Need of Ontology Based Systems in HealthCare System

by Opcion Editor

Submission date: 04-Nov-2019 04:35PM (UTC+0900)
Submission ID: 1206575323
File name: 5_Need_of_Ontology_Based_Systems_in_HealthCare_System.doc (216.5K)
Word count: 2134
Character count: 12110

Need of Ontology Based Systems in HealthCare System

***Abstract*— Recently on the Semantic Web the healthcare is consider as one of the finest topic. To match the concept to the indexed documents into s set of representative the textual query is transformed. For apt documents manually the end user still has to search. In this way it becomes a crucial task to detect the information of patients. The theory of object is its relationship is considered as Ontology. In information science and computer science the ontology encompasses a definition, representation and formal naming of the relations, categories and properties between entities, concepts and data that substantiate all, many or one domains of discourse.**

Keywords- *Semantic Web, healthcare, Ontology, theory of object.*

I. INTRODUCTION

It is seen that the health records of patient digitization is becoming more important day by day because while it going to the hospital the patients are free from carry the big file of data physically with them [1]. Due to use of computing and networking technologies all sharing and storing becomes more convenient. So for several benefits all Healthcare Service Providers move towards the cloud computing. To demands of healthcare and patients service providers cloud promises to offer [2].

The theory of object is its relationship is considered as Ontology. In decentralized and dynamic users while focusing on PHR access control, many systems used approaches which based on ontology. In cloud it represents the relationships and user at a conceptual level. To restrict and regulate the disclosure of data in health care the access control mechanisms used [3].

II. ONTOLOGY

The theory of object is its relationship is considered as Ontology. In information science and computer science the ontology encompasses a definition, representation and formal naming of the relations, categories and properties between entities, concepts and data that substantiate all, many or one domains of discourse.

To organize information and to limit complexity into knowledge and data every field creates ontologies [4-5]. Within the domain their use a hopefully improves problem solving as it made the advance ontologies. Between each of the languages when maintain a controlled vocabulary of jargon [6] by experts from different countries the problem made easy the translating of research papers within every field.

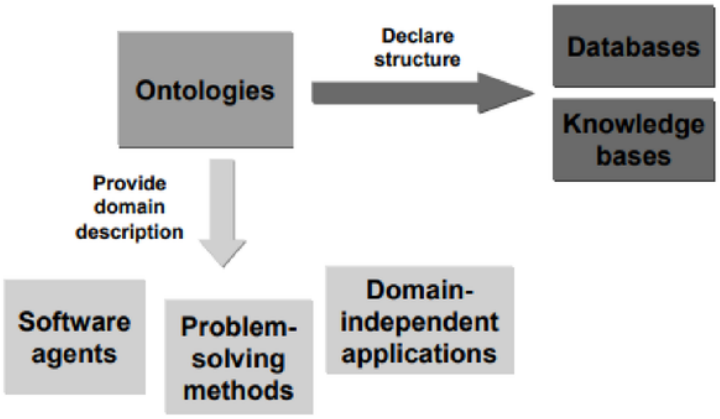

Figure 1: Concept of Ontology

III. DATA INTEGRATION BASED ON ONTOLOGY

From multiple heterogeneous sources to effectively combine information or data the Ontology-based data integration include the utilization of ontology. It may be classified as GAV (Global-As-View) [7] and it is consider as one of the multiple data integration approaches. On expressivity and consistency of the ontology that is used in the process of integration closely ties the effectiveness of ontology based data integration

Ontologies role

In assertion of applicable named relationships and heterogeneous information systems the unambiguous identification enables in Ontologies the entities are connected together by that. The ontologies play the roles as given below:

a. Explication of Content

Through the relationships and explicit definition of terms in the ontology from multiple sources the ontology enables accurate interpretation of data.

b. Query Model

By using the ontology as a global query schema in some systems like SIMS it formulated the query.

c. Verification

From multiple sources used to integrate data it map verification done by ontology. These mapping can be system generated or user specified.

