

Cardiac arrhythmia ontology

*The ontology developed for Symbolique IA course at Télécom ParisTech
by Dinara Veshchezerova, 3rd year student.*

MIRO for built ontology

A. Basics	
A.1. Ontology name	Cardiac Arrhythmias
A.2. Ontology owner	Dinara VESHCHERZEROVA, dveshche@telecom-paristech.edu
A.3. Ontology license	Creative Commons Attribution 4.0 Unported License - https://creativecommons.org/licenses/by/4.0/legalcode
A.4. Ontology URL	http://www.semanticweb.org/dinar/ontologies/2018/10/Cardiac_arrhythmias
A.5. Ontology repository	https://github.com/dinaravvsint/Symbolique_IA
A.6. Methodological framework	Building ontology from existing AMBOSS table gathering different types of cardiac arrhythmias; identification of the ontology classes, relations and restrictions based on this overview.
B. Motivation	
B.1. Need	Cardiac arrhythmias are known as one of the most important threats to human's health and life. The actual state of art recognizes several types of arrhythmias which can have a big variety of different reasons, mechanisms and symptoms that needs to be organized. This ontology gives a structured overview of the field and provides the definitions of its key concepts and relationships. Its general purpose is to simplify the development of automatic diagnostic devices for heart diseases allowing efficient communication between developers and cardiologists.
B.2. Competition	<ul style="list-style-type: none">• The well-known Disease Ontology (http://www.disease-ontology.org/) created by a group of researchers from different institutions is an attempt to describe and classify all human diseases is expanded by the suggested one for the specific field of cardiac arrhythmias. The proposed ontology as designed for a specific application is more compact and suitable and still contains all relevant information.• SNOMED International organisation (http://www.snomed.org) develops the global standards for

	<p>health terms, and for instance for cardiovascular ones but as it has different goals its product is not perfectly suitable for engineering.</p> <ul style="list-style-type: none"> • The Artificial Intelligence Rheumatology Consultant System Ontology (http://biportal.bioontology.org/ontologies/AI-RHEUM?summary) that is used for diagnosis of rheumatologic diseases as well as Cardiovascular Disease Ontology (http://biportal.bioontology.org/ontologies/CVDO) , designed to describe entities related to cardiovascular diseases are both too general and hard to use by non-medical public familiar with only signal characteristics.
B.3. Target audience	The Constructing Ontology for Cardiac Arrhythmias is used both by medtech engineers and cardiologists in a collaborative projects of creation of the automatic diagnostic devices based on signals and provides convenient vocabulary understood by both sides of communication process.
C. Scope, requirements, development community	
C.1. Scope and coverage	The ontology covers field of cardiac arrhythmias: accelerated, slowed, or irregular heart rates caused by abnormalities in the electrical impulses of the myocardium. It divides the given subject on four cases with different characteristics, defines them and details with causes and mechanisms as well as examples.
C.2. Development community	Dinara VESHCHEROVA
C.3. Communication	dveshche@telecom-paristech.edu
D. Knowledge acquisition.	
D.1. Knowledge acquisition methodology.	The domain of knowledge was taken from cardiac arrhythmia overview made by AMBOSS - the medical learning platform initially dedicated to helping future physicians succeed on their exams.
D.2. Source knowledge location	https://www.amboss.com/us/knowledge/Overview_of_cardiac_arrhythmias
D.3.	In order to provide the most complete description of the field for the efficient usage, all types of arrhythmias are represented in the resulting ontology with related key information extraction for ECG diagnosis. This information doesn't contain causes and mechanisms because it is developed to be helpful for development of automatic diagnostic tools based on signals.

E. Ontology content	
E.1. Knowledge Representation language	OWL version 2
E.2. Development environment	Protégé 5.5.0 - beta 3
E.3. Ontology metrics	The ontology has 36 classes, 8 properties, 200 axioms and 13 types of axioms, 16 individuals
F. Managing change	
F.1. Sustainability plan	The ontology represents all existing classes of arrhythmias. Some spread exceptional cases should be specified in order to give more robust classification of pathologies. More diagnosis types of other nature could be added to diagnosis class.
G. Quality assurance	
G.1. Testing	The ontology was successfully classified with HermiT 1.3.8 Protégé reasoner.
G.3. Example of use	The ontology is used for initiation into rhythmology for informaticians working with cardiologists on the development of artificial intelligence algorithms for interventional surgery.