SEMANTIC WEB : A TECHNOLOGY TO SHARE HEALTH DATA

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Abstract

Health Information System (HIS) is very helpful to be used in data collection, management, and analysis so that can be made the right decision to solve a problem. However, there is still a weakness of SIK, the development is still decentralized. This causes difficulties in data exchange. In addition, data reported using paper forms and sent by fax or mail. To solve this problem, Semantic Web technology is offered. Semantic Web is a representation of World Wide Web (www) data. Semantic Web can be used to exchange data over the Web that can be accessed by others. Data can be obtained by accessing through a URI (Universal Resource Identifier).

Keywords: Terms Semantic Web, HIS, health information exchange

1 INTRODUCTION

The Internet is an important mass media for consumers in searching health information and health services online [1]. The development of internet technology affects the health field. It is used as an alternative or recommendation or complement of the health care system and as a tool for developing health web sites. This is manifested in the form of an easily accessible system.

Health data is an important part of health care and the destruction of infectious diseases. Data is collected, stored, and should be easily accessible to all stakeholders in the form of an e-Health System. This is very important for countries that have many health problems. For example, South Africa has problems with the spread of HIV / AIDS, Mozambique with the highest infant mortality rate in the world, and India with a large population [4]

Several studies have shown that joint care provides effective patient care and can improve the quality of care, information exchange, and evidence-based guidance. Information Technology offers the potential to enable efficient communication to improve service quality. In contrast, joint care presents a major challenge to the availability of information processing including trusting shared information, correct and clinical interpretation. Maintenance together requires good communication (fast and high quality) between providers of various health services. The data taken must be of high quality (true and complete), high reliability and flexibility. It requires text entry and is highly structured as well as the use of integrity. Different information systems used by various health care providers together should be able to operate, so that one system can understand the context and meaning of information provided by other systems. [5]

This paper proposed a WEB semantic technology for sharing health data capable of recommending related parties and not necessarily related directly, but simply by entering the data into a semantic web site that has been created, then anyone interested will be able to see the data Already included by all parties. This is because semantic web is a tool to combine data from various places into a very large data that is global (worldwide)

METHODOLOGY

HIS still has weaknesses in the presence of data that are not connected / decentralized to each other. This is caused by difficult in data exchange. There is a new way to exchange data. This can be done by letting the data be directly accessed by others. The proposed new technology is Semantic Web which aims to share health data

The official definition of the Semantic Web World The Wide Web Consortium (W3C) is a representation of Data on the World Wide Web (www). Semantic Web does not replace current Web technologies but is complementary. Semantic Web is the latest Web technology today. Where Semantic Web technology produces information that can be read and processed by machines [13, 14], it is smarter than the current Web. Another difference is that the Web currently provides documents and is accessible to others on the Web because it uses an address (URI; Universal Resource Identifier). While Semantic Web publishes data on the Web that can be accessed by others. The data is also accessed by using a URI, but its URI is not connected to a Web page. Can link to its data source [11]. So, by using Semantic Web, users can collect data provided by others and use it as desired. Semantic Web can be used to share data, including health data. Each side only needs to create Semantic Web sites and connect with each other.

Semantic Web consists of three layers: XML, RDF, RDF Schema and Ontology. XML is the lowest level. This makes it possible to provide metadata to a Web page. Above XML is RDF, which is a basic data model for writing simple statements about Web objects (data sources). While the level above is RDF Schema which provides primitive modeling to set Web objects to the hierarchy [13]. RDF Schema usually does not solve all problems then we need ontology. XML

stands for eXtensible Markup Language. Markup refers to a document that is not to be printed. While the markup language is a description of which part of the document / content, which is the markup [8]. In XML, users can create their own tags like HTML. XML is actually a universal universe for defining markup. However, it does not provide any way about the semantics (meaning) of data [13]. Therefore RDF is required.

RDF (Resource Data Framework) is the language for data model. Data is modeled using three subject - property - objects. This model is usually represented as a graph in which the subject and object are nodes and the property is an arc. Data is the preferred source of the model. Examples of students, doctors, patients, hospitals, etc. Data sources are represented by URI (Universal Resource Identifier). A URI can be a URL (Uniform Resource Locator). In order to make the vocabulary used in RDF in general, then the standard vocabulary should be used. Dublin Core (dc) and Friends Friends (tt) are two examples of standard vocabulary

URI utilization and standard vocabulary allow Semantic Web data and data models that connect directly and precisely connected together via the Web itself. RDF is just a data model. It can not define classes, properties, relationships between resources, property and hierarchy classes. RDF Schema has the ability to describe language vocabulary that is an RDF semantic extension and provides a mechanism for describing the associated resource group and the relationship between resources [9]. This can determine the specific vocabulary that the RDF can use. In other words, the RDF Schema mechanism provides the basic type of system to be used in the RDF model. This type of system itself uses standard terms, such as Class and subClassOf. RDF Schema is quite primitive as modeling languages for the Web that are sometimes missing metadata. Therefore we need ontology to make the system smarter. Ontology defines concepts and relationships used to describe and represent the field of knowledge [15]. Ontologies provide features not provided by RDF Schema such as the scope of properties, class disjointness, cardinality restrictions, etc

