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The Reality of Using Semantic Web Technologies in Bioinformatic

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ABSTRACT

With the recent rapid growth of the semantic web, searches and inquiries about the massive content of heterogeneous Information have become increasingly difficult, there Is a need for end-users to search, discover this issue, and diversify its Information space in Order to form a true, realistic vision. This is a nominal paper whose purpose is to clarify this Type of study and its importance for this field. Our study methodology is based on knowing What has been done in this aspect and Knowledge of the shortcomings and problems of some of these studies in general. We aim in this study to link the available data Sfrom various Medical institutions that use vital information Thus extract meaningful data understandable. We highlight the Most important results of these studies, most of which are summarized in the Product of applying the various tools of the Semantic web through studies that have been Touched in this field and through many tasks that have been developed on Different systems. Accordingly, this paper discusses semantic web searches on different services, and here we Refer to medical Services of all kinds

***Keywords* —:** Ontology, semantic web, semantic web languages, Resource Description Framework (RDF), Ontology web language (OWL), Smart Agent.

I. INTRODUCTION

The Semantic Web is an extension of the normal web known to us by W3C standards [1].

It is a service concept that enhances standards for common data formats and exchange Protocols on the web, the most important of which is the "Resource Description Framework", And according to "W3C, the semantic web provides a common framework that allows data to Be shared and reused across projects that depend on it in its applications[2].

(Tim Berners Lee) formed this term about a network of data made by machines, and some Critics have questioned the utility of this concept as supporters say that applications in Industry, biology, and humanities research have already proven the validity of the previous Concept [3] [4].

(Berners Lee, et all) described it as the expected development of the regular web to the Semantic web [5], and in 2006 AD (Berners Lee, et all) presented this simple idea that is still Being investigated to some extent[6] [7].

In addition to the foregoing, the semantic web services are produced based on the application Of its concepts, the semantic web is in the sense of adding meaning and understanding, as this Type of service is considered more intelligent due to the possibility of processing and Interpreting components that need more clarity, automatically on machines without human Intervention, and through applications The semantic web to web data produces related data That allows it to be reused again, with the ability to link data from different sources easily and Is the approach used to solve this problem.

If we refer to the semantic and ontological web with more clarification, then the web is Nowadays considered the widest source of information in all fields and subjects, and it is in a Permanent expansion, whether in the volume of information or in the size of users.

"Ontology" provides an expandable and expressible framework for accepting common Vocabulary in the field of knowledge, and includes machine-definable definitions of basic Concepts in this field and the relationships that exist between them [8].

At the present time, "ontology" or Study of being is one of the techniques of representing knowledge that is common in the web, and which is defined as a way to represent concepts by linking them with meaningful relationships, Officially ontology consists of entities, Relationships, properties, states, and functions , Restrictions, rules, and other reasoning procedures.

The ontological strength lies in its ability to explicitly represent knowledge concepts, Properties, and limitations, also the ability to encode semantics such as (Meta_ data, Rules, And other inference producer) as well as the ability to allow a common understanding of knowledge between them and humans and software.

"Semantics" is a term used by both logistics and linguists to describe the study of meaning.

On the basic level, this field explores how concepts are codified into a language through a System of symbols that facilitate communication between entities. Natural human language is A very complicated method, yet especially when looking at the nature of words, one word can Functionally differently signify multiple and different concepts, While the concept is the Same, it can likewise be possible through multiple words [9].

When we address the vital information, we find that the information has grown to a large Extent in the molecular biology laboratories where it was established, and many of these laboratories have made their own data available for use within the web, and often this data is Disorganized or semi-structured.

This situation results in a slow change in terms of the availability of information despite its Difference, until a number of centers of service providers appeared and are now in an increase In their scope and often provide many differences on the types of information, and there is Still a lot of information that can be accessed in a way Easily and publicity and we find that The use of "electronic health records" is increasing rapidly, which results in a large amount of Digital forms and also an understanding of mixed data has become increasingly complex for Doctors, which leads to slow decision making.

Data integration is a very difficult and Hard process as it requires a large amount of Programming effort to link the data due to the different interfaces because the structure of Medical data requires a unified approach due to the promising opportunities in the fields of "Biomedical" research in "world health organization" and agencies [10] [11].

II. How can semantic web technologies help with researches in bio informatic?

It is believed that the Wise or intelligent application of semantic web technologies can lead to A faster movement of innovation from research laboratories to the clinic or hospital, as the Semantic web approach introduces an expanded mix of social standards, technologies, and Practices that are placed at the top of the most successful devices for disseminating and Sharing information with "World Wide Web".

