ABSTRACT

In any semantic solution, data could be annotated using ontologies. Ontologies are shared specifications and therefore the same ontologies can be used for the annotation of multiple data sources, like web pages, eXtensible Markup Language documents, relational databases and so on. Their shared terminologies enable a certain degree of interoperability between the data sources using the same ontologies. To enable such interoperation, mediation is required between the ontologies. Ontology mediation includes operations such as, ontology mapping, alignment, matching, merging and integration.

Algorithms for matching and merging of ontologies using directed graphs are developed and the theoretical aspects are dealt with. The fitness of the matched graph is elaborated as an evaluation metric.

The research study also demonstrates a new approach of ontology management using Ontology Abstract Machines. Ontology matching, merging using Ontology Abstract Machine is illustrated using health care domain.

The research work has proposed a framework for ontology matching and merging. The framework is validated by an innovative approach for developing Ontology based Question Bank System. Although other approaches have been discussed in the literature, the approach presented in this work is based on domain ontologies. It identifies important concepts and generates multiple choice questions about these concepts along with the distracters. Each question bank consists of sets of test items each of which consists of a question or stem. An ontological system integrated with an educational platform can support teachers in building effective question bank system and students are tested using generated questions. To this end the researcher has proposed an ontological approach to semantically enrich question bank generation. In particular the association of semantics to the question bank system can greatly improve their organization and management, both for students and teachers. The java ontology developed in this research work is used as a domain ontology for the implementation of the Ontology based Question Bank System.

Several approaches are proposed for the development of teaching ontologies. Ontology as a conceptual structure may work as a mind tool for effective teaching and a visual navigation interface to the learning objects. The research work includes an approach to the
practical ontology development and presented the designed ontology for teaching Java programming. This described an approach that can be applied to developing those teaching systems where general understanding is more important than factual details. Further the effectiveness of the learning process with the use of java ontology is justified with an experiment conducted in a class room situation.