

# The NEMO Analysis Pipeline: EEG Pattern Extraction and Ontology-based Classification

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## ABSTRACT

In this software demonstration, we will show how formal ontologies can be used to label instances of neural (ERP) patterns that have been extracted from multiple datasets using a novel pipeline for pattern and metric extraction (see Figure 1, next page). The entire demonstration will last ~15 minutes. We will begin with a 5-minute introduction to ERP data from several cross-laboratory studies of word comprehension. This overview will motivate our demonstration by showing that ERP data are complex and heterogeneous, which explains the radical challenge of making valid comparisons across different studies within our domain. We will then give a 2-minute description of the pipeline for analysis, which has two main components: (1) a set of pattern extraction (signal decomposition, temporal segmentation) methods; and (2) code to extract a variety of simple metrics (e.g., min and max intensity at a particular electrode) and to express these summary features as N-triples, which are subsequently stored in RDF. Finally, we demonstrate how the NEMO ontology can be used to reason over these data. We highlight both expected and novel findings for the test datasets and note that large-scale application of this method could lead to major breakthroughs in understanding neurological patterns that are linked to sensory, motor, and cognitive processes in neurologically healthy and brain-injured children and adults.

## REFERENCES

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