AN ONTOLOGY FOR KNOWLEDGE EXPLORATION IN INDIAN SPICES

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Abstract- Ontology is a term used in philosophy and it has gained momentum in computer science after the advent of World Wide Web in particular after the vision of semantic web. Ontology characterizes concepts that are a part of the world. At present, ontology serves as a backbone of the Semantic Web. It provides vocabularies and formal conceptualization of the provided domain to facilitate information exchange and sharing. Ontology is connected to grant learning in different fields of Computer Science. Numerous Ontologies are developed which are based on different areas like farming, science, pharmaceutical, material science, chemistry, mathematics and so forth. The Ontology in Indian Spices domain is not developed so far and even the domain is not investigated in detail. This paper proposes the Ontology in Indian Spices domain on different points of view like family name, growing area, sorts of spices, Calorie esteem and so on. OWL format is utilized to build up the ontology, which can be effortlessly coordinated with some other semantic based applications. These are the primary sources to run the Semantic applications, to the client by investigating Domain knowledge.

Keywords- Ontology, Indian Spices, Semantic Web, Owl.

I. INTRODUCTION

In the early of 21st century, Berners-Lee, Hendler and Lassila published a article entitled "The semantic web: A new form of web content that is meaningful to computers will unleash a revolution of new possibilities".

Since then lot of work began, with the aim of getting the web to be a place that will facilitate a more meaningful search. Some researchers have opted to build a hybrid system where Retrieval process will be more efficiently done taking the advantage of semantic web. Ontologies play a vital role in semantic web and it facilitates a semantic search systems.Semantic web helps the systems for better understanding and makes the system work effectively. The huge data stored in the web is organized with the help of the semantic web. Ontology is one of the key factors of Semantic Web.

In the context of knowledge sharing, the term ontology means a *specification of a conceptualization*. That is, an ontology is a description (like a formal specification of a program) of the concepts and relationships that can exist for an agent or a community of agents. This definition is consistent with the usage of ontology as set-of-concept-definitions, but more general. And it is certainly a different sense of the word than its use in philosophy. Domain Ontology describes typically some deep knowledge about the domain. Semantic structure encodes implicit knowledge constraining the structure of a piece of a domain called

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as conceptualization. An Ontology defines the structure, i.e it is generally a consistent hypothesis that communicates the conceptualization expressly in some language. The Ontology can be categorized as OWL, RDFS, DAML+OIL. Once developed Ontology can be integrated and reused in all the applications, It helps in providing efficient results in retrieving web information[1]. The growth of Ontology[2] has made a huge impact in various domains to provide efficient results. The developmental growth had lead to many researches related to Domain Ontology. The evolution of this concept has introduced us to many new technologies about Domain Information retrieval.

Ontology for knowledge exploration in Indian Spices allows us to have the brief knowledge about the Indian spices Domain. This paper consist of following divisions in it 1) describes the related work in various domain Ontology. 2) Includes concepts, relations, and properties of Indian Spices Domain. 3) Implementation of Indian Spices Domain Ontology 4) Implementation and conclusion.

II.RELATED WORK

There are many works done in this area of domain ontology, these works on the ontology has given us brief knowledge about particular domain. Few works that we are aware are as follows TAO Teng-Yang and ZHAO Ming et al[3] developed ontology on vegetable E-commerce. The domain ontology Consists of vegetable spices and lot of other relevant information about vegetables. SAKTHI MURUGAN. R , P. SHANTHI BALA, AND DR. G. AGHILA[4] developed ontology on COMPUTER NETWORKS, which consists of 500+ concepts and lot more information about Computer networks and relevant concepts. Ruban S, KedarTendolkar, Austin Peter Rodrigues, Niriksha Shetty et al[5] developed ontology on Model for Domesticated Plants, which consists of cooking plants ornamental plants and commodities. SwathiRajasurya et al[6], in their work on university Domain [6] developed an ontology and used in an Semantic Retrieval application.

