Identifying, naming and interoperating data in a phenotyping platform network: the GOOD, the BAD and the UGLY.

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The EPPN2020 is a research project funded by Horizon 2020 Programme of the EU that will provide European public and private scientific sectors with access to a wide range of state-of-the-art plant phenotyping installations, techniques and methods. Specifically, EPPN2020 includes access to 31 plant phenotyping installations, and joint research activities to develop novel technologies and methods for environmental and plant measurements.

Here we present the results of the discussions of the 2019 annual project meeting to adopt community-approved architectural choices. It focuses on persistent identification of data and real objects, the naming of variables and the priorities for increasing interoperability among phenotyping installations. We describe the main elements to prioritize (the good) in order to enhance Findable, Accessible, Interoperable and Reusable (FAIR) quality for each data management system with a pragmatic concern for all partners.

Focus on identification...

The plant phenotyping community gathers different actors with various means and practices. Among all the recommendations, the community requests identification methods (including the use of ontologies) compatible with the local pre-existing ones. The identification scheme being adopted is based on Uniform Resource Identifiers (URIs) with independent left and right parts for each identifier. (based on ePID recommendations)

The GOOD

- Use non ambiguous and persistent identifier
- Use minimal information, get rid of everything that may change.
- Require external identifier (B2HANDLE, e-PIC...)
- Provide multiple output format (.txt, .html, .csv, etc.) and link them together, so the user will have the choice
- Integrate/upgrade already existing identifiers in a URI.
- Use persistent-URL with 303 redirect status.
- Associate creation date to help understanding.

The BAD

- Unnecessary metadata in the identifier
- Ownership and other information that are likely to change over time, prefer nature of the resource
- Unnecessary long identifiers with too much semantic
- Entirely opaque identifier
- Files extension in the URI (no extension in the URI)
- Query (no "?" in the URI)
- Misleading characters such as O and 0 or I and l, etc.
- URI that are not the best way to identify the object you are looking at

Focus on naming...

Naming variables need to share a community approved vocabulary, and to build or reuse appropriate ontologies. Some questions like how to choose them, how to implement and update them and with which means are recurrent challenges in the EPPN2020 Phenotyping network. First work focuses on the associated objects and variables common to all EPPN2020 members, namely the scientific object (which can be a plant in a pot or a plot), sensors and variables.

The GOOD

- Look for “reference ontologies”, first in the dataweb stacks
- Be careful of needs and implementation capacities to manage ontology links on the long term
- Look for concepts related to your phenotyping experiments available in “application ontologies” in your disciplinary domain first, before creating new ones
- Ontologies should never be developed isolated.
  Use SKOS to link as much data as possible to reference ontologies first, and to trade/application ontologies with “exact match” then “close match” SKOS predicates
- If you need a new concept, try to do it in concertation with the larger community (as far as possible)

The BAD

- To create an ontology before prospecting an existing one
- To create an ontology without a community approving process
- To give a URI for an ontology with date or version in the persistent link
- To use first a species specific ontology before considering concepts from general and recommended plant ontologies
- To use approximated data type
- To refer to approximated data concept in your specialized ontology

Next challenges that need to be addressed by the EPPN2020 community are related with:

- the partial reuse of pre-existing ontologies,
- the persistence of long-term access to data,
- interoperation between all potential users of the phenotyping data.

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