CHAPTER 1

INTRODUCTION

The World Wide Web has become a ubiquitous technology, as it is deeply intrinsic to several of our daily actions. It’s also a program for commercial enterprise, education, government and many other services that can be achieved from anywhere at any time. A powerful technology may be even more efficient if we enable access to it by any people, regardless of disabilities and other restraints. Making the Web more accessible is a very significant challenge to be addressed to empower a more inclusive “Information Society”. Web development process calls for several actions to create systems. As other software systems, Web systems development also involves tasks ranging from system analysis to software maintenance issues with other software systems, Web systems development also involves tasks ranging from system analysis to software maintenance issues. Auctions are usually won by a full range of people, such as stakeholders, architects, developers, testers, content producers and others.

The success in creating accessible Web systems depends on how people involved in Web development projects are aware of accessibility. It is very important that from the beginning, accessibility is viewed into account during the whole software development performance. Although many techniques have been built up to help on including accessibility issues in Web development (Freire et al. 2007), many Web systems remain still inaccessible. Many developers and people involved in the development process may be not mindful of accessibility matters and may not know how to use appropriate techniques to address them. Demand to know better how these people perceive accessibility, how accessible their Web pages are and why they develop pages accessible or not is crucial to offer novel approaches to boost Web accessibility.

From a technical level of view, Web accessibility corresponds to making possible for any user, using whatever user agent (software or hardware to view Web content) to understand and interact with a Web site, despite disabilities, languages or technological
constraints (Thatcher et al. 2002) (Hull 2004). The need for building accessible Web systems has been a challenge for many developers.

The dissemination of legislation regarding accessibility in several countries has also raised the interest for accessibility. The Section 508 (http://www.section508.gov) from the US Government, the Degree/Law 2010 and the e-MAG (electronic government accessibility model) (http://www.governoeletronico.gov.br/emag) from the Tamil Nadu government are examples of laws that discuss the demand for developing accessible governmental Web sites. Developers and designers carry a very important role in the development process, and are among the people who are most responsible for making accessible systems. Likewise, the growth of Web accessibility guidelines, such as the “Web Content Accessibility Guidelines” (WCAG) (http://www.w3.org/TR/WCAG10) (http://www.w3.org/TR/ATAG20.) from W3C, many other techniques have been suggested to facilitate the growth of accessible systems from system conception to maintenance (Freire et al. 2007).

These evidences show that there is even a gap between techniques been developed to help build accessible applications and its actual usage by people involved with Web development. The outcomes reported in this study and in other ones (Lazar et al. 2004), (Ferreira et al. 2007), (http://www.enabledweb.org/public results/survey results/), (Tangarife 2007), Tangarife and Mont’alvao (2006) show that many of these techniques have not been utilized in practice, not even well known techniques such as manual and automatic guideline review evaluation and code validation. Therefore, it is an important issue to investigate how people involved with Web development have perceived accessibility to identify pitfalls and opportunities to increase accessibility awareness. A more expert knowledge of how people consider accessibility in their paper and which techniques they apply (or not), as good as how they apply them may arise many interesting subjects to enhance Web accessibility.

Many proposals have approached accessibility as not merely a topic to be discussed merely during the creation and evaluation of Web systems, but also an issue to be effectively addressed in the whole Web development process. Therefore, accessibility should be seen in every stage of the software evolution. There are reports around the
utilization of techniques regarding accessibility during requirements elicitation (Sloan et al. 2006), architectural design (Plessers et al. 2005), navigational design (Ahmad et al. 2006) (Kouroupetroglou et al. 2006), interface design (Zajicek 2004), content, design (Ault et al. 2007; Filepp et al. 2007), software construction, evaluation, maintenance, measurement (Vigo et al. 2007) and training (Rosmaita 2006; Freire et al. 2007). The design of novel techniques to support Web accessibility during software development shows that accessibility should involve not just designers and developers, but also stakeholders, content creators, testers, coordinators and managers. Although many techniques have been suggested to facilitate the growth of accessible Web applications, many subjects have indicated that accessibility is still inadequate in many Web sites (Kane et al. 2007; Freire et al. 2008; Goette et al. 2006).

