

A Study on use of Semantic Web for Construct Ontology on Books Domain

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ABSTRACT

The purpose of this project is to construct ontology on books domain. The ontology which is constructed can be augmented and implement in search engine which will facilitate the users to search and find the relevant information related to books domain from the ontology and also represent the information in form of graphs. Ontology construction is very useful for various purposes such as information gathering, information retrieval, browsing and navigational purposes. It is used in various applications such as e-commerce, biomedical, engineering & sciences, etc. There are many tools available for ontology construction/ editing like tools such as Neon, Jena, Protégé, and Gate etc.

1. INTRODUCTION

The concept of semantic web is proposed by Tim Berner's Lee for making the machine – machine communication possible. Semantic web proposes a lot of new techniques for doing those common things for which people have less time like making appointments, booking air and rail tickets through the internet with the help of the intelligent agents. Semantic web is still a new concept of the internet and still in its primary stage. The underlying semantic web technologies are regularly improved, extended and modified, and many other tools and other applications are in the process of development.

2. LITERATURE REVIEW

1) Taras Lendyuk et. al., "Ontology Application in Context of Mastering the Knowledge for Students", 2018 Author proposed the e-learning management system using ontology. A new approach in ontology application to use fuzzy method like trapezoidal function to context linking, input variables, and some other functions in owl language. Protégé is used with Mat-Lab to implement this new approach.

2) G.Suganya et. al., "Ontology Based Information Extraction - A Review", 2018 Information extraction is a tedious task. From, last 10 years the concept of ontology is becoming popular for information extraction. The author present various technique to extract information using ontology and associated tools for them. Author mainly focused on the three strategies of ontology construction named as manual, semiautomatic, automatic.

3) Benlaharache Keltoum et. al., "Towards a Reference Ontology in Islamic Finance and Banking", 2018 Ontology on Islamic finance and banking is constructed using Protégé and neon methodology. Also expands the SPARQL query in owl language.

4) Apon Sahaet et. al., "Mining Semantic Web Based Ontological Data", 2018 Presented the mining of ontological data in semantic web using different methods and merging of sematic data available on different resources like DBpedia, ontobee.org. Also discussed the mining algorithm using pattern recognition, clustering using WEKA and various other available algorithms.

5) Abeer Abdulaziz Alsanad et. al., "A Domain Ontology for Software Requirements Change Management in Global Software Development Environment", 2019 Ontology plays the key role in semantic web. Software change management can be done by ontology in global development industry. It helps to reduce the efforts and cost for the project.

3. TOOLS DESCRIPTION

For constructing ontology, we require java and also require ontology editing or creating tool. There are various tools available in market for construction ontology such as Protege, Jena, Neon, Text2Onto, Swoop, Top braid, etc. For constructing ontology on book domain, We have used jdk1.8 and Protégé tool. Some of the main steps are as follows:-

- 1 Java
- 2 Protege
- 3 Graphviz
- 4 Installation of Java
- 5 Installation of Protégé

4. METHODOLOGY

Here, we constructed ontology for Books but these steps are general and can be used for any ontology. Constructing ontology in Protege is very easy and it is a fast method of creating ontology. Expansion of constructed ontology is also possible and is very easy and fast. Steps used for constructing Books ontology in Protege 5.5 is as under-

1. Gather the Books details
2. Identify the concepts and relationship between the concepts
3. Identify the properties and restrictions
4. Open Protege 5.5 and create classes in it
5. Define the object property and data property
6. Create the individuals
7. Set assertions for individuals
8. Check the consistency and save the ontology
9. Set Annotations for individuals

5. RESULTS

This chapter gives the result based on query, represents the information in form of graphs and also represents the complete detail of any topic related to university. Visualization of graph is only possible by using plug-in Graphviz. We used Graphviz 2.39.

OntoGraf Visualization- OntoGraf visualization is defined as representation of information in form of graphs. It is used to represent the relation between classes i.e. sub classes, super classes, equivalence classes, individuals, etc. We can expand any class and individual. We can hide any relationship. We can zoom in or zoom out the graph. We can represent the graph in grid form, spring form, vertical directed, horizontal directed, tree form, etc.

