

Construction and Use of Semantic Repository for Electrophysiological Experiments



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A need to store, organize, share and interpret data and metadata from electrophysiological experiments emerged also during our investigation of developmental coordination disorder in children. If classic data and metadata were successfully stored to the EEG/ERP portal, related studies, discussions, and partial interpretations remained unorganized and not searchable. Since the EEG/ERP portal (using a relational database) was not sufficiently prepared to store and process these unstructured texts, it was decided to find an appropriate solution to aggregate and store such data and facilitate subsequent search of relevant information. It was also necessary to use already existing description of data and domain knowledge in a form of semantic web structures. The OWLIM repository and the KIM platform were finally selected and used to store, annotate and search data. The KIM Platform supports semantic annotation of documents based on ontology, which is stored in the semantic repository. The annotated documents can be searched through; the use of ontological terms ensures more relevant results than a normal full-text search. To facilitate ontology development, a tool KIM-OWLImport was created. It is able to retrieve the selected ontology into the semantic repository in memory and modify it according to the rules defined by the KIM platform. The ontology then can be used for semantic annotation. To import documents into the KIM Platform a tool KIMBridge was developed. It runs as a service and periodically downloads new documents from selected data sources. Currently, KIMBridge supports downloading PDF documents from Google Drive and downloading discussions from the social network LinkedIn. Downloaded documents are annotated according to ontological prototype and indexed in the KIM Platform. Subsequent search is made through the web interface. This functionality was verified on a test set of domain documents.

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