ANR-06-TLOG-024 Project

Publication of the ontologies

produced in the context

of the NeuroLOG project

Software Technology Program 2006

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Date	5 july 2013

A NEUROLOG PROJECT CONTEXT

Project acronym	NeuroLOG
Title	Software technologies for integration of process, data and knowledge in medical imaging
Coordinator	Johan Montagnat University of Nice – Sophia Antipolis / CNRS
Dates	1 april 2007 – 31 december 2010
Web site	http://neurolog.polytech.unice.fr
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B ONTONEUROLOG ONTOLOGY

B.1 ORIGINAL CONTENT OF THE ONTONEUROLOG ONTOLOGY

OntoNeuroLOG is a multi-level ontology designed to support the integration of distributed and heterogeneous resources in neuroimaging [Michel *et al.* 2010]. This includes both data (such as images), and image processing tools. The overall conceptualization is based on DOLCE [Masolo *et al.* 2003].

The final version delivered at the end of the project is OntoNeuroLOG Version 2.2 [Temal *et al.* 2008, Gibaud *et al.* 2011]. It included 34 modules listed in Table 1, roughly classified into 3 categories: foundational ontology, core ontology and domain ontology. The overall import graph is shown on Fig. 1.

Ontology modules	Contributors	Category
Instruments declaration	Benedicte Batrancourt, Michel Dojat, Bernard Gibaud, Gilles Kassel	Domain ontology
Instrument	Benedicte Batrancourt, Michel Dojat, Bernard Gibaud, Gilles Kassel	Core domain ontology
MR protocol	Michel Dojat, Bernard Gibaud, Gilles Kassel	Domain ontology
MR sequence	Michel Dojat, Bernard Gibaud,	Domain ontology

	Gilles Kassel	
Dataset acquisition	Farooq Ahmad, Michel Dojat, Bernard Gibaud, Pascal Girard, Gilles Kassel, Lynda Temal	Domain ontology
Dataset processing	Farooq Ahmad, Michel Dojat, Bernard Gibaud, Gilles Kassel, Lynda Temal	Domain ontology
Study	Gilles Kassel, Benedicte Batrancourt, Michel Dojat, Bernard Gibaud	Domain ontology
Examination & subjects	Farooq Ahmad, Benedicte Batrancourt, Michel Dojat, Pascal Girard, Bernard Gibaud, Gilles Kassel, Lynda Temal	Domain ontology
Human	Gilles Kassel	Domain ontology
Dataset	Farooq Ahmad, Michel Dojat, Bernard Gibaud, Gilles Kassel, Lynda Temal	Domain ontology
Medical image expression	Michel Dojat, Bernard Gibaud, Gilles Kassel, Lynda Temal	Domain ontology
Medical image format	Michel Dojat, Bernard Gibaud, Gilles Kassel, Lynda Temal	Domain ontology
Medical image file	Michel Dojat, Bernard Gibaud, Gilles Kassel, Lynda Temal	Domain ontology
Web service	Bacem Wali, Bernard Gibaud, Johan Montagnat, Alban Gaignard, Franck Michel, Gilles Kassel	Domain ontology
File	Frederic Furst, Gilles Kassel, Pascal Lando, Anne Lapujade	Core domain ontology
Computer language expression	Frederic Furst, Gilles Kassel, Pascal Lando, Anne Lapujade	Core domain ontology
Library software platform	Frederic Furst, Gilles Kassel, Pascal Lando, Anne Lapujade	Core domain ontology
Computer language	Frederic Furst, Gilles Kassel, Pascal Lando, Anne Lapujade	Core domain ontology
Action on program & software	Frederic Furst, Gilles Kassel, Pascal Lando, Anne Lapujade	Core domain ontology
Language	Gilles Kassel	Extension of foundational ontology
IEC (inscription, expression, conceptualisation)	Sabine Bruaux, Jean-Yves Fortier, Frederic Furst, Gilles Kassel, Pascal Lando, Anne Lapujade	Extension of foundational ontology
Artefact	Gilles Kassel	Extension of foundational ontology
Capacity	Gilles Kassel	Extension of foundational