The World Wide Web provides resources of information, and the user population of the web is varied, including users of all ages, educational levels, and levels of computing experience (Shneiderman 2000). Many users of the web have various types of disabilities. These disabilities include sensory (e.g. Hearing and vision), motor (e.g. Limited use of hands) and cognitive (e.g. Learning disabilities) impairments. Those users with disabilities use various forms of assistive technology to allow them to browse web sites. Assistive technologies include hardware and software such as screen readers, voice recognition, alternative pointing devices, alternate keyboards, and refreshable Braille displays (Paciello 2000).

Users with disabilities can only use a web site if it is designed to be friendly with the various assistive technologies. A web site that is adequately flexible to be used by all of these assistive technologies is called an accessible website (Slatin and Rush 2003). An accessible web site is very similar to an accessible building. An accessible building offers restriction, upgrades, and elevators allow a person with disabilities to enter and navigate through the building with ease. An accessible web site offers related functionality.

The existing web based models that assist the design of e-learning sites for people with disability. Kelly and Phipps’s holistic model (2006) and Seale and Jane contextualised model (2006) is designed for people with disabilities in general and not specifically for those with vision impairment. Lazar et al. 2004, Web accessibility, integration model
(2004), does not take into account the importance of the social elements. Prougestaporn’s WAVIP model (2010), whilst it has generic guidelines, RuchiPernvattana and Scott Hollier VIVID model (2013), designed only for visually impaired people and not for multiple disabilities, these models are limited in its scope has been studied and analyzed for accessibility of websites with Achecker tool. This was based on principles of WCAG 2.0 guidelines predictable, understandable, operable and robust. The data were again evaluated by stakeholders according to WCAG2.0 analyzed with SPSS 16.0.

To achieve the goal of the world national e-health strategy that intends to produce a practical, standardized and secure platform for all concerned partners in supporting aid services, one has to specialize in the ability to integrate all distributed enterprises having access to the proper information within a specified period of time in the most economical ways. (Hess et al. 2004; Venkatesh et al. 2012), states that GIS, as a part of information systems, is often employed in generating geographical reports for effective analysis and decision-making.

Service Oriented Architecture (SOA) has radically modified the appliance integration landscape. SOA is often thought about as a business-centric approach for facultative integration. Visibility, interaction and result are the key ideas in any SOA implementation suggest (Nwe Ni Tun 2006). Visibility refers to the capability of these to ascertain those with a capacity to service the requirements.

As people in companies are dependent on technology nowadays, the requirement for a technique of integration of different applications into a unified set of business processes has emerged as a priority. Users are exacting that seamless bridges be designed to affix them. In effect, they're exacting that a way be found to bind these applications into one unified enterprise application. The event of Enterprise Application Integration (EAI), that permits several of the stovepipe applications that exist nowadays to share each process and knowledge, permits the U.S. to finally answer this demand suggest by Linthicum (1999).

Service Oriented Architecture (SOA) has gained quality in recent years, attributable to its facultative practicality or services to upgrade and extend existing software package
applications. SOA related degree beaux arts approach to create and deploy software package applications. SOA has fully developed as corporations endeavour to leverage their existing consumer base and to integrate their non-inheritable software package with their clients’ existing ERP system and conjointly it makes software package property capabilities terribly straightforward. Unlike EAI, no middleware is required as adoption of standards alter services to move directly said in Enterprise Application Integration and Service Oriented Architecture (2012). It conjointly enhances reusability capability of software packages, ensuing longer lifetime of existing assets. A flourishing SOA implementation makes it easier to customize and upgrade existing applications, thereby reducing the total value of possession. (Kester et al. 2012; Qusay H Mahmoud 2005) (Ren and Lyytinen 2008; Hass et al. 2004) suggest the adoption of service oriented architecture and web services give a fast resolution to resolve integration issues faced by organizations.

