CHAPTER 2

PARAMETERS FOR EFFECTIVE UTILIZATION OF WEB 3.0

2.1 INTRODUCTION

Parameter identification and analysis is the baseline for any research area. In modeling either statistical or mathematical, to elucidate a system, parameter analysis is a tool. The initial stepping stone in parameter identification of Web 3.0 is the Web 3.0 domain analysis. Web 3.0, has been interpreted as a true communal medium, which is created and controlled by a community of similar interest hence internet as a communal medium. In Web 3.0 distinctions between professional, semiprofessional and consumers get blurred as it is a collective knowledge base.

In Web 3.0, the entire web is transformed into a database and the information seekers collect from the entire web and not from a single website. The search on Web 3.0 is more meaningful than the present interface. For example in the website www.wolframalpha.com the entire web is transformed into a structured data from which the user can input the query in natural language and it gives the result. For complex queries, input interpretation is generated using standardized phrases and results are produced. It is also capable of performing calculation on data from more than one source. The result is a logical output and not websites which may contain the result. A simple query “chisquare” gives the logical concise output about chisquare i.e. the statistical properties, degrees of freedom and examples. A complex query "How many years Jawaharlal Nehru was prime minister of India?" fetches the list of prime ministers and their timelines. It interprets “Jawaharlal Nehru” and yields the basic information, leadership position and timelines. The enhancement in Web 3.0
is an evolutionary path to artificial intelligence which contains reasoning software that must be based on description logic and intelligent agent.

Web search facility to provide personalized, on-demand, country-specific, category based was designed called Search Engine for South East Europe (SE4SEE). Based on the geographically distributed nature of the grid the pages from the web are retrieved. (Cambazoglu et al, 2006).

In Web 3.0 internet would transform into a series of 3D spaces. In Multimedia presentations, virtual look of any object from three different sides is simultaneously possible. A change in new version of web browser, OS, Graphics cards and the plug in has to be updated to make it work. A framework was designed to facilitate multimedia for web browsers, heads-up displays, 3D authoring and remote play. (OleIvar, 2010).

Usage of web in clothing, appliances and automobiles is potential in Web 3.0. To facilitate interoperability among pervasive networked systems an Adaptable Service Component Interface Framework to construct a pervasive computing environment is designed. This will take care of interoperability and manageability requirements of web services based applications. (Vasanthi et al, 2012)

The definition of web3.0 is proposed to extend to

- Ubiquitous connectivity
- Network computing
- Open identity
- Intelligent web
- Distributed databases
- Intelligent applications
2.2 WEB 3.0

The main objectives of Web 3.0 are seeking information, seeking validation and seeking entertainment which is the enhancement of the Web 2.0 environment. The technologies which rules Web 3.0 are Artificial intelligent, Automated reasoning, Cognitive architecture, Composite applications, Distributed computing, Knowledge representation, Ontology, Scalable vector graphics, semantic web, Semantic WiKi, Software agents.

The PCF Personal Collaborative Framework is utilized within Organizations will not only collect and render web pages but also used to publish, collaborate, search the web and having an integrated editor for posting news and comments and to maintain photos. The identity of the individual is also managed in the network. (Tapiador, 2006).

Web 1.0 was termed as a web of cognition and Web 2.0 was termed as a web of human communication and Web 3.0 was termed as a web of cooperation in which the web is used for describing and characterizing the social dynamics and information processes that are part of the internet. The notions on Web 2.0 and social software was modeled to improve communication and cooperation. (Fuchs et al, 2010), (Kolbitsch and Maurer, 2006), (Tapscott and Williams, 2006), (Rollett et al, 2007), (Schmidt, 2007) (Giddens, 1984).

An analysis on the social networking environment to provide support in the areas of social, practical and academic and its impact on the transition into Higher Education was done based on a case study. (Knight and Rochon, 2012) (Guth and Helm, 2010).