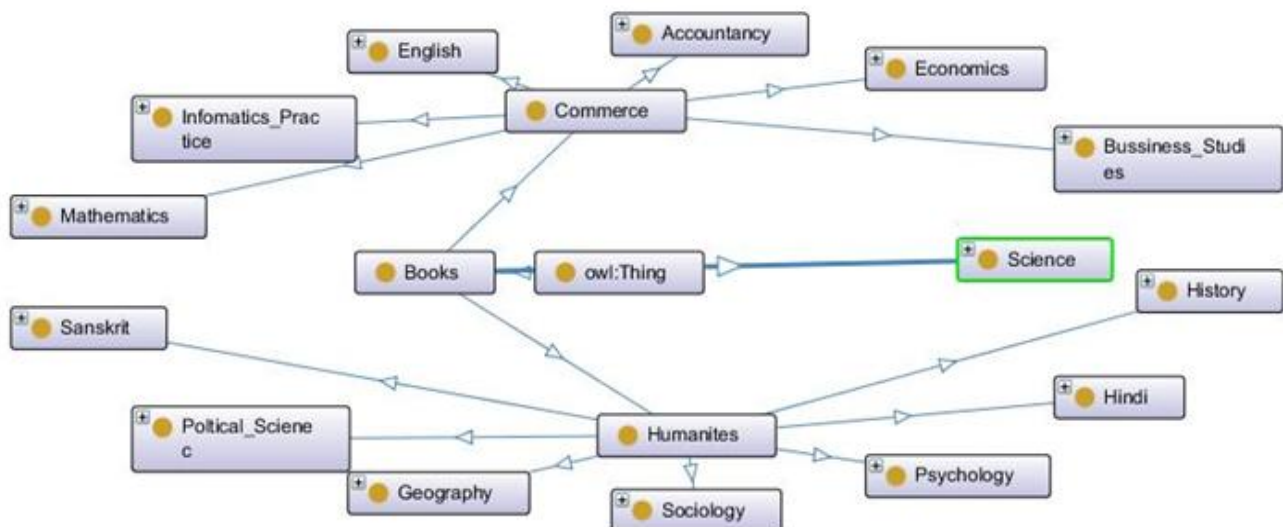


Figure 1:-OntoGraf Visualization of Books

OWL Viz Representation- OWLViz tab is used to represent the information in form of graphs. When information represents in form of graphs, it is better for users to understand.