		ontology
Collection	Gilles Kassel	Extension of foundational ontology
Agentive	Gilles Kassel	Extension of foundational ontology
Number	Gilles Kassel	Extension of foundational ontology
Action	Gilles Kassel	Extension of foundational ontology
Participant role	Gilles Kassel	Extension of foundational ontology
Discourse & message act	Gilles Kassel	Extension of foundational ontology
Linguistic expression	Gilles Kassel	Extension of foundational ontology
State	Gilles Kassel	Extension of foundational ontology
Temporal quality	Gilles Kassel	Extension of foundational ontology
Physical quality	Gilles Kassel	Extension of foundational ontology
Particular	Gilles Kassel	Foundational ontology

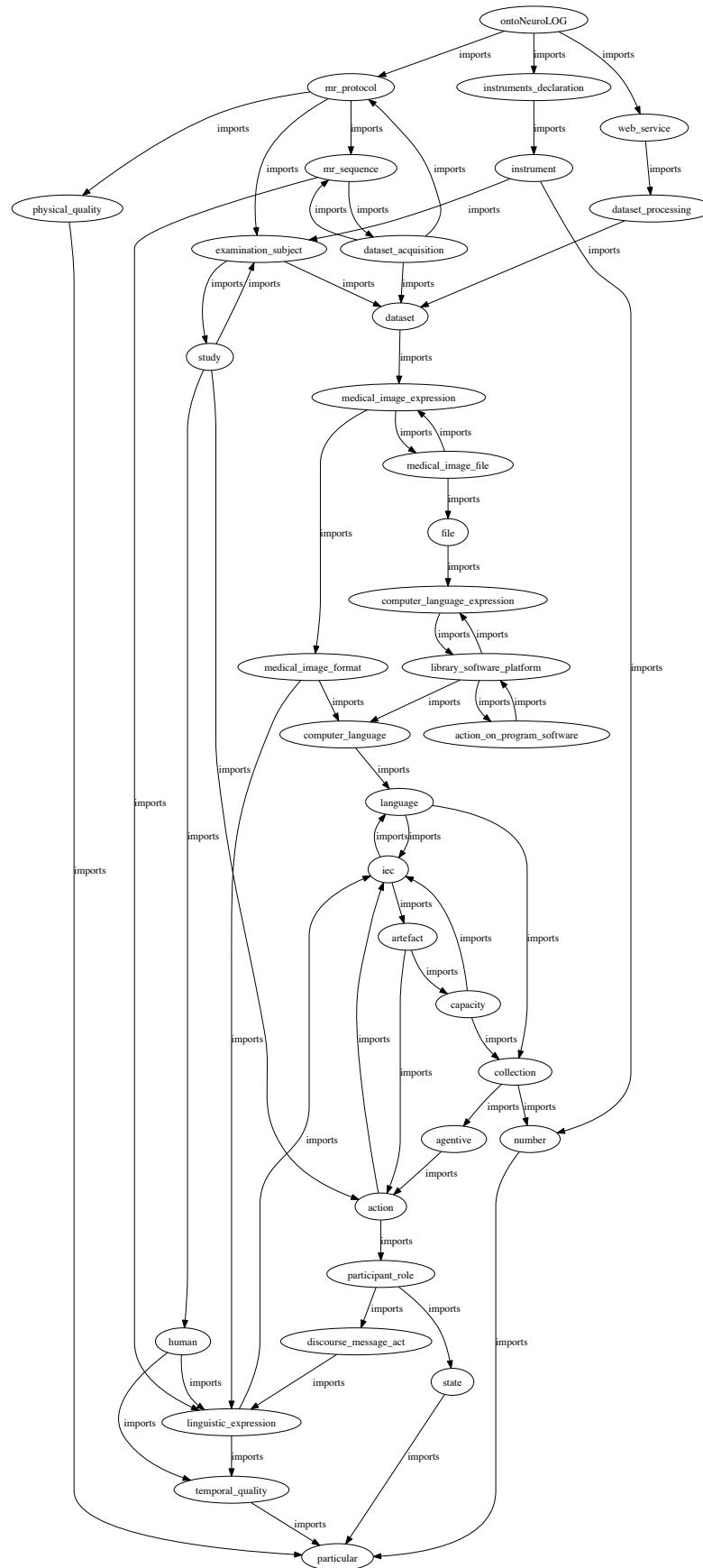Table 1. Ontology modules in OntoNeuroLOG v2.2

