International Journal of Engineering Innovation & Research
Volume 1, Issue 6, ISSN: 2277 – 5668

Automatic and Intelligent Decision Making In Semantic Web

Shrutika Kulkarni
AISECT University Bhopal

Pradeep Chouskey
Deptt. of Computer Engineering
TIT, Bhopal
dr.pradeep.chouksey@gmail.com

Gajendra Vaiker
AISECT University Bhopal

***Abstract* – Concepts like "semantic computing" and "semantic search" refer to computational techniques that use knowledge representation and deep linkage into the referents of information tokens in language dictionaries, thesauri and ontology's) and in data resources (libraries, databases and web-based repositories). Perhaps the best-known sense is in the "semantic web", it is also reviews the technologies that make up the SW with the implications of these technologies Semantic Intelligence, Defined Semantic Intelligence exists at two levels; first it represents the immediate (local) ability to process data and information-based semantic patterns and rules in order to gain insight or add value. Secondly it represents on a larger (global) perspective the ability to harness shared knowledge in a more efficient, automated fashion. The second part comes later as more organizations make value enhanced information available in global communities.**

***Keywords* – Intelligent, Semantic Web, Semantic Computing, Computational.**

I. INTRODUCTION

The following inferences are drawn from this thesis:
1. The decision ontology approximately apprehends a decision rationale and the progression of making a decision.
2. By annotating a case study with several perspectives of semantic technologies.
3. The annotation and inferred visualizations to semantic technologies also comforts in probing a rationale or a constituent and in turn substituting useful reasoning ability [5].

Controlling data quality on the Semantic Web is a colossal undertaking, and the problem cannot be solved with a single work alone. The other focus is a framework that can utilize this kind of annotations. The basis for this framework is provided, along with a prototype implementation and qualitative analysis to justify the choices made. The widespread adoption of XML for exchanging information has led to an increased interest in developing XML vocabularies like TAML for use in exchanging tactical information. They are of special use in semiautomatic annotation where a human ensures the quality of the automatic annotations, as then the ensuring process can be prioritized to handle the most probable errors. The increase in data and decrease in the time available to process it has led to a widespread problem of information overload. The need for machine automation to better support the tasks of gathering, processing and analysing data from various sources is great. The SW provides a methodology for machine automation which can significantly enhance the information available for making decisions. Given below table provides an overview of the various applicable needs, capabilities and limitations of Semantic Web Rule Languages, which is worth for analysing the problem coming up and giving a decision oriented result.

II. SEMANTIC WEB

The semantic web approach of the [W3C] is layered.

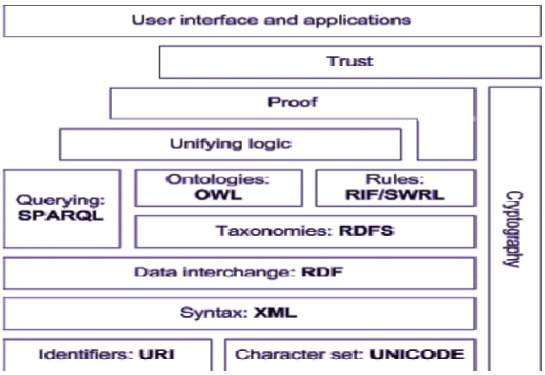

Fig.1. Layer in semantic web

Layer 1	XML provides a surface syntax for structured documents, but imposes no semantic constraints on the meaning of these documents
Layer 2	XML schema is a language for restricting the structure of XML documents
Layer 3	RDF is a data model for objects ("resources") and between them, provides a simple for this data model, and these data can be represented in an XML syntax
Layer 4	RDF Schema is a vocabulary for describing properties and classes of RDF resources,
Layer 5	OWL adds more vocabulary for describing properties and classes: others, relations between classes (dis-jointness), cardinality (e.g. "exactly one"), equality, richer typing of properties, characteristics of properties (asymmetry) and enumerated classes.