ArunChhatpar (2008), discussed about SOA is a progressive architectural style for creating and using business processes that are packaged as services. It provides a uniform means to offer, discover, interact with, and use capabilities to produce desired effects that are consistent with measurable preconditions and expectations. The main goal of these services is to expose the business functions with as much loose coupling as possible from the operating systems and programming languages upon which they are built said by ArunChhatpar (2008). This approach allows these services to be distributed over a network and to be combined and reused with different applications. Bosch group (2006), suggests SOA provides the technical platform with the Enterprise Service Bus (ESB) and a standardized functional specification of services with the Web Services Definition Language (WSDL).

The semantic web is providing an innovative access to information and communication for individuals with disabilities. Semantic web accessibility mainly suggests that persons with disabilities will use the network. Especially, semantic web accessibility suggests that individuals with disabilities will recognize, navigate, and moves to the network when accessing e-learning environments. Nganji (2012), suggests disability is an individual experience and two people with the same disability can have different experiences, it is necessary to consider and incorporate the common needs of disabled
students into e-learning environments in the design, development and testing phases. All efforts to build comprehensive systems are more strengthened with the contribution of disabled students throughout looking for their opinions as expressed. The researcher developed a model based on service oriented architecture to assess the accessibility of learning for disabled with websites based on semantic networks.

A search engine has become a primary tool to search the knowledge in internet. Without search engine, it's nearly impossible to search information in the internet. With the extraordinary growth of the internet, there are several search engines on the market to assist the users on finding their want, however search engines realize troublesome to supply helpful results. Looking out is one among the foremost used action on internet. There are 2 ways that of looking out in the internet: by using user queries or by using classes. If the users have keywords or phrase that describes the subject they have, then surely they use user’s query choice. If the users don’t have keywords or phrase then they must use the classes. If the user use user’s query he ought to sort the keyword or phrase and click on “search”. Then the results are going to be shown.

A semantic search engine stores semantic information concerning internet resources and is ready to resolve complicated queries. Semantic search integrates the technologies of Semantic internet and search engine to enhance the search results gained by current search engines. Semantic Search seeks to enhance search accuracy by understanding the searcher intent and also the contextual within the searchable database, on the internet to get a lot of relevant results. In general, processes of semantic search engine are: (1) The user query is interpreted, extracting the relevant ideas from the sentence, (2) set of ideas is employed to build a query that’s launched against the ontology, and (3) The results are presented to the user.

RDF could be a framework for representing information concerning resources in an exceedingly graph type. It was primarily supposed for representing metadata concerning WWW resources, like the title, author, and modification date of an online page; however it may be used for storing the other knowledge. It’s based mostly on triples subject-predicate-object that type graph of information. All knowledge within the semantic internet use RDF because the primary illustration language. The normative syntax for serializing
RDF is XML within the RDF/XML type. The OWL (Web Ontology Language) could be a language, offers a lot of constructs over RDFS. OWL relies on description logic. It’s syntactically embedded into RDF, it provides further standardized vocabulary. OWL comes in 3 species – OWL Lite for taxonomies and straightforward constrains, OWL DL for full description logic support, and OWL Full for max expressiveness and the syntactic freedom of RDF for querying RDF knowledge, RDFS and OWL ontologies, a Simple Protocol and RDF query Language (SPARQL) is employed. SPARQL is SQL-like language; it uses RDF triples and resources for each matching a part of the query and for returning the results of the query. Ontology may be outlined as a certain specification of a conceptualization. A conceptualization may be outlined as an intentional semantic structure; here Ontology could be a specification of this structure. Ontologies capture the structure of the domain. Ontology could be a body of data describing domain. After ontology is developed it's used, reused, related to alternative ontologies. One application uses several ontologies. The operations merge, mapping, alignment, refinement, unification, integration, inheritance is done on ontologies.

There are totally different reasonably ontologies are used
(a) Terminological ontologies where ideas are word senses and instances are words,
(b) Topic ontologies where ideas are the topics and instances are documented, and
(c) Data-model ontologies where ideas are tables in an exceedingly knowledge base and instances are knowledge records.

