CHAPTER 7

CONCLUSION AND FUTURE ENHANCEMENTS

7.1 E-LEARNING STYLE

This research work mainly focuses on analysis of the cognitive behavior of the individuals. The research work performs a survey of nine different learning style models and tools. After a complete analysis, it is found that a broad research component is present in analyzing the learning style of the learners especially in an e-learning environment. It is also argued that, finding out the appropriate learning style of an individual and delivering the e-learning content accordingly will provide a greater impact on the learning methodology. The present work analyzes theoretically to obtain the learning styles of an individual from explicit and implicit information about the learners.

7.2 AGENT BASED PAIR PROGRAMMING

In this work, an intelligent agent-based model to study the impact of self-efficacy of learners is proposed. In addition, agents are used for effective teaching and learning methodologies.

7.2.1 Intelligent Agent Based Pair Programming

This research work focuses on the impact of self-efficacy of the learners which plays a key role in performance enhancement in e-learning environments. Self-efficacy has been addressed by identifying the learning
styles of the learners using Felder Silverman learning style model. In addition, the self-efficacy is also increased by making the learners to self learn the recommended e-contents available in mediawiki e-learning servers. It is observed that, learners learning in a Pair Programming strategy using peer-learning agents after self learning through e-contents which are recommended to them based on their learning styles to perform better than learners paired directly with peer-learning agents. Further works, in this direction involve the incorporation of varied teaching and learning formats namely documents, audio and video lectures.

7.2.2 Learners Evaluation in E-Learning Based on Pair Programming

Agents play a vital role for web applications like e-commerce, e-learning, decision making and resource management. This research work focuses on the performance evaluation of the learners learning with peer-learning agents in e-learning of ‘C’ programming language in e-learning environment. The performance evaluations of the learners in e-learning are compared with Bayesian Networks and Temporal Deontic-based Ontology Alignment techniques before and after learning with peer-learning agents. This work focused on analyzing the performance through two techniques namely Bayesian networks and ontology alignment and to compare their efficiency in terms of determining the learners performance. The experimental results compared the analysis of performances using questionnaires and short written documents produced by the learners. The graphical results also indicate that learning with peer-learning agents is better than self learning and increases knowledge retention and confidence of the learners. The current ongoing work aims at enhancing the performance of the learners through delivering the course content in the e-learning servers based on incorporating the learning styles of the learners.
7.3 ONTOLOGY CONSTRUCTION

In this work, new techniques have been proposed for anaphora resolution, ontology construction and ontology alignment techniques.

7.3.1 Enhanced Anaphora Resolution Algorithm

Ontology plays a vital role in clustering the web documents semantically to enhance the performance of many information extraction and information retrieval systems. Most of the systems given in the literature survey had the potential of constructing ontology based on synonyms, antonyms, hyponyms, anaphors and many more. The proposed work provides an enhanced pronominal anaphora resolution algorithm based on the results of Stanford Parser and Penn Treebank which works well on resolving anaphors existing among multiple sentences. The algorithm is tested against different data corpuses and is found to give better precision and recall values. The performance efficiency of the proposed algorithm in resolving intersentential anaphors is closer to 83% compared to the traditional algorithms.

7.3.2 Ontology Construction Using Computational Linguistics

Ontology plays a vital role in clustering the web documents semantically to enhance the performance of many information extraction and information retrieval systems. Section 2 details several methodologies for constructing the ontology automatically using Natural Language Processing. However, the systems discussed in the literature survey had the potential of constructing ontology based on synonyms, antonyms and hyponyms. Out of the several challenges existing, the problem of anaphora resolution gained importance from the early 1990’s. This work has addressed the sensitive issue of resolving anaphors. A complete framework is designed for parsing,
anaphora resolution, uncovering ontological relationships and visualizing the ontology. Studies on survey have found that there is an enormous research gap present in the field of anaphora resolution.

### 7.3.3 Deontic Logic Based Ontology Alignment Technique

In this research work, a new deontic logic based ontology alignment technique for e-learning of ‘C’ Programming Language has been proposed. The main advantage of this approach is that it evaluates the student performance based on both dominant and non-dominant words present in the documents produced by the learners. Moreover, domain experts’ advice is taken in the e-learning evaluation for learning ‘C’ programming language using e-contents. The rules applied in this work considered comparison based on equals, partial-equals and also conflicts which were not considered in the previous works. The performance accuracy in the evaluation of e-learning of learners obtained in this work is approximately 5% more than the existing systems and tools available in the current scenario.

### 7.4 FUTURE ENHANCEMENTS

The future work in the learning styles prediction system involves the implementation of a back propagation neural network algorithm in order to identify the learning style of a learner of an e-learning environment accurately. The current work in ontology construction provided a positive motivation and presents a wide research gap in the area of resolving cataphora in the raw text corpus which will be discussed in the future work. Moreover, the future work addresses the problem of resolving cataphora (twin domain of anaphora), where, the occurrence of the pronoun will be at an initial stage and the nouns (exact meaning of pronouns) shall be occurring later in a sentence. Future works in the direction of ontology alignment could be the provision of
spatio-temporal extensions to the deontic logic in order to enhance the capability of the semantic analysis techniques.