A model of E-learning Management System using semantic web and a namespace to represent a university on semantic web where course syllabus, teaching
methods, learning activities and learning styles were included. It provides a hierarchical content structure and semantic relationship between concepts that can provide related useful information for searching and sequencing learning resources in web-based E-learning systems. (Sharmin Rashid et al, 2012) (Hai Doan, 2003) (Gulli and Signorini, 2005) (Lee W Lacy, 2004), (Rokou, 2004), (Adelsberger, 2003) (Quemanda and Simon, 2003) (Sure et al, 2002).

Innovative design is seen as the core competitiveness of Agile Virtual Enterprise which need the knowledge engineering method urgently. However, the current human readable web can not meet the demands of complexity, flexibility and real-time in innovative design. Until the emergence of Web 3.0, it is possible for an intelligent software agent based on machine accessible Service Oriented Architecture services which can be combined to higher levels of enterprise web services. Ontology for innovative design which includes design, process, skill, application domain and organization sub ontology and the OWL description of the domain. Protégé tools are used to set up the design service web platform based on J2EE with Protégé-OWL API, and gave a practical case in the domain of environmental protection device manufacturing. (Pan et al, 2009) (Pan and Zheng, 2007) (Yuhua Li et al, 2003) (Ikuijro, 1995) (Feng, 2007).

Web 3.0 technologies are used to create an open architecture in which information is shared among communities, learn about the people's interests, nature, behaviors, related objects and friends, to reorganize and mix the existing data to produce a productive information and to find the exact information user needs based on their interests and location.
2.3 ISSUES IN WEB 3.0

Web 3.0 though is artificially intelligent and semantic, has some issues which have to be considered before design and development of Web 3.0 applications

a. Uncontrolled web leads to failure of innovative development.

b. Usage of large 3D in web3.0 needs virtualized resources. Virtualization of resources completely is expensive.

c. Representational State Transfer (REST) is hard to understand.

d. To trust an identity, in Web 3.0 certificates is used. The browsers may not identify certificates other than root certificates.

e. SPARQL protocol services give poor results under constrained query and complex queries.

In spite of the above limitations Web 3.0 is unique for the ideas for social networking, ontology and standards, protocols, rules. Since Web 2.0 does not pave way for communal medium, personalized search, semantic web and find the exact needed, it lead to the next emerging level Web 3.0.

2.4 PARAMETERS ADOPTED IN WEB 3.0

a. Time to produce results

Response time in Web 2.0 can be generally categorized into three viz 0.1 second, 1 second, 10 seconds. If the response time of a website is 0.1 second then it appears that the user is directly manipulating the objects of the user interface. If the response time of a website is 0.2 second to 1 second it appears to the user that the command is being worked. If the response time is 10 seconds then it makes the user to give attention on the specific task. Users can interrupt during the operation. The
response time of a website is a metric of a Web 3.0 user and the response time expected from the user group is captured.

b. Usability

The interface of Web 3.0 is a mash up whereas in Web 2.0 the interface emphasizes on interface elements on demand, specialized controls and context sensitive navigation. The highlights of Web 2.0 interface elements have to be aggregated with the mash up in which the web site is dynamic and updated from multiple web site sources.

c. Privacy

A privacy document on a website is one which clearly mentions the kind of information collected from the user in that website and what the website owners do with that information. A privacy policy has to be specified in the website for two main reasons viz a) Create a better electronic environment on the internet b) Laws and legislation may pertain to the business. Further cookies have to be explained to the visitor like what are cookies, information collected by the cookies and how they will be manipulated, how cookies can be accepted or rejected and assure the users of no harmful consequences of the information collected. The expected level of privacy policies of the user group are captured.

d. Site loyalty

Site loyalty ensures the repeated visits of a user to a particular web site, provided the user primarily depends on many criteria like the ease of using the website, information provided by the website is trusted, the website is frequently updated and the customer can be a part of an open forum in website public interaction.
etc. The expected level of loyalty in transactions and information provided in the websites by the user groups are captured.

e. **Effort**

The time taken by the user group to learn the navigation and usage of a website is called as effort of the user. Less Effort has direct and indirect positive impacts on site revisits, loyalty and reach of a website. The expected time taken by the user group to learn the website in Web 3.0 is captured.