Fig. 1. Graph of imports of OntoNeuroLOG v2.2

Each module was developed according to the OntoSpec methodology [Kassel 2005], and is documented in an OntoSpec document. Table 2 lists the corresponding OntoSpec documents.

Ontology modules	Category
Instruments declaration	*(no OntoSpec document available)*
Instrument	Instrument-OS
MR protocol	MR_protocol-OS
MR sequence	MR_sequence-OS
Dataset acquisition	Dataset_acquisition-OS
Dataset processing	Dataset_processing-OS
Study	Study-OS
Examination & subjects	Examination_Subject-OS
Human	Human-OS
Dataset	Dataset-OS
Medical image expression	Medical_image_expression-OS
Medical image format	Medical_Image_Format-OS
Medical image file	Medical_image_file-OS
Web service	*(no OntoSpec document available)*
File	File-OS
Computer language expression	Computer_language_expression-OS
Library software platform	Library_Software_Platform-OS
Computer language	Computer_language-OS
Action on program & software	Action_on_program_and_software-OS
Language	Language-OS
IEC (inscription, expression, conceptualisation)	Inscription_Expression_and_Conceptualization-OS
Artefact	Function_and_Artefact-OS
Capacity	Capacity-OS
Collection	Collection-OS
Agentive	Agentive-OS
Number	Number_Scalar_quale_and_Unit_of_measure-OS
Action	Action-OS
Participant role	Participant_role-OS
Discourse & message act	Discourse_Message_Discourse_act-OS
Linguistic expression	Linguistic_expression-OS
State	State-OS
Temporal quality	Temporal_quality-OS
Physical quality	Physical_quality-OS
Particular	Particular-OS

Table 2. Ontology modules in OntoNeuroLOG v2.2

B.2 REPACKAGING OF THE ONTOLOGY MODULES

A new version (OntoNeuroLOG version 3) was designed in 2013, aiming at facilitating the reuse of the ontology.

A specific objective was to eliminate the loops in the import graph. This has led to a re-organization into 11 modules, detailed in Table 3. The modules appearing in the left column were obtained by merging the corresponding original modules appearing on the right column.

Ontology modules	Category
Ontoneurolog Mental state assessment (Batrancourt *et al.* 2013, submitted)	Instruments declaration
Instrument (Batrancourt *et al.* 2010)	Instrument
Ontoneurolog MR dataset acquisition	MR protocol
	MR sequence
	Dataset acquisition
Ontoneurolog Dataset processing	Dataset processing
Study examination subject	Study
	Examination & subjects
	Human
Dataset (Temal *et al.* 2008)	Dataset
Medical dataset expression	Medical image expression
	Medical image format
	Medical image file
Ontoneurolog Service access and composition (Wali *et al.* 2012)	Web service
Core ontology of programs and software (Lando *et al.* 2009)	File
	Computer language expression
	Library software platform
	Computer language
	Action on program & software
OntoneuroLOG extension of DOLCE (Kassel *et al.* 2010)	Language
	IEC (inscription, expression, conceptualisation)
	Artefact
	Capacity
	Collection
	Agentive
	Number
	Action
	Participant role
	Discourse & message act
	Linguistic expression

	State
	Temporal quality
	Physical quality
Dolce particular	Particular

Table 3. Re-packaging of ontology modules in OntoNeuroLOG v3

The new graph of imports of OntoNeuroLOG version 3 is shown Fig. 2.

Fig. 2. Graph of imports of OntoNeuroLOG v3.

C RE-USE AND CREDIT

The ontologies can be re-used free of charge. People are invited to provide credit to the authors by referencing the publications cited below.

D PUBLICATIONS

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