# The Use of Semantic Web Technology in the Diagnosis Internal Diseases

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**Abstract:** *Recent interest of web applications (semantic web) have increased , with the aim Of supporting Discovery and the formation of compatibility services. Therefore, this paper is A discussion of the application for This technology in The field Of bioinformatics , and witch Help the internal diseases doctors to Diagnose Properly And to reduce the selecting of Symptoms inappropriate for Those diseases ,our approach in this Research is how to Formalize the solution of a problem for particular disease even if it is difficult to find a Solution , we have used the tool (resource description framework) "RDF" in building the Database which in turn describes data content intelligently and understandable with use the Method (Psedocode) false code to the steps of solution. The paper also highlights some of the difficulties Facing the development of services (Semantic Web) and propose some experiments with Positive effects on the development of this project ,The most important results of this Research is the difficulty of making a decision about the existence of a particular disease and Called it unless its symptoms are completed to avoid similarities between the symptoms of Various diseases.*

**Keywords:** Semantic web Services (SWS), Resource Description Framework (RDF), Automated Agents, Web Ontology Language (OWL), patient

## 1. Introduction

In the last ten years, biological capacity has increased in experiments, largely due to The Emergence of high-capacity technology that has enabled data collection.

The Semantic Web is a "network of data" that enables the browser to understand The Meanings on the Web automatically,It is an expansion of Web pages that Can be read online By including readable metadata about pages and how they Relate to each other, Allowing Automated agencies to access the Web more Intelligently and perform tasks on behalf of Users, and here the doctor can have a Clearer understanding of the symptoms of the disease And thus the accuracy of The results[1].

In the past, the reasons for blocking semantic Web progress were to adopt more Users for Search methods via the normal web and the appearance of results may be irrelevant or results In many difficult user requests.

Studies have shown that the wise application of semantic Web technology can Speed up the Movement of innovation from the research lab to the clinic or Hospital [2].

If we address the semantic and ontology web more clearly, the web is now the broadest Source of information in all fields and topics, and it is in constant expansion both in the size Of information and in the size of users.

Ontology provides an expansive framework for the expression of acceptance of common Vocabulary in the field of knowledge, and includes the interpretive definitions of basic Concepts in the field and the relationships between them [8].At the moment, Ontology or Ontology is one of the techniques used to represent common knowledge in the Web. Theology is formally composed of entities, relationships, characteristics, situations, functions, Constraints, rules, and other reasoning procedures. The power of ontology lies in its ability to Explicitly represent knowledge (concepts, characteristics, and limitations); also the ability to Encode semantics such as meta_ data, rules, and other inference procedures; the ability to Allow a common understanding of formal knowledge through humans and software.

The term "significance" is a term used by both logistics and linguists to describe the study of Meaning. At the basic level, this field explores how concepts are written into language through a code system that facilitates communication between entities. Natural human language is a very complex way, however, especially when looking at the nature of the word, Depending on context, one word can function differently Denote various and different Concepts, while one concept, likewise, can be possible through multiple words [9][10][11][13][14].When We look at vital information, we find that the information has grown considerably in Molecular biology laboratories where it has been established.

Many of these labs have made their own data available for use within the web, and these data Are often unorganized or semi-structured.
This situation results in a slow change in the availability of information, although it varies, Until a number of service provider centers have emerged and are now in the process of Increasing their scope and often provide many differences in types of information.

There is still a lot of information that can be accessed in a way Soft and public. The use of "Electronic health records" is growing rapidly, resulting in a large amount of digital forms, And the understanding of mixed data has become increasingly complex for doctors, leading to Slow decision making process.

Data integration is a very difficult and difficult process because it requires a great deal of Programming effort to link data because interfaces are different because the medical data Structure requires a unified approach because of promising opportunities in WHO's Biomedical research and agencies [15][16][17][18].

Semantic Web approaches provide an extensive mix of technical standards that Have Successfully shared information on the World Wide Web, Some of the Most relevant Technology components of biomedical research include:
1) The global scope of knowledge that allows the use of URLs to introduce new Paths of Importance to biomedical domains [3] [4].
2) Semantic web languages "Recourses Description Framework" and "Web Ontology Language (RDF, OWL) offer the potential to simplify, Understand and manage complex and Rapidly evolving groups in relation to the Relationships that need to be recorded. This takes a lot of time. Diagnosis is a Diagnosis. The speed of understanding of data can save a lot of Time certain.

## 2. Methodology

The situation now allows us to make the inference process correct in the Diagnostic process, And to rely on how to formalize the solution to the problem Of a particular disease.