f. **Fault tolerance**

Fault tolerance is a crucial property which defines the operations of a system when one or more of its components fail to work. Initial systems were not fault tolerant as small failure will lead to the crash of the entire system. Web sites are vulnerable to failures and even may not be available due to a crash. The Expected fault tolerance in both interface and hardware of Web 3.0 are captured.

g. **Omnipresent**

The earlier websites are available only on computers and later moved on to mobiles. The evolution of availability of website is moving in the direction of omnipresent in which it is available everywhere in clothing, appliances, doors and windows. The requirement of being omnipresent by the user groups are captured.

h. **Downloading**

Downloading is more exciting activity to the information and knowledge seekers when the accurate data is located. Present downloading time scenario depends on traffic, bandwidth and the size of the file to be downloaded. In Web3.0, standardization of downloading is projected and downloading in Nano seconds required or not by user groups is captured.
i. **Uploading**

Content uploading is a frequent activity of a professional knowledge disseminator and the uploading process also depends on the traffic, bandwidth and size of the file to be uploaded. In Web 3.0 standardization for uploading is projected and uploading in Nano seconds required or not by user groups is captured.

j. **Personalization**

Web pages are personalized based on the characteristics like interests, social category, context of an individual. There are three categories of personalization:

1. Profile / Group based
2. Behavior based (also known as the Wisdom of the Crowds)
3. Collaboration based

Web personalization models include rules-based filtering, based on "if this, then that" rules processing, and collaborative filtering, which serves the relevant material to customers by combining their own personal preferences with the preferences of like-minded others. Collaborative filtering works well for books, music, video, etc. There are three broad methods of personalization:

1. Implicit
2. Explicit
3. Hybrid

With implicit personalization the personalization is performed by the web page based on the different categories mentioned above. With explicit personalization, the web page is changed by the user using the features provided by the system. Hybrid personalization combines the above two approaches to leverage the best of both
worlds. Personalization required or not by the user groups is captured. For example www.amazon.com gives personalized recommendations on books which can be purchased based on the individual preferences.

k. **Two Dimension**

Although web3.0 is a three dimensional environment text has to be in two dimensions. The usage of two dimensions cannot be completely scrapped in a Web 3.0 environment. The requirement for the two dimensional interface is captured for the user groups.

l. **Three Dimension**

Three dimensional interface is to rule Web 3.0. Although 3D has many advantages like real time viewing, more reachability in knowledge transfer and catchy, it has lots of technology and technical requirements. Not all the interface elements can be used in three dimension, For example text is more readable and reachable in two dimension. Usage of a 3D interface by user groups are captured.

m. **Speech recognition**

Speech recognition refers to the art of understanding and interpreting the voice of human by the computer. Several softwares are available for speech recognition which understands and do according to the voice input. This technique will be extended to websites and search engines also which will facilitate the learning, dissemination and interaction of physically challenged with the web sites. The requirement of speech recognition in Web 3.0 among the user groups is captured.

n. **Audio**

Audio quality is a very important requirement of media stakeholders. Though videos will occupy Web 3.0 environment, videos has an interleaved audio
and the quality of it has a direct impact on the quality of video. The quality of audio expected from user groups is captured.

An MP3 and video player interface for the physical iPod Touch (or iPhone) and the corresponding virtual touchscreen workbench is implemented for Web 3.0 access to organize and retrieve multimedia material from online repositories such as YouTube and LastFM. Web 3.0 interfaces can either access Web 3.0 information on the Semantic Web and/or base the user interaction on Web 3.0 data. AI mashup is done in which YouTube access is combined with a speech dialogue. For example, a YouTube request can be initiated by a natural speech request: "Find videos featuring Nelly Furtado". The user can retrieve the videos by natural speech and take the user ratings into account, as collaboratively constructed semantic resources. A semantic ranking system can take the ratings into account to select videos and can proactively offer extra information to the user. (Sonntag et al, 2009) (Fensel et al, 2005) (Sonntag, 2007).