III. RDF (RESOURCE DESCRIPTION FRAMEWORK)

Resource Description Framework (RDF) is a simple language for expressing data models. As the name suggests, RDF refers to objects (resources) and their relationship and is based upon the idea of making statements about these objects. Resources are identied by URIs and statement are expressed through triples which

consist of a subject, a predicate and an object. In other words, a triple is a binary predicate in terms of logic. RDF (Resource Description Framework) [5] is a data format where data consists of resources, specific entities with identity such as objects, concepts or people, an words and numbers with no other intrinsic meaning in addition to their syntactic form. Resources are represented by globally unique identifiers, URIs, so an abstract entity can be encapsulated as a piece of data. By convention, URIs themselves are strings similar in appearance to web page addresses, URLs, though the two should not be confused with each other. Resources are linked to literals and other resources with statements represented as triples. Triples are simple three-part constructs that have a subject, a predicate and an object. Each triple in RDF is a statement saying that the subject has a certain property (predicate) with a certain value (object). A single triple is the smallest unit of information that can be expressed in RDF. A set of triples that interlink resources with each other forms an RDF graph. [5]. RDF is the language that provides the semantic foundation of the SW. RDF is used to make assertions about resources or add metadata to data. Assertions are statements that describe or point something out about a resource, and a resource is any object that can be described. Resources in RDF are identified by a unique Uniform Resource Identifier (URI) to avoid name conflicts. The RDF model creates a description or set of machine-interpretable statements about a resource. RDF is a W3Cspecification and does not require a license. RDF can be serialized in many formats including XML to guarantee broad interoperability. There occur several serialization formats for RDF, such as XML, N-Triples, N3, Turtle, etc. The following listing shows an example of a triple in a N3 notation.

RDFS stands for RDF Schema but has nothing to do with schemes in the context of XML document validation. RDFS is an extensible knowledge representation language. It extends RDF and provides basic elements for the description of Ontology's,

- resource discovery to provide better search engine capabilities
- describing content and content relationships
- content rating and describing privacy policies and privacy preferences of users and resources
- Expressing intellectual property rights for web resources.

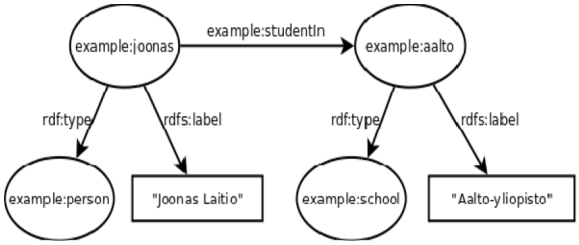

Fig.2. RDF graph

They connect total off our resources and two literals (by convention represented by ellipses and rectangles respectively) to each other in the above graph, the URIs for the resources are written in their shortened or prefixed form for brevity [7].

IV. ADVANTAGES

RDF is the language that converts semantic information about data into a machine understandable format. The triple format of RDF allows information to be written as Statements with explicit semantics.

Each RDF statement is similar to a Basic English sentence and is made up of a subject, predicate and object. The explicit semantics of the language ensure each statement has only one meaning or interpretation.

In XML, structure and order are important if a parser is expected to process the document; however, order does not matter in RDF. An RDF parser can process the statements or triples in any order and come up with the same graph representation.

XML utilizes complex nested structures which have to be represented in memory as a treelike structure in order for the data to be queried. XML Query (X Query) is the standard language used when querying XML instance documents. The explicit semantics of an RDF document often provides easier querying because humans typically understand the semantics of the data they are querying but may not necessarily know the structure of the data.

RDF effectively removes the requirement to know the structure of the data, thus RDF querying is easier, more efficient, and more powerful than XML querying.RDF/XML still maintains the interoperability advantages of XML since the RDF/XML format itself is well-formed XML. There are other serializations of RDF, but RDF/XML is the most widely used because it can be accepted and processed by any XML parser. RDF enhances the interoperability of XML by allowing vocabularies to be combined within a document. Combining vocabularies enables a resource to be described by properties from two different domains. Data from two different vocabularies can therefore be joined together without having to resolve structural differences between them (Powers, 2003).The amount of tactical data available in the armed forces is staggering and requires automation in order to be processed and queried quickly[12].

RDF provides a powerful mechanism for cataloguing, retrieving and querying data (Powers, 2003). The RDF data model provides increased automation for finding and querying data stored as RDF triples. TAML documents are also filled with data that can be archived as historical information, which may need to be queried from large stores of information [9].

V. DISADVANTAGES

Although RDF is powerful, it does not provide the best characteristics for all situations. RDF/XML increases the size of documents, thereby increasing overhead for exchanging information.

RDF/XML increases document complexity, making RDF/XML documents harder for a human user to

understand. Serializing data into RDF/XML increases the size of the document. The same information is represented in a machine-interpretable format, but the size of an RDF/XML document is almost double the size of the XML representation. TAMLExample.xml is a TAML instance document with a size of 12.4 kilobytes. When the same data contained in TAMLExample.xml is serialized as RDF/XML it becomes a 19.6 kilobyte file. The larger file size introduces overhead during message exchange over networks. RDF/XML adds a layer of complexity to TAML documents. The complexity makes it difficult for humans to browse and understand the information portrayed in an RDF/XML document.
Humans understand the hierarchical format of XML, so RDF/XML is a trade-off between human readability and machine readability.