IV. ONTOLOGIES TYPES

On the level of generality it can classify the ontologies. Some ontologies types are as follows:

1. For problem-solving methods of particular tasks it uses **task and method ontologies [8]**. On domain knowledge they are used for reasoning.

2. To capture general knowledge **top-level or generic ontologies** are used. it is also known as common sense ontologies. Across various domains the defined conceptualizations are valid.
3. The knowledge is containing in **Domain ontologies** for a particular domain type that is valid like mechanic, electronic and medical.
4. Without stating that what is represented the representational entities provided by **Representational ontologies**. To any specific domain they do not commit themselves. Frame Ontology is example of the well known representational ontology. Concepts like slot constraints, frames and slots are defined, in frame-based or object-oriented way it allow the expression of knowledge.
5. In the World Wide Web for describing the content of information sources **the meta data ontologies** provide a vocabulary.

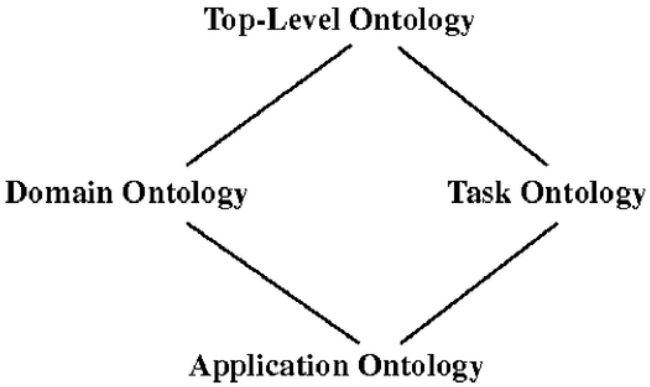

Figure 2: Types of Ontologies [9]

V. CONCEPTUAL ONTOLOGY

In a specialization or generalization hierarchy the relation or concept are ordered in general. The kernel of an ontology is constitutes as type hierarchy. It called as type hierarchy ontology if ontology contains only type hierarchy. By associating to each type its definition it can extend the minimal definition of an ontology. The outcome is a definitional or terminological ontology.

With the descriptions to each type its instances it can associate. It is well notable in Cognitive Science, Philosophy and linguistics that some is the type of real world that have no complete and clear definition however just an authoritative depiction that portrays limitations on the utilization of the type. Other types of "real-world" have just a bunch of diagrams that represent the utilization of the sort in like manner circumstances. By a prototype however other "real-world" types are "introduced" [10]. By a prototype it can present other “real-world” types. Several types of Conceptual Structures include prototype constitute, canon, type definition, individual description and schemas cluster. It is called as commonsense or knowledge based ontology [11] to the ontology that is constituted from these Conceptual Structures.

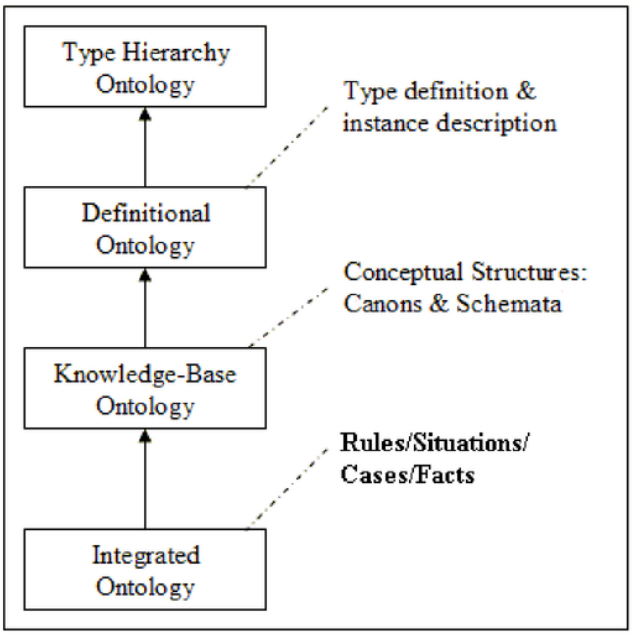

Figure 3: Ontology Types hierarchy

VI. HEALTH-CARE ONTOLOGIES

Within a relationships and domain the ontology is known as knowledge model that represents a set of concepts among these ideas. Within a domain the Ontologies not only facilitate the only representation but also instance-based reasoning and concept instantiation. On the World Wide Web for sharing and publishing ontologies the OWL is consider as a semantic markup language. In the OWL language tree version as maintaining computational completeness the OWL D [12] reaches the maximal expressiveness.