Ontology created to give domain information in a more extensive area like Indian Spices is extremely constrained. In spite of the fact that there are numerous ontologies in light of different fields, The ontology in view of Indian Spices is still not done, so the development of Indian spices ontology must be done and the relations between the concepts must be broken down appropriately with the end goal that there is a relationship utilized between the concepts, Thus making the correct ontology on Indian Spices domain.

III.INDIAN SPICES ONTOLOGY

A.   *Classification of Indian spices*

The Indian Spices ontology depicts the Classes, Object properties, Data properties, Annotation properties and connections of the spices. The Indian Spices domain ontology is isolated into classes, for example, Family name, Botanical name, part utilized, and region of growing and so forth. Every classification is sub separated into ideas under it (class, subclass, occasions, question and protest properties) with specific cases. The domain ontology demonstrates the classification and afterward characterizes a class, class property and the connection relating to these classes. Later the classes are loaded with the occasions, According to the related data investigated in the Indian spices Board Web, The Indian spices

domain ontology has Botanical Name, Family Name, Part utilized as zest and the district where spices is grown. Group of spices are arranged into 23 units, for example, Apiaceae, Araceae, Solanaceae, Zingiberaceae, Piperaceae and so on. The chart of the developed classes, Individuals, Object property and data property worked in protégé 5.0.0 is given in the fig 1.
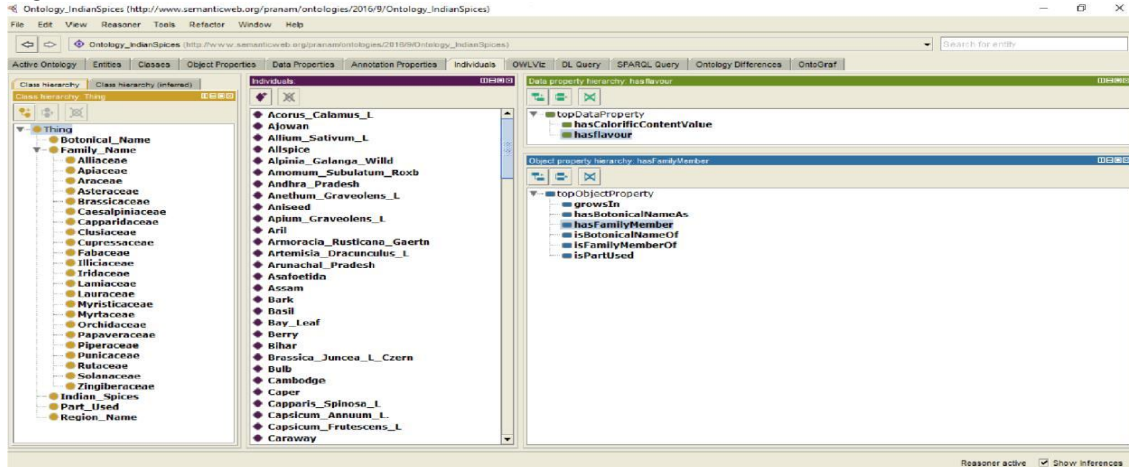

Figure 1-Indian spices domain ontology.

To finish the importance of the concepts relation are utilized. For instance, class Botonical_Name and