The languages of Semantic Web Diagrams (RDFs and OWL) provide the ability to simplify The management and understanding of a set of complex and rapidly evolving relationships That we need to record data describing life products and medical science, along with their Technical benefits on which existing data stores are based, and there are a number of flaws That address them Web schema languages.

OWL is self-describing, Scientists who integrate different types of data need to understand What this data means at the field level, as well as details of its shape in what it calls a "Detailed outline of related data." Since these charts tend to be technology-specific and their Resources, it places a huge burden on her understanding and working with it, while the need To integrate more data types will continue, so (RDFs and OWL) offer some relief from the Burden of understanding data charts [13] .

III. Background and related work

All This large volume of information and the rapid expansion of the web make managing Information to access it an extremely complicated matter, and most of us have suffered from The large number of documents and links returned by any search engine in response to any Query, this is apart from the inconsistency of the search results with the user's request !This Complexity has two main causes:

The **first** is the structure used to store documents. Most of the documents on the web are Stored in the form of textual data that a person manually classifies without any possibility to Express the content of these documents an expression that allows the machine to deal with it. **Second**, the methods of classification and automated search are currently used all of them are Statistical methods not exceed than morphological analysis level for the written texts (Searching by keywords).

We review some of the previous relevant studies, the studies reviewed and the results, and Summarize some of them and their similarities.

In the paper [12] its objectives are based on:

1 .Knowing the correct way to extract information about the rapid spread of information change.

2 .Creating an ontology to extract information that is rapidly spreading with disease change Using a semantic language on the Internet.

3 .Propose or establish a basis for the disease (smart disease system) by building a smart Ontology to extract disease information using the "Web Ontology Language" and the "Protégé" tool.

The study deals with gathering knowledge from different sources using OWL ontology to Provide reference information to researchers [13]**.**

It provided a framework design for a system that uses simplified medical knowledge such as Symptoms of the disease, and reduces the difficulty of acquiring the knowledge that is applied By the logical thinking methodology in using simple pattern matching to collect the diagnosis Of disease diseases of candidates according to the applied approach so as to improve the Diagnostic decision, but no search engine has been designed for the episode used How to Solve a problem with the purpose of discovering effective new ways to build cases to collect New data[14].

The application of ontology in the differential and probabilistic diagnostic progression to Improve the shortcomings of complex systems that do not take advantage of the capabilities Of an ontology in the differential and probabilistic diagnostic and semantic web in its various Applications for the purpose of supporting physicians and students in medical specialties by Following the method "ODDX" which is a clinical diagnostic program Interested in providing The user with an expert system that enables the identification of different medical diagnoses Generated from a set of indicators, but the system needs to incorporate other apparent Components needed in the diagnosis, as it is a possibility in choosing a correct diagnosis.

Web services such as(MedCIRCLE) [16] and (MedCERTAIN) [15] are semantic projects Aimed To direct users to health information on the Internet and extract good health Information available on the network [17].

"Peer To Peer" is an object management system that provides detailed search services.

It is a network of local databases, and on the other hand data is shared without a global Scheme using metadata for each attribute 'P2P' avoids physical and semantic bottlenecks in Exchanging and retrieving information.

(PIER) is a commonly used query engine [18] [19] that is used to process queries in Distributed networks.

As for the computing environment everywhere [20] provides what is called context science Where the rules were used to convert low level contexts into higher level contexts, for the Purpose of providing personal health care services to users, and although companies with less Formal training the proposed curriculum is very complex.

There is another methodology mentioned in [21] where it proposes merging the two health Care systems (SNOMED CT and ICNP), and because of that proposed merging different Perspectives from two ontologies are preserved without losing important information but There is no effective technique proposed to integrate large ontologies.

The paper [22] provides headlines for neuroscience data as it has an integration problem Resulting from the use of a data model (RDF Oracle) where data is extracted from extra Brains as the proposed system provides the conversion of the relationship to an (RDF) Structure.

This paper [23] provides organized medical advice for diabetics with the help of food Anthology, as this ontology is tested to exchange knowledge between different stakeholders In the Diabetes Control Pipes project.

In the paper [24] the proposed approach uses a framework-based ontology capable of Providing personal health care to users by retrieving all required knowledge such as patient Care, prescription medications, etc., but the system does not use any seminal base drives in its Implementation.

Aside from ontology-based medical systems there are some rule-based healthcare systems Suggested by researchers.