In biomedicine it widely applied the Ontologies and in multiple online ontology libraries made it aviable like Protege library, Biomedical Ontologies Foundry, Bioportal, Open Biological Ontologies Foundry etc. To the development of biomedical ontologies various ontology editors as Protégé have also contributed. About health-care management between biomedical subdomains and ontologies it suggest a distinction by a review of published biomedical ontologies.

Inside a connections and area the cosmology is known as information model that speaks to a lot of ideas among these thoughts. Inside an area the Ontologies encourage the main portrayal as well as example based thinking and idea launch. On the World Wide Web for sharing and distributing ontologies the OWL is consider as a semantic markup language. In the OWL language tree form as keeping up computational fulfillment the OWL DL arrives at the maximal expressiveness [13].

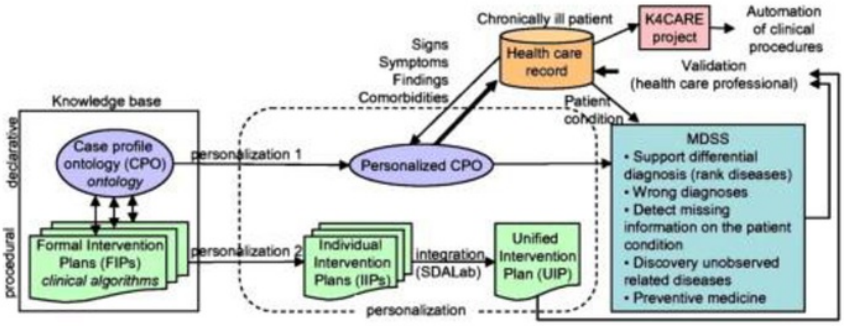

Figure 4: On the basis of ontology personalization of health-care [14]

VII. Public Healthcare System based on Ontology

In a database in emergency doctors, nurse, medical services, patients' records are stored and in Web Ontology Language (OWL) format it can be accessed. To classify the records that stored in database it used the Meta data modeling. To map the input to output data this model can easily help.

For the database technology and concepts it can consider as next emerging generation to the Ontologies.

For the web the exact relationships between information and web and description is about ontology.

The exact relationships and description of things is about Ontology [15].

OWL stands for Web Ontology Language

By application of computer to be read the OWL was initially developed.

As compare with RDF the OWL comes with a huge vocabulary. From the special interest groups and various countries all over the world for the bazillion sets of data being added to the web the RDF is used.

To process the content of web information the OWL was designed to give a common way.

With the use of elements of RDF language with greater machine interpretability the OWL is consider as a stronger language.

For processing the information it designs the OWL.

In a database in crisis specialists, nurture, medicinal administrations, patients' records are put away and in Web Ontology Language (OWL) design it tends to be gotten too. To order the records that put away in database it utilized the Meta information demonstrating. To delineate contribution to yield information this model can undoubtedly help.