Indian_Spices uses the relation "isBotanicalNameOf" shown in fig 2.1,Indian_Spices and Region_Name uses the relation "growsIn". Figure 2.1 and 2.2 exhibits the bit of made ontology with relationship between the concepts.
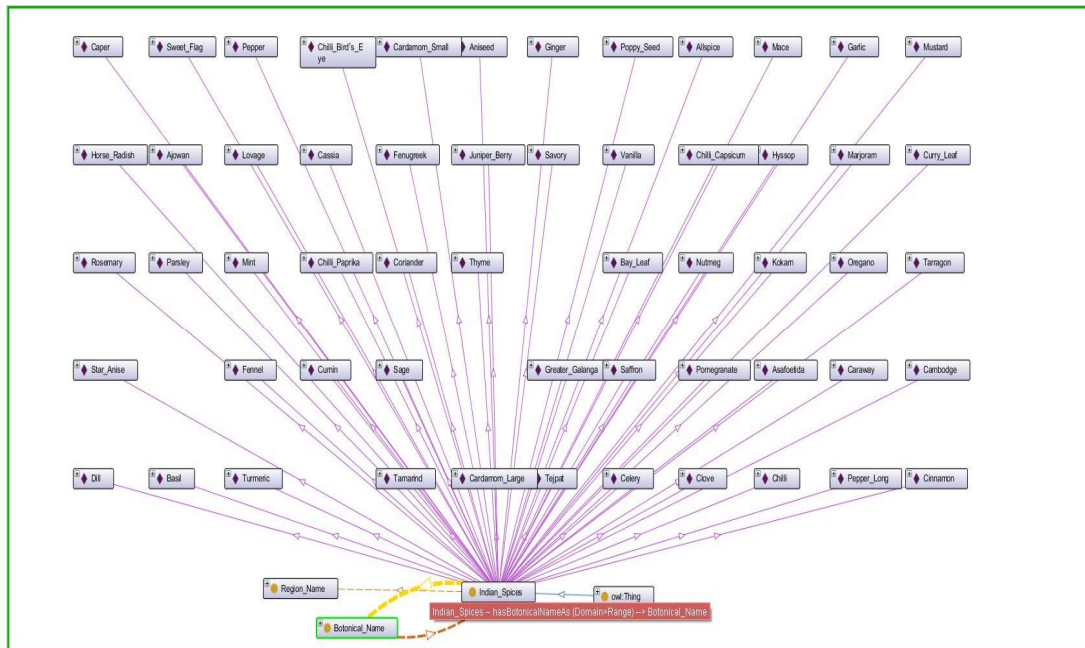
Figure 2.1-graph of relation "hasBotanicalName" between Indian spices and Botanical Name
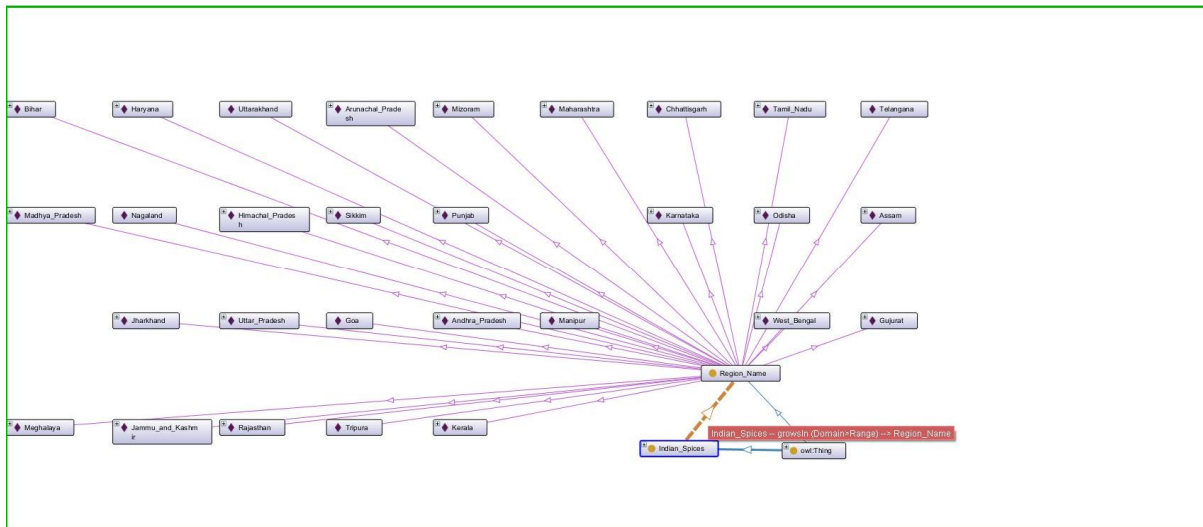
Figure 2.2 -graph of relation "growsIn" between Indian spices and Region Name

B.Ontology Development

The ontology development process is to first recognize the key concepts and after that, the relation between the concepts lastly arrange the concepts in light of their properties. The primary disadvantage of the current framework is the concepts not investigated in detail, and the relation between the ideas is not dissected, which gives open world semantics. In our ontology, we analysed about 151 instances with 5 classes and 23 sub-classes, 8(6-object properties, 2-data properties) relationships , which are related to classes through relationship.