Ontology describes data concerning the domain in terms of ideas or vocabularies at intervals the domain and the relationships between them. Ontology is required to develop semantic search engine. Ontologies may be used for making semantically a lot of correct annotations relating to the domain data. With the assistance of ontologies, the users will specify the queries a lot of exactly and unambiguously, that ends up in high precision and recall rates. Through Ontology the metadata may be enriched semantically.

RDF is the main language of the Semantic internet, straightforward language that uses graphs to represent collections of statements. Nodes within the graph represent things, and the arrows represent relationships between the items they connect. RDF’s original purpose was to permit metadata to be hooked up to web content. RDF is to be used because the foundation for a variety of lot of powerful languages likes OWL. RDF
Additionally provides a way for publishing each human-readable and machine-process. The RDF Model and Syntax specification defines an abstract knowledge model. The model is abstract as a result of its outlined abstract mathematical structures like triples and sets.

![Diagram of RDF graph](image)

Figure 1.1 RDF graph

It's an information model solely, as a result of no formal semantics is given. It’s urged that RDF statements represent facts. RDF graph could also be represented by an information structure in laptop memory or tables in an exceedingly relational database. RDF provides a model for describing resources. Resources have properties or attributes. RDF defines a resource as any object that's uniquely identified by a Uniform Resource Identifier (URI). The properties related to resources are identified by property-types, and property-types have corresponding values. In RDF, values could also be atomic in nature (text strings, numbers, etc.) . A collection of those properties refers to constant resource.

RDF defines an easy, however powerful model for describing resources. A syntax representing this model is needed to store instances of this model into machine-readable files and to speak these instances among applications. RDF imposes formal structure of XML to support the consistent illustration of semantics.

RDF syntax used to represent the RDF model for storing the instances of the RDF model into machine readable files. It imposes formal structure of XML to support the illustration of semantics. Multiple communities use constant property-type to mean terribly various things. RDF stops this downside of using the XML namespace mechanism. XMLnamespaces give away for unambiguously identifying the semantics. RDF Schemas outline application-specific categories and properties and that they are used to declare vocabularies, the sets of semantics property-types outlined by a specific community. RDF
schemas outline the valid properties in an exceedingly given RDF description, is extending RDF vocabulary to permit describing taxonomies of categories and properties. It sets the domain and a variety of properties and relates the RDF categories and properties into taxonomies using the RDFS vocabulary. All resources may be divided into teams referred to as categories. Categories also are resources, so that they are identified by URLs and might be described using properties. The members of a category are instances of categories, that is stated using the rdf:type property. Category and a group of instances ought not to be constant. The set of instances is that the extension of the category, and 2 totally different categories could contain a constant set of instances.

A SWAM (Semantic Web Accessible Model) was developed as a universal web accessible platform for disabilities for evaluating the performance of disabled students using semantic websites for learning. This work aimed towards integration of information systems of schools across countries via a service bus. A centralized service bus was accustomed to facilitate the ability of applications across platforms and enhance communication at intervals in the school infrastructure enabling atmosphere for the brand new layer of abstractions to be accessories without modifying the complete system. A new model has been created with the help of SOA for disabled schools in integrated educational information system with semantic web services for speedy integration, resolution in determining the challenges faced throughout the integration of multiple incompatible applications and analysed with the same questionnaire. The result showed that the performance has been improved considerably.

KEEL (Knowledge Extraction Evolutionary Learning) is a software tool to create and use different Data Mining models containing a free code Java library of Evolutionary Learning Algorithms. The main features of KEEL tool (2010) contain pre-processing algorithms: transformation, discretization, instance selections and feature selections. It also contains a Knowledge Extraction Algorithms Library, supervised and unsupervised, remarking the incorporation of multiple evolutionary learning algorithms. It has a statistical analysis library to analyze algorithms. It contains a user-friendly interface, oriented to the analysis of algorithms MacQueen (1967). By using KEEL tool, the extent to which the knowledge is extracted was explored.