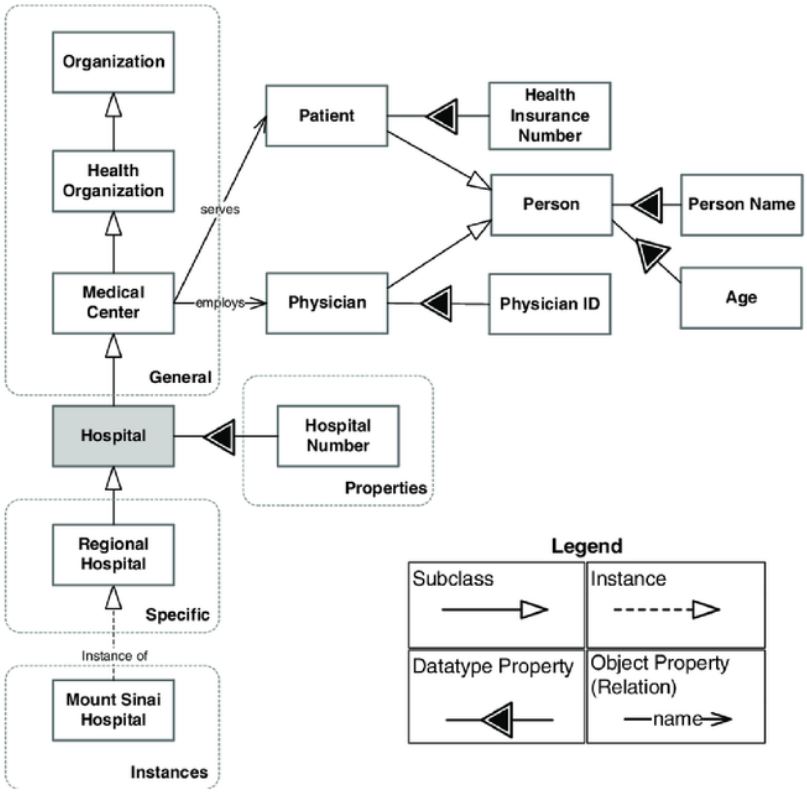

Figure 5: Ontology Based Systems in HealthCare System Example

VIII. IN HEALTHCARE NEED OF ONTOLOGY BASED SYSTEMS

The utilization of ontologies in prescription is fundamentally focussed on the reorganization and representation of terminologies of medical. To help communicate and store patient-related information and general medical knowledge efficiently the physicians implement their own specific lexicons and languages. By a significant amount of implicit knowledge for human processing these terminologies optimized. on the other hand medical information systems need to be able to communicate detailed and complex medical concepts unambiguously. This is clearly a troublesome undertaking and requires a significant investigation of the structure and the ideas of restorative wordings. Be that as it may, it very well may be accomplished by building therapeutic space ontologies for speaking to restorative phrasing frameworks.

In the Medical Natural Language Processing area it also made the Ontology-based applications [16].

Some benefits of Ontology Based Systems are as follows:

1. For different purposes to to support different statistical aggregations the Ontologies can also provide - criteria that is based on semantic.
2. In healthcare to develop more interoperable and powerful information systems the ontologies can help.

3. The ability to support the indispensible integration of data and knowledge is the most important benefit od data.
4. To share, re-use and transmit the need of healthcare process supported by Ontologies.

IX. Conclusion

The theory of object is its relationship is considered as Ontology. In information science and computer science the ontology encompasses a definition, representation and formal naming of the relations, categories and properties between entities, concepts and data that substantiate all, many or one domains of discourse. The theory of object is its relationship is considered as Ontology. To restrict and regulate the disclosure of data in health care the access control mechanisms used. From multiple heterogeneous sources to effectively combine information or data the Ontology-based data integration include the utilization of ontology.

References

[1] Maurizio Lenzerini (2002). Data Integration: A Theoretical Perspective.

[2] E. Mena; V. Kashyap; A. Sheth; A. Illarramendi (1996). OBSERVER: An Approach for Query Processing in Global Information Systems based on Interoperation across Pre-existing Ontologies.

[3] Fonseca, F. Egenhofer M., Agouris, P., Camara G. 2002. Using Ontologies for Integrated Geographic Information Systems. Transactions in GIS, −(6):3 in print.

[4] Fabien Gandon "Distributed Artificial Intelligence And Knowledge Management: Ontologies And Multi-Agent Systems For A Corporate Semantic Web", scientific philosopher doctorate thesis in informatics INRIA and University of Nice- Sophia Antipolis- Doctoral School of Sciences and Technologies of Information and Communication (S.T.I.C) 7/11/2002, 486 pages.