The paper [25] introduces rule-based information extraction from medical documents, and Then the information that is extracted is compiled and categorized into the required complex Templates, and the proposed method can also be used to determine the most prominent and Important diagnosis for patients requiring special attention, but the system development is Time consuming style.

In the paper [26] a dynamic adjustment of the workflow is described, and in the event of an Exception, the system dynamically identifies the affected workflow area with a view to Correcting it, as rules are used to detect semantic exceptions and identify activities that are Dropped or added.

In the study [27] modern health care relies mainly on data analysis, in the context of quality Assurance.

In the United States, "the National Committee for Quality Assurance" (NCQA) defines a wide Range of quality measures, including, for example, "the proportion of diabetics who regularly Undergo eye exams," and because diabetes can cause retinal damage Blindness is ultimately Required by the health maintenance organization (HMOs) to demonstrate satisfactory Performance.

(NCQA) measures whether you want to participate in government-funded health care Programs such as Medicare that cover more than 48 million patients in the United States and Account for a large share of the healthcare market This study aims to present the project in Which Semantic techniques were applied to calculate the part that is considered more difficult For (HEDIS) standards.

In this paper, a project that was implemented in cooperation with (Kaiser Permanente) to Ascertain the benefits of using (Semantic Technologies) in data analysis using the RIM Modeling Standard has been described.

A schematic science has been developed that reflects how experts in this field visualize Business processes. In health care, these preliminary data have been translated into a graph (RDF) that follows the aforementioned chart.

At the end of the paper, we will include a brief table of the most important previous studies and their comparison with our current study

IV. DISCUSSION

Through our narration of previous studies, a brief explanation of their comparison with each Other in several aspects (features, similarities and shortcomings)

First: The method of collecting vital information for most studies was by collecting data from Different sources , We mean "public and private" hospitals and health centers here to ensure The correctness of the information We use them in question, and previous studies have Generally also focused on data collected from previous studies that have been processed and Collected in different ways

The similarities also lie in the use of smart ontology with its tools (RDF & OWL), according To how different they are used in each study separately, which is also an advantage in relation To the use of more intelligent research methods.

V. CONCLUSIONS

For those interested in the art of using semantic web components in vital services, data Indicates the importance of adding meaning to these components to allow machines to Understand and process reliable data.

Semantic web technology such as "RDF" is the main factor for building semantics and it Allows expanding the normal web services for semantic web services that can be easily Discovered and called automatically, and also allow automatic detection of all data on the Relevant network and answering any inquiries, whether it is clear or complex.

Also, for those interested, the semantic web on the other hand helps in analyzing big data only by putting the concepts of standard units into consideration.

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	Author Name / year	Objective	Method	The differences	Limitation
[10]	Abey Siriwardana, et al, A unit of White globe Publication (2012)	1\ Know the right way to extract information about the rapid spread of information change 2\ Create an Ontology to extract Information that Spreads rapidly with disease Change using a Web language 3\ Proposing or Establishing a basis for the disease (Smart Illness System)	Build intelligent ontology to extract disease information Using web Ontology language Owl and tool (Protege)	The study dealt with the collection of knowledge from different sources using an ontology Owl To provide reference information to researchers **in our study**, the resource description framework was used to search information more intelligently	Although the Study dealt with how to Collect Information , but it was Not Ascertained That the Information Collected Was Collected for the purpose of validating It by doctors, For example
[11]	Hsein.T seng wang, Abdallah Uz tansel (2013)	Design a framework for a system that Uses simplified Medical knowledge Such as disease Symptoms, and Reduces the Difficulty of Acquiring knowledge.	Methodology of logical thinking case-based reasoning (CBR)	Using Simple Pattern Matching to Compile Candidate Diagnosis Based on the methodology used to improve diagnostic decision, **in our study** the symptoms were collected from the outset and aggregated and the probabilities	A search engine for the problem-solving loop is not designed to discover new effective ways to build cases for new data collection.

[12]	Angel Garcia crespo , et al Universidad carlos III demadrid (2003)	Applying the ontological for differential diagnosis and probabilistic statistics to improve the shortcomings of complex systems that do not benefit from the possibilities Semantic web in its various applications to support doctors and students in medical specialties.	ODDX A clinical diagnostic program that provides the user with an expert system that enables the identification of various medical diagnoses generated from a set of indicators.	excluded for correct diagnosis. Consider the appear symptoms as part of the patient's symptoms, to avoid making the right selection mistakes.	The system needs to integrate other virtual components needed in diagnosis, as a probability of choosing a correct diagnosis

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