And for better understanding, we can present a model of one disease more than one Case and The results associated with each.
We will present the solution steps to the problem and using the (Pseudocode) Commands. To Illustrate how data is stored by the Resource Description Framework (RDF) and the correct Inference by Smart Ontology:
1) The inference analysis compares all stored data through the resource description Framework and compares with the facts contained in the database.
2) The symptoms are asked and identified by a doctor's question to patient.
3) Determining the type of disease after selecting the correct symptoms and excluding the symptoms that do not apply to the conditions.
4) After the disease has been identified, appropriate treatment is chosen according to age, weight and chronic diseases

## 3. Symptom

Set RDF Syntax
Get the RDF File From Library
Describe The Symptom "symptom 1"
Describe The Symptom "symptom 2"
Describe The Symptom "symptom 3"
Describe The Symptom "symptom 4 "
If Iterator Matching  Symptom 1& Symptom 2 & Symptom 3 & Symptom 4
Then Find The Disease Name

**Medicine**
Set RDF Syntax
Get The RDF file From Library

IF Patient Age Less Than 15 years old
And Patient Chronic Disease is Non
Then Put The Suitable Treatment
Set RDF Syntax
Get The RDF file From Library
IF Patient Age More  Than 15 years old
And Patient Chronic Disease is Exist
Then Put The Suitable Treatment

**An Ontological Definition**
We refer to the introduction of a summary of the elements of the previous Solution to Illustrate the idea of the ontology used to apply this study, which is Similar to one of the other Developed for other works It relates to the ontology Of medical applications to the storage of Diagnostic data.

The main difference between them and the previous Ontology are  use of a more Standardized Classification to identify categories and situations, in which case We use the Resource Description Framework (RDF) to implement them [5][6][7][8].

## 4. Result and Decoction

We review the results of patient data entry, which in turn presents the expected disease According to the symptoms of the disease we have introduced
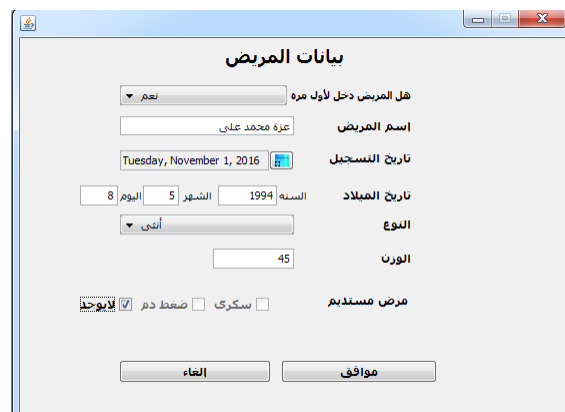


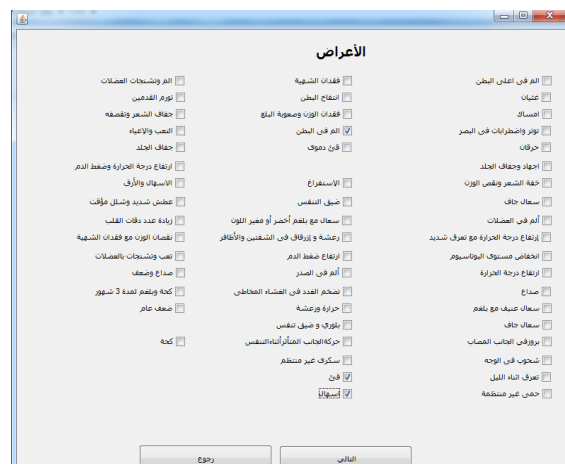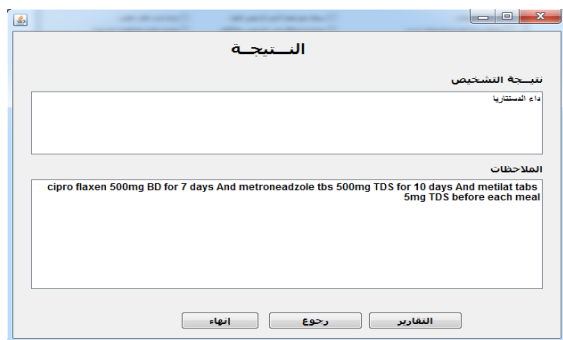**Figure 1:** Shows the patient data entry screen



**Figure 2:** Shows the screen selection of symptoms

**Figure 3:** Shows the expected disease screen according to the choice of symptoms and treatment by age, weight and chronic disease



**Figure 4:** Reports screen (Roche)

1) Proved that it is not possible to make a decision for a particular type of disease, unless the Symptoms are completed, even if the state of similarity in the symptoms are eliminated, the Symptoms are not identical until the exact type of disease is determined in a smarter way
2) The application of semantic web technologies in the diagnosis of internal diseases has Achieved many tasks, and there are many enhanced processes have been developed on the System, and this leads to the speed of the doctor's decision on the correct diagnosis based on The treatment of similarities in the medical field or other
3) The web-based semantic technology can be a training program for ease of use, especially Since it works on computers with appropriate specifications.

