7.1 Conclusion

Present web is a scattered platform for dispersed presentations whereas Semantic Web is for dispersed knowledge. An important objective of Semantic Web is to hand over most of the important information to software agents. For any domain of concern, information can be captured using Ontology with the focus of merging machine readable information on the current human understandable web. Ontology building is the most intrinsic step and has been described in this research by developing Ontology (as prototype) in Computer Science domain. Critical role is played by Ontology acquisition and management process of knowledge and it helps in making storage of knowledge and its retrieval process more intelligent in a significant manner. If mechanical processing can be used for acquisition of information, then it’s achievable to use the already acquired information again i.e. reuse is possible. Relevant information retrieval can be done in a better way and with more efficient techniques when there is a provision of single interface for all the related information whether domain specific or comparative information (based on parameters selected by end users).

For IRSCSD system, open source tools were used for modeling Prototype in Computer Science domain. The mechanism developed for its designing and construction can be used for the development of any domain specific Ontology either at small scale or at large scale.

Provision of comfortable interaction mode is the basis for the progress of the Semantic Web, as it acts as a bridge for the whole system. To increase the usability of such systems by casual users, its logic-based framework needs to be made accessible for querying. QUEPY aims to fill the gap between users and the technology, which in my opinion is precisely what we should do in order to make people start using semantic technologies. In IRSCSD system, Jena API was used to provide interfacing between SPARQL query and RDF.

Ontology evaluation is an important open problem and there is no single method for evaluating Ontology which is good enough. The Choice of suitable approach for Ontology evaluation must focus on the purpose of evaluation, the application usage of
Ontology and the parameters on which Ontology is going to be evaluated. Purpose of evaluation and application context is an important factor which helps in decision for Ontology evaluation approach to be followed. Also, Comparison of distinct Ontologies is possible if they can be used in the similar type of applications. This research has integrated the concepts namely, Ontology development process, Ontology evaluation approaches and layers at which Ontology evaluation should be done. This integrated framework helps knowledge engineers to build accurate Ontology that serve best for desired applications. The increase in the use of Ontology has heightened the need for evaluating the Ontology. So, Ontology evaluation is an important task which has to be done for the wide adoption of Semantic Web and its applications. Certain aspects of the Ontology were described through OntoQA metrics rather than describing Ontology on the basis of its effectiveness or goodness in yes-no manner. The manner in which Ontology is built largely depends on the domain on which it is drafted.

For the wide adoption of Ontology in Semantic Web field and its application, evaluation of Ontology is an important concern that should be taken care of. Different end-users or different domains may have varied judgment regarding the parameters like goodness or validity for Ontology. Ontology evaluation is a complex and time-consuming process. It is very difficult, in fact, not possible for a single approach to work best for Ontology evaluation in all application contexts.

7.2 Analysis and Social Relevance

Provision of natural language interface to the casual users in acquiring required information from Ontology helps ordinary users as well as helps in expanding the influence of Semantic Web and Ontology. IRSCSD system overcomes the drawbacks of keyword-based searching and fetches required information instead of giving list of all the records containing related information. Through IRSCSD system, structured information can be easily browsed and queried at advance level with automatic assembling of results and output rendered straight at user-interface thus reducing the effort manually. This will provide help to users to access the information without technical knowledge of RDF.

The developed prototype Ontology in this research acts as a model for the future development of other Computer Science related Ontology, so that the management of
domain knowledge is more efficient. The potential of this kind of tool is clear, as it can provide an exact response to what the user is looking for, contrasting it against several distributed databases instead of independent warehouses of information like Bing or Google.

Inculcating knowledge and skills is not the only purpose of education. Rather it should focus on the development of intellectual and psychological sufficiency which will help people in learning continuously for whole life. Semantic Web is the emerging technology aiming at providing provision of information and services which are web based and also understandable, reusable by both humans and machines.

**7.3 Research Contribution**

In this thesis, methodologies and techniques for developing Semantic Web based systems is studied, with a particular focus on efficient domain specific information retrieval and knowledge management. Therefore, Semantic Web based framework has been designed for supporting retrieval of Computer Science domain specific information which this research called as IRSCSD system. The core part of the Semantic framework described in this thesis is Ontology (machine-readable vocabularies) development. Computer Science Ontology (considering Stacks and Queues topics for prototype) is developed which acts as a seed knowledge base for IRSCSD system. Translation procedure for natural language queries to SPARQL queries have been described which helps in making semantic web based systems more users friendly. Last, but not the least, the implemented prototype is evaluated in two contexts (qualitative as well as quantitative) motivated by the requirements of real users. Complete procedure and metrics used for evaluation are described and implemented on IRSCSD system.

**7.4 Future Scope**

This work can be further extended for the development and deployment of large and complex Ontology in Computer Science Domain. Various analytical issues related to Ontology can be further looked into. Through domain-independent data model i.e. RDF, interoperability can be provided between Semantic Web based applications. Adaptive E-learning can be merged with RDF as E-learning is associated with Semantic Web. Intelligent learning system can be considered as an intersection of adaptive web i.e. Semantic Web and adaptive education system. In future, limitation
of RDF for expressing binary relationships only can be enlarged to support many way relationships. Online data can be converted into RDF and related Ontology is updated in real time. Results of the query can be displayed in adaptive way according to user profile.

QUEPY is a nice initiative but work can be done for mapping complex natural language queries to languages like SPARQL. Mixing natural language processing and common pattern approaches can improve the amount of queries covered by each system separately.

This research can be enhanced by working on real time data. In that, information might be retrieved during run time after processing the user’s query. Domains involving huge information sources and interchange of data can be realized with the Semantic Web.