

Title: Ontological Formalisation of Mathematical Equations for Phenomic Data Exploitation

Abstract:

In recent years, plant phenomics community has adopted Semantic Web technologies in order to harmonise heterogeneous, multi-scale and multi-source datasets. Semantic Web provides inference services for representing logic relationships in an unambiguous, homogeneous and clean manner, which enhances data harmonisation. However, mathematical relationships involving numerical attributes are poorly formalised, despite the fact that they are supported for a theoretical and well-defined structure. For instance, whilst unit ontologies (e.g. UO, OM, QUDT) provide relationships and annotations to perform unit conversion, they are not effectively used for automating the integration of heterogeneous measurements.

In this presentation, we will show a preliminary ontological framework for representing such equations supporting the automatised use of inference services, metadata, domain ontologies, and the internal structure of mathematical equations. This approach is evaluated using two plant phenomics case studies involving the calculation of unit conversions and thermal time.

These preliminary ideas are published at: https://link.springer.com/chapter/10.1007%2F978-3-030-80418-3_30