Abstract An Agent is a goal based entity having specific behaviour developed an envisaged system based on formal ontologies. B2B and web enterprises having increased interest in information sharing, processing, reuse of existing knowledge; where constraints on interaction in different contexts are a major obstacle. Agent Technology for web applications is facing continuous changes. Many web technologies have been developed and combined with web agents. Agent System exploits ontology to analyze domain knowledge. In this paper, systematic review of agent based communication has been presented and elaborates some technology pitfalls among agent based communication.

Keyboards: - Ontology, Agent System Ontology Matching, Ontology Knowledge Base, Rosetta Net

I. INTRODUCTION

The Semantic Web is a set of tools and frameworks for making, querying, and manipulating knowledge [1]. Nowadays, Semantic Web Services are an emerging area of research and currently technologies are still far from final product. XML provides syntactic tree structured document. Using OWL (Web Ontology Language) with XML, the level of XML is enhanced. There are various technologies need to be combined to provide description about every content on a web and the abundance of information available on the web is increasing rapidly which leads to the formulation of originating more desperate information that ultimately annoys users. To resolve that problem, Ontology playing a vital role in supporting the information sharing mechanism by using semantic interoperability of the web. Ontologies are intentional models of information contents with a well-defined logical basis which can be used for reasoning [2]. Domain ontology means to define own knowledge structure by user. Ontology matching is the matching of concepts describing the meaning of data in heterogeneous distributed information sources, such as database schemas which provides basic operations of semantic heterogeneity reconciliation [3]. It is widely used as a universal medium for information sharing among intelligent agents. Intelligent agent system is vital future of ontology.

Agent is an autonomous software entity that has the ability to do its job on behalf of others. Autonomous software is characterized by its ability to be executed by a single HTTP call that returns a satisfactory response. Therefore, the role of ontology matching is to find semantic correspondence among queries. The problem arises when two different agents use dissimilar technologies in dynamic and heterogeneous environment. As a result, knowledge exchange among agent communities is inconsistent. The next section discusses existing literature review on ontology matching and current status of deployment of agent system approach.

II. RELATED WORK

Researchers have proposed various approaches for Semantic Web and Agent technology. In this section an overview of some of the agent based techniques is presented.

Most of the academic research work, has so far been focused on the global public gains of adopting the software technology, to a large extent has neglected the industrial development and migrations needs to meet the software challenges. As a result, many organizations hesitate to become early adopters of these technologies and still view the semantically with some skepticism [4].

The authors [5] proposed an additional matching filters (degree of match) to obtain the semantic similarity between two ontological concepts for the service matchmaking. The paper [6] proposes a mechanism to match the semantic descriptions of Web Services adopting different ontological concepts. Efforts have been made in [7] [8] to obtain the semantic similarity between domain concepts through fuzzy based techniques. Singh et.al [9] proposed an intelligent and adaptive ontology mapping mechanism for providing an interface that facilitates agent communication in homogeneous as well as heterogeneous ontologies. Algargawy et.al [10] proposed clustering-based matching system for
large scale ontology matching. This cluster based matching algorithm works on breaking up large ontology into sub-ontology and craft outcome. However, this approach still under semantic research.

In Existing literature, Rosetta Net standards have gone a long way to ease the process of setting up and executing long term B2B relationships via the web, PIPs (Partner Interface Process) are used to define standard way of interacting companies to carry out a specified task. They define the aspects of a business process which are common to the two parties, but place no constraints on how the internal processes implement these common aspects [11].

The author [12] in paper studied semantic modeling and development tools which are based on ontology. These tools need to support the design and development of RDF/OWL technologies, as well as web services. However, because ontologies are meant to be not only for knowledge acquisition and structuring but also for reasoning upon this knowledge.

The next section discusses the ontology knowledge base.

III. MODELLING DOMAIN KNOWLEDGE

Ontologies have been developed within the knowledge Modelling research community [13] in order to facilitate knowledge sharing and reuse. At the time of modeling domain knowledge, ontologies provide greater expressiveness and support communication between people and heterogeneous environment with the help of autonomous techniques such as Ontology Matching, Nile technology, Rosetta Net and Intelligent agents. Nile System [14] is used to generate the syntactic and semantic constraints for exchanged document which used further constraint knowledge data base i.e. specific to the content. Ontology matching finds correspondence between semantically related entities of ontologies and determine the set of synonym concepts which are parallel in meaning but have different names or structures [3].

OWL (Web Ontology Language) is an extension of existing Ontologies languages. Before existence of OWL, RDF (Resource Description Language) is used which is an XML based standard from W3C for describing resources on the web [15].But OWL provides greater machine interpretability than RDF. When functionality of web agent is to be combined with Ontology then a Semantic Web Service is produced as a result; enabling machine interpretability of its capability, knowledge sharing, reuse of information among agents and web applications.

IV. TECHNOLOGY ISSUES

In literature there are few proposals presented which highlights the fact that the agent technology and ontology is widely used in different area of research, but some facts are presented in literature review which demands further study like:

A. For long term B2B relationship, Rosetta Net technology came which defines standard ways of interacting companies to carry out a specified task. But the problem is that to create a new Rosetta Net deal, it can take many months. Under Rosetta Net, PIPs (Partner Interface Process) are used but there are some constraints which appear in PIP specification can’t be represented in XML schema. Some syntactic constraints may be expressed, but in case of semantic constraints, additional technology requirement is raised.

B. Due to differences in ontologies used by different agents of different fields, knowledge sharing and evolution of new knowledge through this process is not possible. Every service has some parameters like Service Identification, Service Installation. After interacting different agents, these services accepted only limited support from current web services technology.

C. During Domain Modeling using Ontology, there is no logical relationship exists between parameter description in the profile and input output parameters.

D. Logical contradictions also available which will arise during development of large ontologies. There will be inconsistent results when the sources taken from ontologies are entirely different from one another.

E. Maintenance problems raised when constraints imposed on a single class is applied to whole document. This leads to the editing of the entire schema.

V. CONCLUSION

It has been concluded that ontologies provides more flexibility for information sharing among agents. This review paper highlights some issues among agent communication through ontology. The further research can be made to produce a formal mapping of XML to web ontology language and to allow new tools which will provide interaction by using semantic interoperability of the web with consideration of discussed issues.

REFERENCES


World Wide Web Consortium, "Resource Description Framework"