

The European Centre for Ontological Research

Future Perspectives in Biomedical Ontology

Mathias Brochhausen

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An ontology

An ontology is a formal explicit specification of a shared conceptualization (*R. Studer et al.*).

An ontology

An ontology is a formal explicit specification of universals and their relations in reality. These can be viewed from different perspectives.

Aim

Get rid of
the Tower
of Babel!



Ontology Classification

- lightweight vs. heavyweight ontologies
- level of formalization
- logical power (disjoints, etc)
- relations

(Lasilla & McGuinness, 2001)

In biomedical science the integration of data by means of ontologies has been a major topic over the last years.

Method

Relations in biomedical ontologies

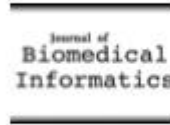
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A reference ontology for biomedical informatics:

How to Distinguish Parthood from Location in Bio-Ontologies

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Informatics Group,

State of the Art

- Foundational Model of Anatomy (FMA)
- Gene Ontology (GO)
- Ontology of Clinical Investigation (OCI)

Ontology-integrating EU Projects

- SemanticMining
- RIDE
- ACGT
- Aneurist
- ...

ECOR: Structure

- based at Saarland University, Saarbrücken, Germany
- 9 members, 4 partners (1 industrial partner)

ECOR: Members (1)

Austrian Centre for Ontological Research,
Innsbruck, Austria

Bremen Ontology Group, University of Bremen,
Germany

Centre for Ontology, Geneva, Switzerland

Department of Medical Informatics, University
Hospital, Freiburg, Germany

Laboratory for Ontology, University of Turin, Italy

ECOR: Members (2)

DFKI Competence Center Semantic Web,
Saarbrücken, Germany

Foundational Ontology Group, University of Leeds,
Great Britain

Institute of Formal Ontology and Medical
Information Science, Saarbrücken, Germany

Institute of Philosophy, Saarland University,
Saarbrücken, Germany

ECOR: Partners

Human-Computer Studies Lab, University of
Amsterdam, The Netherlands

Institute for Law and Computer Sciences, Saarland
University, Saarbrücken

Instituto di Linguistica Computazionale del CRN,
Pisa, Italy

Ontology Works Inc., Odenton/MD, USA

NCOR: International collaboration

Apelon, Inc.
Ridgefield, Connecticut

Gene Ontology Consortium

Lawrence Berkeley National Laboratory
University of California for the U.S. Department of Energy

Medical Ontology Research
National Library of Medicine · Bethesda, Maryland

The MITRE Corporation
McLean, Virginia

Mouse Genome Informatics
The Jackson Laboratory · Bar Harbor, Maine

TopQuadrant, Inc.
Beaver Falls, Pennsylvania

MUSC Biomedical Ontology Research Group
Charleston, South Carolina

National Institute of Standards and Technology
Gaithersburg, Maryland

Ontology Works
Baltimore, Maryland

Open Biomedical Ontologies Consortium

Sierra Nevada Corporation
San Antonio, Texas

Structural Informatics Group
University of Washington, Seattle



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ECOR: Mission

- collaboration
- interdisciplinary approach
- best practice
- realism & perspectivism

Bad Practice

- concept-oriented ontology development
- use-mention mistakes
- multiple inheritance
- category mistakes
- mistakes in definitions

OBO Foundry



OBO FOUNDRY

Ontologies Resources Participate About

Welcome to the OBO Foundry Ontologies

Domain	Prefix	Files	Format	Foundry	OBO CVS
Animal natural history and life history	ADW	protege_source	Protege	no	no
Biological imaging methods	FBbi	image.obo	OBO	no	yes
Biological process	GO	gene_ontology.obo	OBO	yes	yes
BRENDA tissue / enzyme source	BTO	BrendaTissue.obo	OBO	no	yes
C. elegans development	WBls	worm_development.obo	OBO	no	yes
C. elegans gross anatomy	WBbt		OBO	no	no
C. elegans phenotype	WBPhenotype	phenotype_ontology_obo.cgi	OBO	no	no
Cell type	CL	cell.obo	OBO	yes	yes
Cellular component	GO	gene_ontology.obo	OBO	no	yes
Cereal plant development	GRO	cereals_development.obo	OBO	no	yes
Cereal plant gross anatomy	GRO	po_anatomy.obo	OBO	no	yes
Cereal plant trait	TO	plant_trait.obo	OBO	no	yes
Chemical entities of biological interest	CHEBI	chebi.obo	OBO	yes	yes
Common Anatomy Reference Ontology	CARO	caro.obo	OBO	yes	yes
Dictyostelium discoideum anatomy	DDANAT	dictyostelium_anatomy.obo	OBO	no	yes
Drosophila development	FBdv	fly_development.obo	OBO	no	yes
Drosophila gross anatomy	FBbt	fly_anatomy.obo	OBO	no	yes
Environment Ontology	ENVO	envo.obo	OBO	yes	yes
Event (INOH pathway ontology)	IEV	event.obo	OBO	no	yes
Evidence codes	ECO	evidence_code.obo	OBO	no	yes
eVOC (Expressed Sequence Annotation for Humans)	EV	evoc.obo.tar (v2.7)	OBO	no	yes
Fly taxonomy	FBsp	fly_taxonomy.obo	OBO	no	yes
FlyBase Controlled Vocabulary	FBcv	flybase_controlled_vocabulary.obo	OBO	no	yes

ECOR: Actions

- collaboration in EU projects
- collaboration with OBO Foundry and OOA
- industry contact
- training courses
- individual training

ECOR: Future projects

- organize joint training events
- optimize exchange of researcher from one institution to another
- intensify collaboration with industry
- start eLearning initiative
- think about certification of ontologies

Thanks for your interest!