DISCUSSION OF THE PROPOSED SYSTEM

The proposed intelligent health system architecture is shown in Figure below:

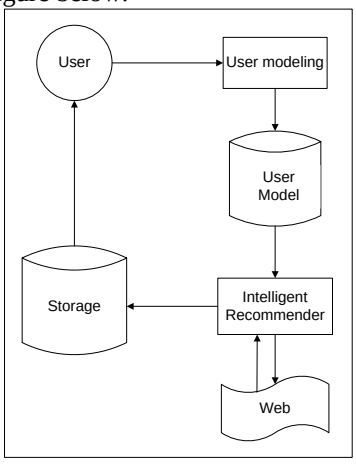

Figure 1. The proposed system architecture modified results [12]

The system will work as follows: collect information about the user's health by including a series of questions. This information will be used to create user models. The user model is used as a basis for finding health information on the Web. Searching is done using the Semantic Web search engine. After finding the relevant health information, it is stored in the repository and then sent to the user that matches the user model.

One of the information provided by the user will be the most significant information used to recommend the health information to the user. This is because the proposed system will use so-called subject networks. The health information the user needs will be used to find the correct subject network for each user

The system will recommend health information on Semantic Web. To understand Semantic Web, will also recommend XML, RDF, RDFS, OWL, Softwares, Dublin Core, RDF / XML, and N3. Recommendations will be presented in the form of a list of health information in the recommended order. In this case the Semantic Web will be in the first place on the list as it is of user interest, followed by XML, RDF, RDFS, OWL, Softwares, Dublin Core, RDF / XML, and N3. If one item is clicked, health information will be available. The system will recommend health information by using content-based content

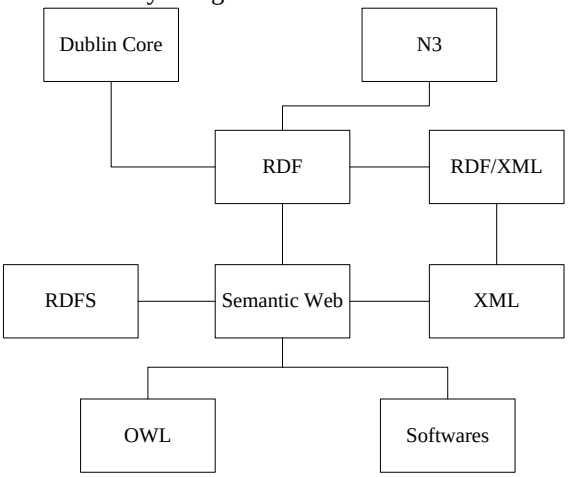

Figure 2. Network Subject

The system applied to the health field, the subject network will contain topics in the health field only and all related to each other. Each health institute develops a Semantic Web system. Each system must link to other people's systems. By doing this, the data in the Semantic Web system can be retrieved from any associated Semantic Web system. But before developing Semantic Web that contains disease data, we must ensure that standard vocabulary on health has been in place. If not, vocabulary should be developed first. It is the community's responsibility to provide it. An example of a standard vocabulary in health is a cancer ontology from the National Cancer Institute in the United States. For a common vocabulary, the Unified Medical Language System integrates 100 biomedial vocabulary and its classification [13]. Vocabulary is needed to ensure that anyone who develops Semantic Web will use the same vocabulary. If there is no standard vocabulary, then everyone will use a different vocabulary to state the same. This will reduce the power of Semantic Web. To use the power of Semantic

Web, each site must use the same vocabulary. In this model, general health information will be first downloaded manually and stored in database, then semantic metadata will be provided for search by Semantic Web search engine. Searching will be done on the database, not on the Web

CONCLUSION

The Health Information System (HIS) is very helpful, because it is used in data collection, management, and analysis so that the right decision can be made to solve the problem. But there is still a weakness in HIS, because the development of HIS is still decentralized

Semantic Web is a representation of data on the World Wide Web (www). Semantic Web can be used for data exchange because it publishes data on the Web that can be accessed by others. Data can be accessed by connecting to URI. Semantic Web consists of three layers: XML, RDF, RDF Scheme, and Ontology. XML. XML is a universal method of defining markup. Resource Data Framework (RDF) is the language for data modeling. Data is modeled using three subject - property - objects. Data is any data source to be modeled. Data sources are represented by URIs. RDF Schema is a RDF semantic extension. RDF provides a basic type system, such as Class and subClassOf, to be used in the RDF model. Ontologies provide features not provided by RDF Schema such as property scope, class joints, cardinality restrictions, etc.

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