Ontology Developmnet in EEG/ERP Domain

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Because of difficulties with neuroinformatics data/metadata storage, a new research field dealing with the development of neuroinformatics databases is gradually formed. The data within these databases are supposed to be recognizable by interested researchers. To support the development of these databases the description of specific neuroscience fields is needed. Therefore, the scientific community is intensively working on description of individual neuroscience fields by domain ontology. This ontology is expressed by Semantic Web languages. Since the current neuroinformatics software tools are usually based on object-oriented languages and relational databases a need for suitable mapping is emerging. Due to differences in semantic expressivity of common modeling techniques and Semantic Web languages it is necessary to fill these semantic gaps. This work is focused on developing ontology for EEG/ERP domain that expresses EEG/ERP experiments. The developed ontology is practically implemented together with the EEG/ERP Portal. The goal of the EEG/ERP Portal is to serve as a system for storing, managing and interchanging EEG/ERP experiments. The work particularly solves semantic gaps between object-oriented code and Semantic Web languages by adding a missing semantics into the object-oriented code. The developed mapping is implemented within the presented Semantic Framework. The integration of the Semantic Framework within the EEG/ERP Portal ensures transformation of stored experiments into the ontology representation. The registration of the EEG/ERP Portal within the Neuroscience Information Framework practically validates the presented approach.