. The framework will be coded in Python — a language commonly used for machine learning applications. WAVESTAR will be released as an open-source software for healthcare facilities across the EU, thereby strengthening Europe's position in healthcare data science.

Scientific disciplines:

Biomedical engineering (50%) | Anaesthesiology (30%) | Time series analysis (20%)

Keywords:

High-Resolution Medical Waveform Data Data Engineering Data Standardization HL7/FHIR BICEPS Software Framework

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Further links to the persons involved and to the project can be found under

<https://www.gmbh.wwtf.at/funding/programmes/ei/DARE25-030/>