Semantic explanations are accessible for the vast majority of the concepts, which make the client become acquainted with more insights about the concepts.
The key concept or sub-concepts are spoken to as Classes. We discovered key concepts in the area of Indian Spices and examined all the equal concept to discover the relation between the concepts. We concentrated on the properties of every idea to classifications all sub-concept under one fundamental concept and we found the aggregate number of concepts assembled under one principle concept in Table 1. The list sub concepts of Family name used during development of this ontology is shown in Table 2.

Table 1. Investigated concepts in Indian spices

Sl. No	Concepts	No. Sub-Concepts	No. Of Individuals
1	Botanical Name	-	54
2	Family Name	23	-
3	Indian Spices	-	56
4	Part Used	-	12
5	Region Name	-	29

Table 2. List of sub-concepts in Family Name

Sl.No	Family Names
1	Alliaceae
2	Apiaceae
3	Araceae
4	Asteraceae
5	Brassicaceae
6	Caesalpiniaceae
7	Capparidaceae
8	Clusiaceae
9	Cupressaceae
10	Fabaceae
11	Illiciaceae
12	Iridaceae

13	Lamiaceae
14	Lauraceae
15	Myristicaceae
16	Myrtaceae
17	Orchidaceae
18	Papaveraceae
19	Piperaceae
20	Punicaceae
21	Rutaceae
22	Solanaceae
23	Zingiberaceae

IV. IMPLEMENTATION

There are numerous tools like Protégé[8],OilEd[9] and KAON[10] , which are utilized to create Ontology. We utilized Protégé UI as a part of building up the Ontology for Indian spices. Intensive learn about the ideas are made before ordering it. There are some sub-concepts, which are to be ordered under various primary concepts whose perplexing relations can be effectively recovered through the created Ontology Figure 3 demonstrates the bit of code of made Ontology. This code is in XML organize where "www.w3.org/2002/07/owl#" has the pattern definition for Ontology improvement.

Figure 3 -Screenshot of part of developed Ontology

Figure 4 demonstrates the different concepts investigated with Indian spices in Protégé tool. The "Thing" is the framework class of the Protégé tool under which the client characterized classes are made.
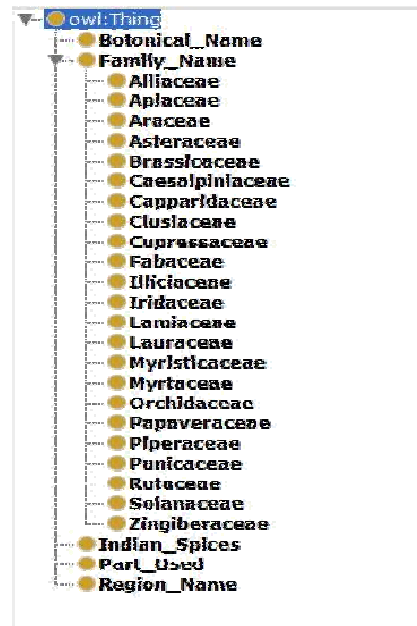