XML may be the better choice for exchanging messages intended to be processed by both humans and machines, since RDF/XML increases automation at the expense of human readability.

VI. Conclusion

To the research questions posed in the introduction, the following conclusions can be made:
(i) The Semantic Web is about storing and combining pieces of information, even when they are not immediately useful for the task at hand.
(ii) The approach is implemented because of its versatility and semantic validity in annotation with hierarchic relations of elements.
(iv) Quality control can be used to give quality information in addition to the achieved results, should the annotator provide them.

References

[1] "XML and Semantic Web W3C Standards Timeline". 2012-02-04. http://www.dblab.ntua.gr/~bikakis/XML%20and%20Semantic%20Web%20W3C%20Standards%20Timeline-History.pdf.

[2] a b c "W3C Semantic Web Activity". World Wide Web Consortium (W3C). November 7, 2011. http://www.w3.org/2001/sw/. Retrieved November 26, 2011.

[3] a b Berners-Lee, Tim; James Hendler and Ora Lassila (May 17, 2001). "The SemanticWeb". ScientificAmericanMagazine. http://www.sciam.com/article.cfm?id=the-semantic-web&print=true. Retrieved March 26, 2008.

[4] Lee Feigenbaum (May 1, 2007). "The Semantic Web in Action". Scientific American. http://www.thefigtrees.net/lee/sw/sciam/semantic-web-in-action. Retrieved February 24, 2010.

[5] Berners-Lee, Tim (May 1, 2001). "The Semantic Web". Scientific American. http://www.sciam.com/article.cfm?articleID=00048144-10D2-1C70 84A9809EC588EF21. Retrieved March 13, 2008.

[6] Nigel Shadbolt, Wendy Hall, Tim Berners-Lee (2006). "The Semantic Web Revisited".IEEE IntelligentSystems. http://eprints.ecs.soton.ac.uk/12614/1/Semantic_Web_Revisted.pdf. Retrieved April 13, 2007.

[7] Allan M. Collins, A; M.R. Quillian (1969). "Retrieval time from semantic memory". Journal of verbal learning and verbal behaviour 8 (2): 240–247. DOI: PMID 615603750.

[8] Allan M. Collins, A; M. Ross Quillian (1970). "Does category size affect categorization time?" Journal of verbal learning and verbal behaviour 9 (4): 432–438.DOI: 10.1016/S0022-5371(70)80084-6.

[9] Allan M. Collins, Allan M.; Elizabeth F. Loftus (1975). "A spreading-activation theory of semantic processing". Psychological Review 82 (6): 407–428. DOI: 10.1037/0033-295X.82.6.407.

[10] a b Quillian, MR (1967). "Word concepts. A theory and simulation of some basic semantic capabilities". Behavioural Science 12 (5): 410-430.DOI: 10.1002/bs.3830120511. PMID 6059773.

[11] Greater elaboration on all of these advantages is provided in M. K. Bergman, 2009. "Advantages and Myths of RDF," AI3:::Adaptive Innovationblog, April 82009.See http://www.mkbergman.com/483/advantages-and-myths-of-rdf/.

[12] See M.K. Bergman, 2009. "'Structs': Naïve Data Formats and the ABox," AI3: Adaptivei innovation blog, January 22, 2009.Seehttp://www.mkbergman.com/471/structs-naive-data-formats-and-the-abox/.

[13] A considerable expansion on this theme is provided in M.K. Bergman, 2009. "'The Open World Assumption: Elephant in the Room," AI3:::Adaptive Innovation blog, December21,2009. See http://www.mkbergman.com/852/the-open-world-assumption-elephant-in-the-room/.

[14] P. Haumer: Eclipse process framework composer: Part 1 key concepts, 2007 http://www.eclipse.org/epf/general/EPFComposerOverviewPart1.pdf

[15] For a full expansion on this topic, see M.K. Bergman, 2011. "Ontology-driven Apps Using Generic Applications," AI3:::AdaptiveInnovation blog,March7,201.See http://www.mkbergman.com/948/ontology-driven-apps-using-generic-applications/.

[16] See M.K. Bergman, 2010. "'Pay as You Benefit': A New Enterprise IT Strategy," AI3: Adaptive Innovation blog, July12,2010.Seehttp://www.mkbergman.com/896/pay-as-you-benefit-a-new-enterprise-it-strategy/.