[5] Noy N.F., McGuinnes D. L. 2001. ''Ontology Development 101: A Guide to Creating Your First Ontology''. Stanford Knowledge Systems Laboratory Technical Report KSL−01−05 and Stanford Medical Informatics Technical Report SMI−2001−0880, March.

[6] Russell S., Norvig P. Artificial Intelligence: A Modern Approach. Prentice Hall, Englewood Cliffs, NJ. (1995).

[7] Learning medical ontologies from the Web David Sánchez, Antonio Moreno Intelligent Technologies for Advanced Knowledge Acquisition (ITAKA) Research Group Department of Computer Science and Mathematics Universitat Rovirai Virgili (URV).

[8] Le XH, Lee S, Lee Y-K, Lee H, Khalid M, Sankar R. Activityoriented access control to ubiquitous hospital information and services. Inform Sci. 2010; 180(16):2979–90.

[9] Tsai W-T, Shao Q. Role-based access-control using reference ontology in clouds. 2011 Tenth International Symposium on Autonomous Decentralized Systems; IEEE; 2011. p. 121–8.

[10] Ardagna CA, De Capitani Di Vimercati S, Foresti S, Grandison TW, Jajodia S, Samarati P. Access control for smarter healthcare using policy spaces. Comput Secur. 2010 Nov; 29(8):848–58.

[11] Fox J, Alabassi A, Patkar V, Rose T, Black E. An ontological approach to modelling tasks and goals. Computers in Biology and Medicine 2006;36:837–56.

[12] Martínez-Costa C, Schulz S. Ontology-Based Reengineering of the SNOMED CT Context Model. Conference on Artificial Intelligence in Medicine in Europe, Springer Berlin Heidelberg; 2013, p. 216–220.

[13] Uribe GA, Lopez DM, Blobel B. Architectural analysis of clinical ontologies for pHealth interoperability. Stud Health Technol Inform 2012;177:176–82.

[14] Guariano N. IOS Press. Frontiers in Artificial Intelligence and Applications 1998;46:347.

[15] Campbell JR, Brear H, Scichilone R, White S, Giannangelo K, Carlsen B, et al. Semantic interoperation and electronic health records: context sensitive mapping from SNOMED CT to ICD10. Stud Health Technol Inform 2013;192:603–7.

[16] Rodrigues JM, Schulz S, Rector AL, Spackman KA, Üstün B, Chute CG, et al. Do we need a Common Ontology between ICD 11 and SNOMED CT to ensure Seamless Re-Use and Semantic Interoperability? MedInfo, 2013, p. 1234.

Need of Ontology Based Systems in HealthCare System

ORIGINALITY REPORT

7%	4%	5%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	research.ijcaonline.org Internet Source	2%
2	Jayaprabha, Palanisamy, and Arumugam Saradha. "Automatic conversion of web content into ontology-based resource description language for tourism domain", International Journal of Innovation and Learning, 2012. Publication	1%
3	Mohan, K., and M. Aramudhan. "Ontology based Access Control Model for Healthcare System in Cloud Computing", Indian Journal of Science and Technology, 2015. Publication	1%
4	en.wikipedia.org Internet Source	1%
5	S. K. Jayanthi, S. Prema. "Ontology based web search results visualization using BSDSC", 2011 3rd International Conference on Electronics Computer Technology, 2011 Publication	1%

6	www.ami-communities.eu Internet Source	1%
7	Amir Hajjam. "Chapter 5 Ontologies and Cooperation of Distributed Heterogeneous Information Systems for Tracking Multiple Chronic Diseases", Springer Science and Business Media LLC, 2013 Publication	<1%

Exclude quotes	Off	Exclude matches	Off
Exclude bibliography	On		

Need of Ontology Based Systems in HealthCare System

GRADEMARK REPORT

FINAL GRADE

/0

GENERAL COMMENTS

Instructor

PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8