CHAPTER 2

PROPOSED WEB RESOURCES
TRANSFORMATION ARCHITECTURE

This chapter presents the overall system design of the proposed architecture. It discusses about the different levels in the architecture and the components at each level. This chapter also discuss about the requirements considered and the working of those components.

2.1 OVERVIEW OF THE SYSTEM

Figure 2.1 gives the overall view of the system. Web resources like web pages, wiki pages, Web services and Unified Modeling Language which has Class diagram are all represented using HTML, authoring system, Web Services Description Language (WSDL) and XMI format respectively. These web resources need to be identified exactly and are to be searched meaningfully.

![Figure 2.1 Overview of the System](image-url)
The main objective of the semantic web is to describe things which can be understandable by the machines. Every resource in the web is unique. For example, same document can be available in the web in different locations, different formats and in different URLs. So, it is necessary to uniquely identify the web resources. Also the meaning of the resource which is uniquely identified should be understandable and the relationships between these resources are to be established for the machines to understand and link the resources. The Ontologies are used to define various classes and express relationships between them. This helps in structuring and adding semantics or meaning to the resources. E.g. Person may act as a student, a man, an employee, a father to his child and so on. Hence describing the web resources helps in the identification of the web resources uniquely and adds meaning to them.

The major contributions of this system are Web pages representation, Wiki pages representation, Inconsistency detection and resolution during UML model conversion, annotating Web services and discovery and ranking of Web services based on QoS requirements are designed and analysed.

2.2 PROPOSED WEB RESOURCE TRANSFORMATION ARCHITECTURE

The proposed web resource transformation architecture is given in Figure 2.2. The system is divided into three levels: Modeling level, Server level and User Level.
In the architecture, different web resources are transformed or annotated to include meaning to the resources which will improve the access of the resources. Whenever the users request a web page, wiki page or web services, it is to be searched in the server, fetched and displayed it to the user.

To fetch the exact or correct page or resource which matches the search query, the resources should be represented in such a way that it is understood by the machine, agent or system. To make the web resources understandable by the machine, available resources can be annotated and the annotated documents are stored in a repository. Since OWL plays a major role in Semantic Web, the standard OWL representation is used.
At the modeling level, the UML class diagram of a system is obtained in XMI format and is converted to OWL to create ontology or OWL repository. This improves reusability also. Since formal methods like Description logics are used to convert the class diagram, the inconsistency that occurs in the modeling phase is captured and resolved using the proposed algorithm. This proposed algorithm identifies inconsistencies like multiplicity constraint, cyclic inheritance, attribute type error etc. It tries to resolve the detected inconsistency using arity and impact parameters and calculates the rank. The results of minimum and random ranking methods are compared.

At the server level, the Web page and wiki page representation system are available and the converted or annotated pages are stored in the OWL/RDF repository. Web services are stored in the UDDI registry and these services can be annotated using SAWSDL. The annotated web services helps in speedy discovery of the services. The web services are generally discovered using function matching and input/output matching. Further, the proposed system, considers the service quality parameters also. The parameters used are cost, response time, throughput, availability, reliability. These preferences of these parameters are retrieved from the user and the services are ranked. This ranking is done by calculating grade points for each parameter. The total grade point is calculated by summing up all the calculated values. The web services that are discovered based on functional and I/O requirements are ranked using the overall grade points is acquired.

The subsequent chapters will describe the components and the proposed algorithm at each level in detail.