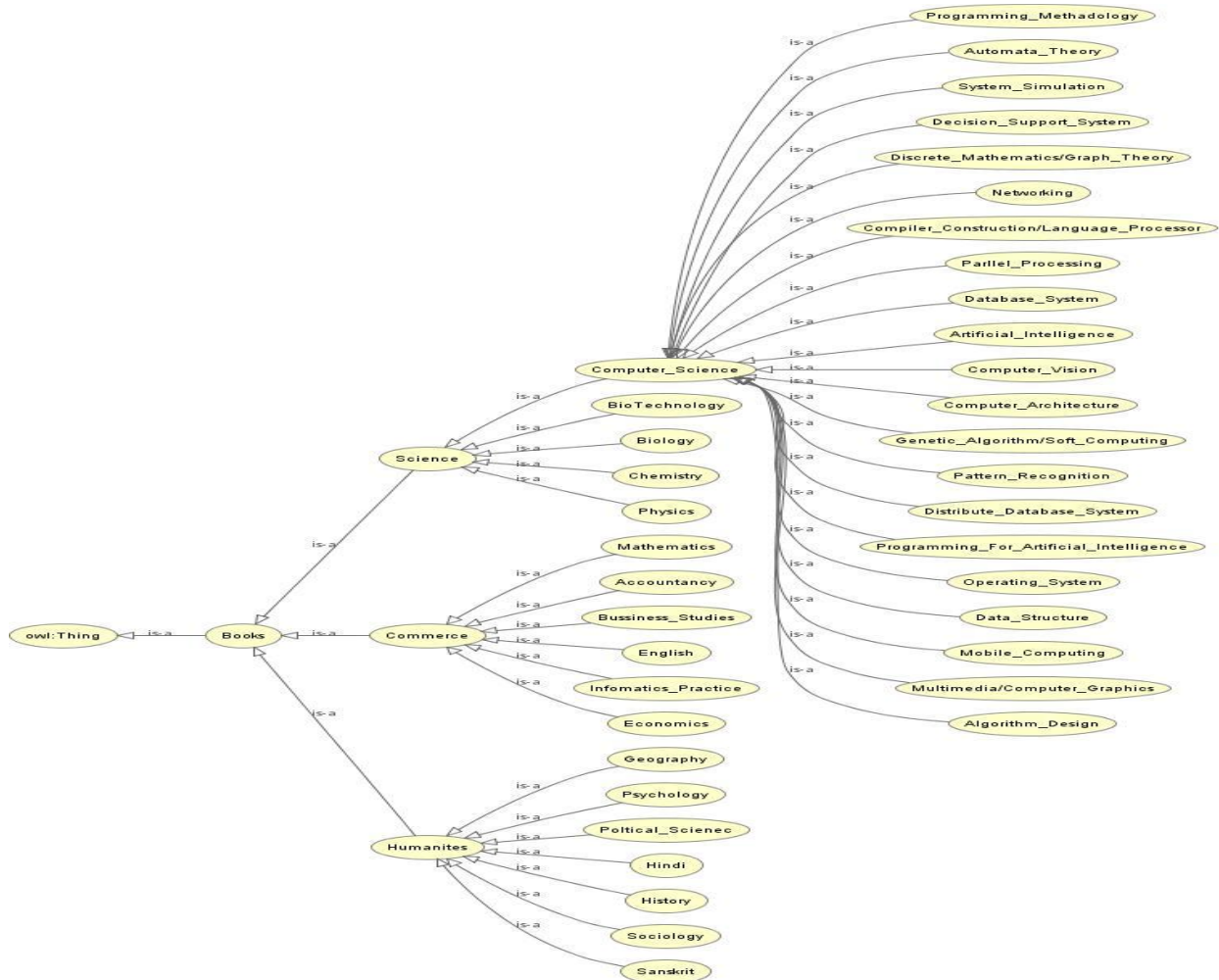


Figure 2:- OWLViz Representation of Books

Results based on query- When user wants to ask query, then he/she has to add query in DL query and when user clicks on execute button, then result will generate. In this dissertation, query is related to Books domain.

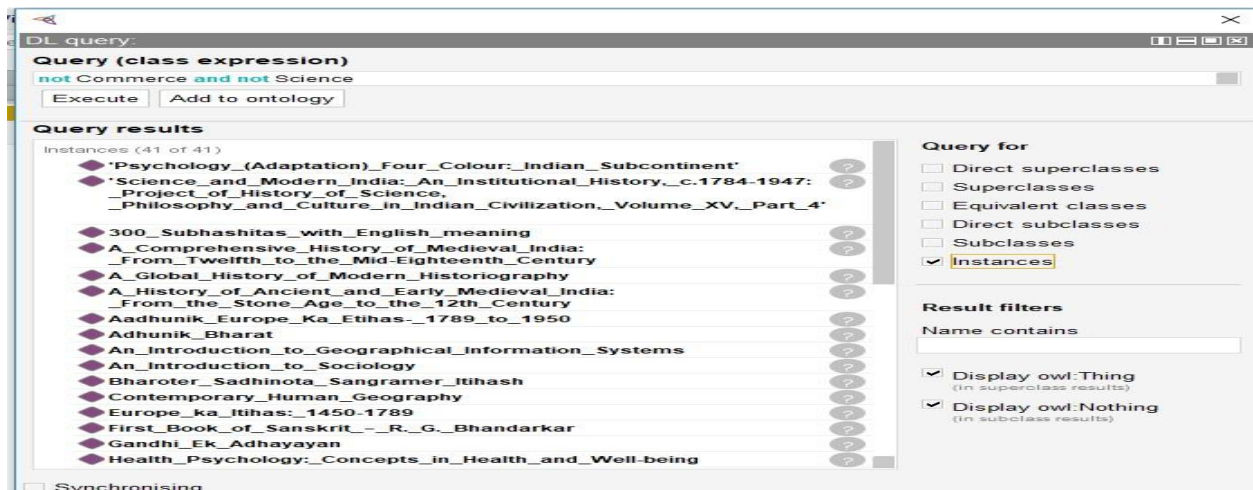


Figure 3:- shows query to know query about Books.

Results when search in search box- If anyone wants to know anything i.e. complete details of anything so we simply have to search in search box and then it shows the result.