Figure 4 - Concepts investigated with Indian spices

Figure 5 demonstrates the perception of the created ontology. OntoGraf module has been utilized to demonstrate the representation. It recognizes the concepts from the classes in the OWL document and makes a relationship between those concepts which are connected by the SubClassOf tag as shown in figure 6.
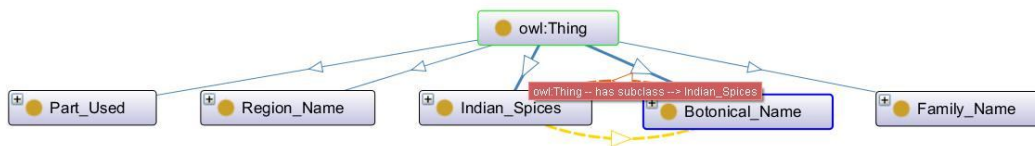

Figure 5 - Relationship between those concepts which are connected by the SubClassOf tag
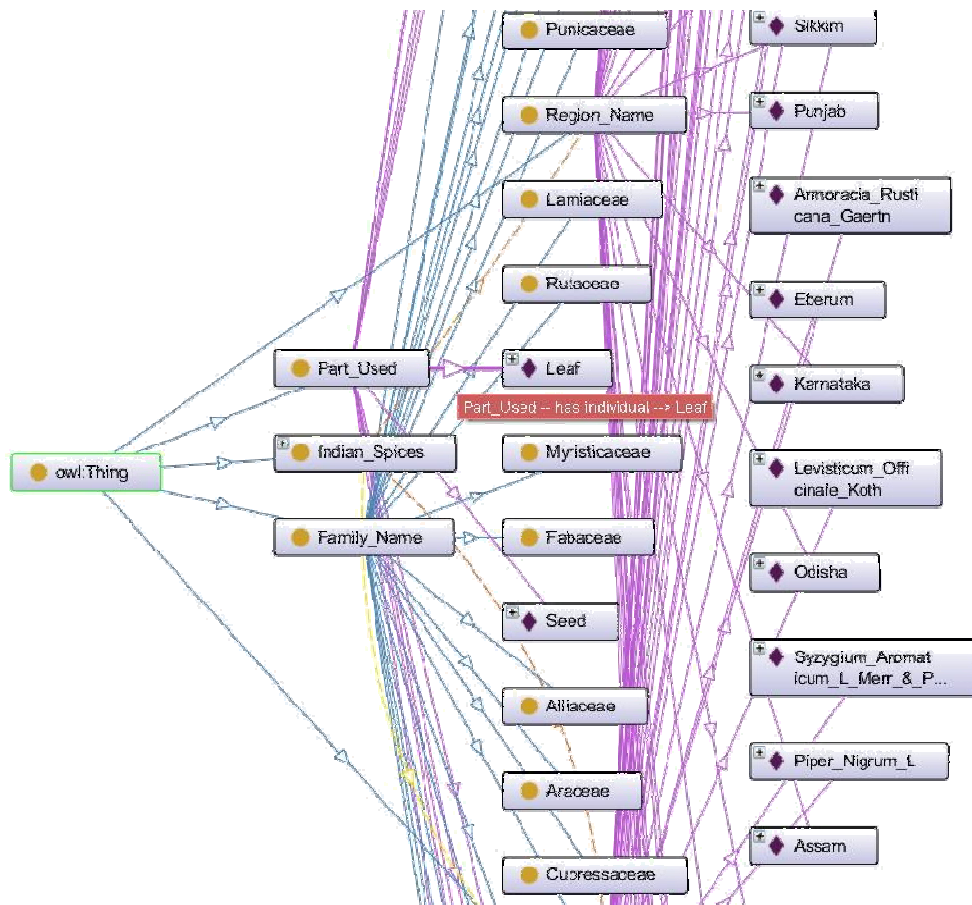
Figure 6- Perception of the created ontology

V. CONCLUSION

This paper reports the underlying phase of research which concentrates on the advancement of Ontology for the domain of Indian spices with 5 classes and 23 sub-classes, 8(6-object properties ,2-data properties) relationships , 151 instances which are related with classes through relationship. These are the primary sources to run the Semantic applications, to the user to investigate domain knowledge. The domain of Indian spices ontology that has been developed here can be used in the information retrieval system to improve the precision ratio of the context based search.

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