The search method in the system is sensitive to vocabulary and the primary keywords often Get the results we want; in these cases the relevant documents use different terms from the Original query, which is satisfactory because semantically similar queries must return similar Results and hence can Measurement of Accuracy and Potential Error This is the difference in Our study compared to previous relevant work.

The way in which information is provided by the ontology is that in which the technical Coding of the user is hidden, and only information that means "human consumption" is Presented to learners and researchers who use the environment as an integral part.

## 5. Conclusion

In this paper we explained how we can represent vital information using Semantic web Technologies such as (RDF and OWL) and how we can add these Technologies to a system That relies on more features and describes Interoperability with greater flexibility and Accuracy.

Our work now on this project is focused on working through the (RDF) unit which will help Everyone with vital information from doctors and assistants to Make sound decisions in a Short time.

## 6. Acknowledgments

## References

[1] Charles, C.,Jeffery J (2017) . Use of Semantic in bio informatics. Department of Biomedical informatics. Asia University.
[2] Beber,M,E . (2015). Models of biological Regulation.
[3] Sztromwasser . (2014). Through put and robustness of bio informatics pipelines for genome. Scale data analysis .The university of Bergen, Department of Informatics.
[4] Ford, Heather, and Mark Graham. (2015). Semantic Cities: Coded Geopolitics and the Rise of the Semantic Web . University of South Wales, Faculty of Arts and Social Sciences.
[5] Gonzalez , Aliejandro Rodriguez , .et Al . (2009). Med finder .using Semantic web , web 2.Universidad Politecnica de Madrid , Departamento de languajes y sistemas informaticos .
[6] Motik , Boris , et Al . 2009. OWL2 web ontology language : structural Specification and functional . style syntax .W3C recommended . Oxford University.
[7] Abdelrahman, A.M.B. and Kayed, A. (2015) A Survey on Semantic Similarity Measures between Concepts in Health Domain. American Journal of Computational Mathematics, 5, 204 -214. Hoa A
[8] Hoa A. Nguyen. (Dec, 2006). "New Semantic Similarity Techniques of Concepts Applied in the Biomedical Domain and Word Net" Master Thesis
[9] Prashish Rajbhandari , Rishi Gosai, Rabi C Shah. Semantic Web In Medical Information Systems, Indian Institute of Information Technology,2012.
[10] Prabath Chaminda Abeysiriwardana , Saluka R. Kodituwakku . OntoLogy Based Information Extraction For Disease Intelligence , University of Peradeniya , Sri lanka, 2012 .
[11] Hsien-T seng W ang , Abdullah Uz T ansel . Composite Ontology -Based Medical Diagnosis Decision Support

System Framework , The City University of New York ,2013.

[12] Berners-Lee, T., Hendler, J., & Lassila, O. ( 2014). The Semantic Web. Scientific American, Available at: http://www.cs.umd.edu/~golbeck/LBSC690/SemanticWeb.html

[13] Berners-Lee, T. ( 2014)Web Services: Program Integration across Application and Organization Boundaries. Available at: http://www.w3.org/DesignIssues/WebServices.html

[14] Breitman, K. K., Casanova, M. A., & Truszkowski, W.(2007). Semantic Web: concepts, technologies and applications. New York: Springer

[15] Alejandro Rodríguez-González ,Jose Emilio Labra-Gayo&Ricardo Colomo-Palacios, Miguel A.( 2011) Mayer&Juan Miguel Gómez-Berbís ,Angel García-Crespo . Using Semantics and Description Logics to Support Aided Clinical Diagnosis.

[16] Abey siriwardana, et al, (2012) Ontology Based Information Extraction For Disease Intelligence . A unit of white globe publication.

[17] Hsein.T seng wang, Abdallah Uz tansel, (2013). Composite Ontology-Based Medical Diagnosis Decision Support system Framework. The city university of new york.

[18] Angel Garcia crespo , et al.( 2003). Ontology-driven differential diagnosis based on logical inference and probabilistic refinements. Universidad carlos III demadrid