MEDIGRID AS A SCIENTIFIC PUBLICATION

PETR LESNY
Motol Faculty Hospital, Prague, Czech Republic, petr.lesny@lfmotol.cz
KRYSTOF SLABY
Motol Faculty Hospital, Prague, Czech Republic
JAN VEJVALKA
Motol Faculty Hospital, Prague, Czech Republic
ADELA JAROLIMKOVA
CESNET, z.s.p.o., Prague, Czech Republic
HELENA BOUZKOVA
National Medical Library, Prague, Czech Republic, bouzkova@nlk.cz

Introduction

The main goal of the MediGrid project is a proposal, development and pilot implementation of a modular application system for distributed processing of data and computing tasks in healthcare (both in a healtcare research and praxis). The basic unifying technology is a standardized network for application management - GRID, which allows inserting scientific modules for data sharing (including modules for real-time data sharing and teleconsultations), data harvesting and analysis and modules for scientific information exchange [1].

Current implementation of the MediGrid system uses the GRID network in several subsystems: documentation, modules, catalogue and sorter.

Documentation service

The main task of the Documentation Service (DS) is to allow a consistent description of data in complex algorithms and to enable decisions about their use and validity of their results. At the same time serves the DS also as a mean of communication among individual specialists, sharing of unique knowledge (in a form of algorithms) and as a foundation for system evaluation according to EBM rules. The DS should in this sense function as a scientific periodical, that publish structured and peer-reviewed documents.

Metadata of main MediGrid entity categories, that are currently used for consistent documentation, are stored in the DS: metadata of modules, indicator classe and citations.

Indicator class can be defined by a term adopted from one of a controlled vocabularies (assuming that the use of this term by potential MediGrid users is unambiguos) or can be newly defined in the DS. The original intention was to use for indicators description only the UMLS Metathesaurus, but in a lot of examples the concepts are either to vague or nonexistent at all (dtto for other classification systems). It is therefore possible to use other controlled classifications and even user vocabulary in cases where the concept cannot be found in any existing vocabulary. Part of the documentation is also an author identification and a description, that allows understanding and differentiation of one indicator class from the others; the documetantion contains also relevant citations.

Correspondingly the module documentation contains except an author code, module title and its URI also a structured description with citations.

A relation structure (corresponding to what is called an ontology), which serves for retrieving and chaining of modules, is generated on the basis of machine-readable form of the documentation. It is not a static structure, but a structure generated „ad-hoc“ that contains

only entities currently existing and documented in MediGrid and their relations. It changes therefore with every added knowledge element (algorithm).

Compendium of Pediatric Auxology

An implementation of Compendium of Pediatric Auxology 2005 is an example of use of MediGrid for sharing of unique knowledge.

Compendium of Pediatric Auxology 2005 (CPA2005) [2] is a complex digital knowledge system for the needs of the pediatric community, an update of formerly published CD ROM „Compendium of Pediatric Auxology“ [3], and serves as a knowledge base for the needs of biomedical specialists and generalists, who meet the problems of growth abnormalities. The knowledge base of CPA was revised using MediGrid methodology and renewed to the form of ad-hoc ontology that describes processing of selected growth data. Based on this methodology we created and documented both relevant modules implementing individual algorithms and their relations.

During the process of knowledge base analysis it was necessary to carry out following steps: (1) current knowledge analysis, (2) identification of modules and indicator classes, (3) documentation containing semantic information, (4) revision of documentation from the EBM point of view and its linking with published knowledge (5) implementation of GRID net services containing.

Results and discussion

The fact that CPA2005 is a mature project that went through eight years development and improvement turned out and advantage for current knowledge analysis. Therefore it was not a problem to identify modules and indicator classes, that are necessary for description of the field of pediatric auxology in such a range that is sufficient for usual analysis of growth data in pediatric praxis.

Documentation was created according to the MediGrid methodology for the said modules and indicator classes (including linking with peer-reviewed information resources) and inserted into documentation service. This process uncovered – accentuated some weak points, that are characteristic for other fields of algorithmic medicine as well, especially:

1. The domain ontology of pediatric auxology contains information of consensual character that are not supported by evidence, respectively cannot be linked with citable peer-reviewed resources.
2. Borderline conditions of the use of some scientific modules and computation controversies are insufficiently documented.
3. The most controversial algorithms of pediatric auxology is a computation of body surface; except parallel existence of cca five possible algorithms (that are moreover insufficiently documented in original literature) references to the computation method are completely missing in many sources.

Using MediGrid methodology for processing of a domain specific knowledge database lets us indetify and study questions, that could cause problems during integration of this and similar databases into larger knowledge systems.

Conclusion

The MediGrid project has been launched on two (http://www.medigrid.cz and http://medigrid.lf2.cuni.cz), where the first scientific modules are being implemented.

Documentation service that serves for storing of metadata of used modules and indicator classes is a part of implementation.

Supported by Czech research project no. 1ET202090537

Literatura

1. MediGrid : o projektu [online]. [c2005/2006]. [cit. 2006-04-18]. Available from: <http://www.medigrid.cz/cs/oprojektu/index.html>
2. Krasnicanova H, Lesny, P. Kompendium pediatrické auxologie 2005. Praha: Novo Nordisk 2005.
3. Krasnicanova, H, Lesny, P. Kompendium pediatrické auxologie. Česko-slovenská pediatrie. 2001 1.7.2001;56(7):412-6.