Multilingual

Customary websites are in English which is the universal language. The reachability of information is restricted to the people who can read, and understand English. A slow transition from English to the local languages paved the way for knowledge availability and reachability to the regional language of the geographic area. The projected websites in Web 3.0 might necessarily have the translation of web pages from one language to many other languages. For example the web site http://www.mamanautrement.com/index.php/en/ a commercial website which displays the products needed for babies and mothers can be viewed in French and English. Another German website http://www.florentzundpartner.de/ in which the
default language is German can be switched over to English if needed. The need of multilingualism in the websites by the user groups are captured.

Multilinguality for social networking was achieved by designing an open architecture by considering the following criteria like similar multilingual behavior expected by the users, identical data structures and facility have language button. Most of the European Institution sites are Multilingual Web sites simply called as Multilingual Web sites. A comprehensive open architecture is designed to create high quality, Low cost Multilingual Web Sites as the current Multilingual Web sites is costly. (Carrasco, 2009).

p. Semantic Maps

Google maps display the route from the source to the destination with the metadata like the kilometers and travelling route guidance. The semantic maps in Web 3.0 would display the maps from the current place where the user is to the solicited place. It would also give recommendations on the best restaurants, rest places on the solicited place based on the preferences of the user. The stepping stone attempt to this meaningful maps is www.openstreetmap.com in which the editable maps of the entire world are displayed. The expectations regarding the semantic maps by the user groups are captured.

q. Semantic Wiki

Semantic wikis provide the ability to capture or identify information about the data within pages, and the relationships between pages, in ways that can be queried or exported like a database. There are a number of wiki applications that provide semantic functionality. Some standalone semantic wiki applications exist,
including Onto Wiki. The requirement of semantic wiki by the user groups are captured.

Discussions on the four versions of the semantic web layered architecture proposed by Tim Berners Lee is done. A new CFL architecture is proposed which imbibes the established software engineering principles. (Aurona, 2008). An Active Documents Paradigm (semantically annotated documents associated with a content commons that holds the corresponding background ontologies) and the Planetary system (as an active document player) was presented. It is shown that the current Planetary system gives a solid foundation and can be extended modularly to address most of the criteria of the Executable Papers Challenge. (David, 2010; Stamerjohanns et al, 2010; Ausbrooks et al, 2010; Kohlhase, 2008; Zholudev, 2009; Giceva et al, 2010; Lange, 2008; Kohlhase, 2010; Harper et al, 1993; Mossakowski, 2005; Pfenning and Schurmann, 1999; David et al, 2011; Gardner A.2010; Ginev et al, 2009; Kohlhase et al, 2006).

r. Electronic decisions

Each and every day of affairs needs decision making by human. Electronic decisions are generated by the computers after analyzing the data available using web based data resources. It requires human like thinking and analyzing, which can be done by specifically designed software agents. For example in www.wolframalpha.com concise information is aimed to the query solicited. The requirement of E-decisions by the user groups are captured.

Intelligent real time decision making in E Governance by integrating heterogeneous data is performed in Semantic web based E-Governance products. A semantic web based E Governance system for connecting distributed heterogeneous
data from various e – services are proposed. A common citizen ontology is built and shared among the e-services of certain government departments. The proposed system uses the unique-id for the citizen to enable easy integration of distributed data of various services and greater service delivery. (Kavidha and saradha, 2012) (Furdiki et al , 2010) (Microyannidis and Theodoolidis, 2010) (Peltz, 2003).

s. Software agents

Software agents are intelligent application programs which analyze the present day scenario of any activity and combines with the past activity events and intelligently does an action. For example a software agent can analyze the daily share market scenarios and considers the previous status and intelligently invests by getting concurrence of the user by convincing the user with the arguments. To start with, software agents for automatic debit and credit from a customer account to bank account and vice versa is available and widely utilized in our day to day life. Also electronic bill payments are miniatures of such type of software agents. The enhancement of such an application is software agents which act intelligent. The requirement of software agents by the user groups are captured.

