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

Zusammenfassung

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.

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

Keywords:
High-Resolution Medical Waveform DataData EngineeringData StandardizationHL7/FHIRBICEPSSoftware Framework

Principal Investigator:	Daniel Laxar
Institution:	Medical University of Vienna
Co-Principal Investigator(s):	Oliver Kimberger (Medical University of Vienna) Mathias Maleczek (Medical University of Vienna)

Status: Vertrag in Vorbereitung
GrantID: 10.47379/DARE25030

Weiterführende Links zu den beteiligten Personen und zum Projekt finden Sie unter
https://www.wwtf.at/funding/programmes/ei/DARE25-030/