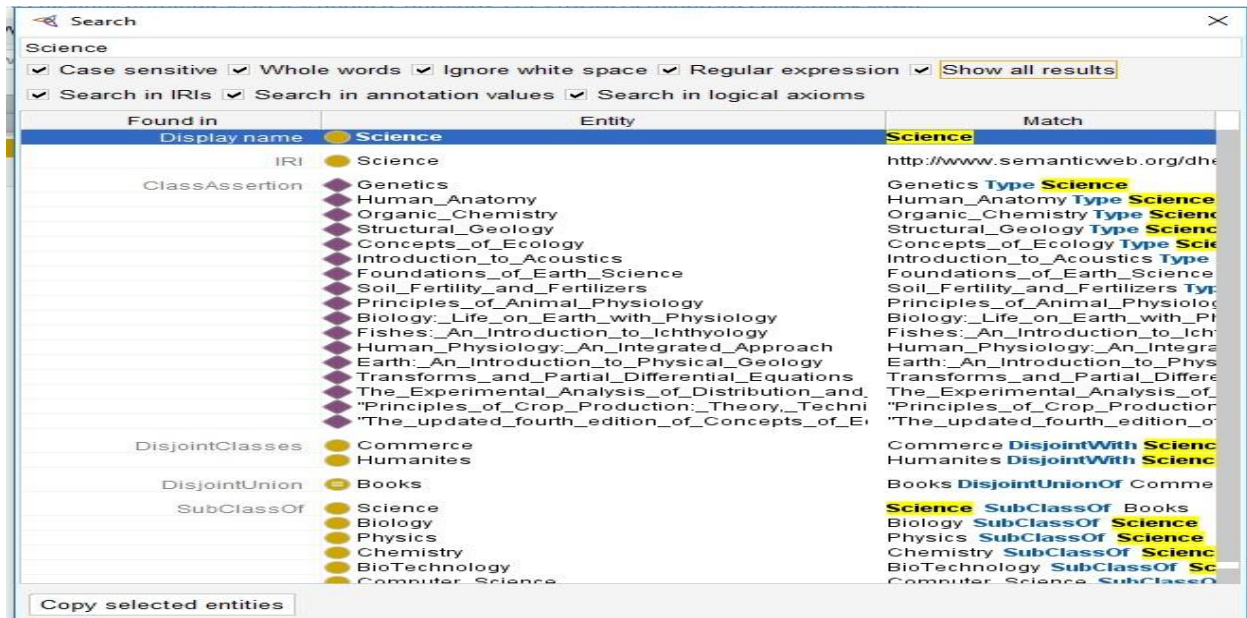


Figure 4:- Complete information of Science Books

CONCLUSION AND FUTURE SCOPE

Conclusion- Ontology construction is useful for various purposes such as information gathering, information retrieval, browsing and navigation. It is used in various applications such as e-commerce, biomedical, engineering, etc. There are many tools available for ontology construction/ editing tool such as Neon, Jena, Protégé, and Gate etc.

Semantic web has produced a great number of ontology learning methods and techniques. Here we use Protégé for constructing university ontology as it is very famous tool and gives efficient results. There are various advantages of ontology construction-

- It saves time as it is fast.
- It gives in page answer to query.
- It gives efficient results.
- It gives relevant information.
- It represents the information in graph form.
- Augment ontology is very easy.
- It is based on semantics.
- Anyone can create ontology in any language.
- User can ask query in any language.

From above results, we can conclude that semantic web has a great future and if it is implemented on internet, then it will definitely give more efficient results as it is based on semantics, it will save time of users, user can easy access to the information and will give in page answer to query instead of giving hyperlinks.

Future Scope

According to experts, semantic web has a great future and it is also known as future of web. Ontology is an important part of semantic web. Aim of semantic web is to add intelligence to the web i.e. to make the web more intelligent. Goal of semantic web is to focus more on intent based collective intelligence instead of keywords. With the help of semantic web, anyone can write the query in any language and get the result in any language. Semantic web is based on RDF instead of HTML. RDF proposes to create machine readable personal webpage.

In this project, we have just constructed ontology. This constructed ontology can be used in tasks such as query expansion and question answering and it can be used to extend other ontologies, etc. but this ontology is not verified by domain experts. Domain experts are the persons who are expert in their field and they have enough and sufficient knowledge to verify the concepts and relations which are used in ontology construction task. Ontology construction is very easy and this dissertation will guide to people who are novice in the ontology construction process. There are some aspects that need to be focused in future. First recommendation for the future work is to collect large data and various details on the topic. Second recommendation is to construct ontology on other tools such as Neon, Jena and so on and compare them. Third recommendation is to evaluate the performance and reliability of the constructed ontology by using recall, precision and F-measure.

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