Web 3.0 learning scenario is based on Learners, Personalized Learning Portal, Learning Content Management system, Learning resources in Internet. Using the personalized learning portal users can learn instead of traditional interface which was designed in common for all learners. Learning resources are created by experts which can be reused, located, distributed and evaluated by Learning content management services. (Sunita Dhotre and Sheetal Patil, 2010) (Jans Aasman, 2008) (Ora Lassila and James Hendler, 2010) (Zhiyuan Fang et al, 2009), (Olfa Nasraoui and Leya Zhuhadar,2010 ) (Xion Hui-Xiang, Su Ying 2010).
t. **Virtualization**

Virtualization is creating the virtual version of the operating system or hardware platform so as to reduce overhead costs and differs from multitasking, which involves running several programs on the same Operating System. Virutalized resources are widely used in cloud computing and hence for autonomic computing in a three dimensional environment requires lot of virtualized resources. However Virtualization completely is very expensive. The requirement of virtualized resources among the user groups are captured.

u. **Query**

Inputs in search engines are not standardized (ie) in order to get a specific output there is no format for the input. Now google search engine is intelligent and can guess the next words the user might type a query in search engines. The requirement of specific formats in the input query box for user groups is captured.

Grid computing is a platform for coordinated resource sharing and problem solving all over the world among virtual organizations. Grid computing imbibes the benefits of the semantic web to manipulate Grid services for obtaining better searches, results and performance. (Belen, 2010) (Muhammad et al, 2009), (Lassila et al, 2007), (Alonso, 2004), (Maedche and stub, 2001), (Aquin et al, 2008), (McIlraith et al, 2001).

v. **Matchmaking aspect**

Search engines make the process of matchmaking to the user's query. The match making does not have an understanding of an adjective as it can be interpreted by an example as “ocean” is understood as an ocean but “an Ocean and two children playing “ is also understood as ocean only. It is solicited by the user to get an image of
an ocean with two kids playing. Such a type of search engine is projected in Web 3.0. The requirement of such a search process among the user groups is captured. It also filters text only, images, video options so that to suit the user requirement.

Clustering, a classification technique can be used to identify the semantic search engine using a Visual ranking algorithm. It combines both content based and session based clustering. Instead of using those two methods separately the combined approach gives better results. (Jayanthi and Prema, 2011).

A new approach by combining Structured and Unstructured information in a web image archival retrieval and annotation system called PARAgrab is scalable to handle very large volumes of data. Multimodal searching by keywords, visual examples and local image file uploads are supported in PARAgrab. (Dhiraj, 2006)

w. Custom mash up

Mash up refers to the combination of two or more websites to suit the requirement of a user's information need. Present mash up will combine from the predefined web sites in which the aggregation of user defined websites is expected in Web 3.0. The users must specify two or more websites from which the mash output tailored to the requirement is obtained. The requirement of custom mash up by the user groups is captured.

x. Result as mash up

Traditional websites are static which moved on to an interactive web and now the new horizon of web applications combine or mash up the data from more than one website and produces a single integrated web application. Yahoo! Pipes, released in February 2007 is a web application from Yahoo that provides graphical user interface for building data mashups that aggregate web feeds, web pages, and other services, creating web-based apps from various sources, and publishing those
apps. The application works by enabling users to "pipe" information from different sources and then sets up rules to modify the content. Mash up results whether required or not by the user groups is captured.

### 2.5 CONSTRUCTION OF DATASET IN WEB 3.0

Perceptions of Students, Faculty and IT professionals in line with Web 3.0 attributes are collected. A five point scale was adopted which ranges from very low satisfaction, low satisfaction, Medium satisfaction, High satisfaction and very High satisfaction. A dataset with 35 simple attributes and 1026 records are constructed based on the responses from the three categories Students, Faculty and IT Professionals. The following is the data set structure in which the inputs from 264 students, 378 Faculties and 363 IT professionals are gathered.

**Nomenclature**

- **Simple Attributes**

Let $X_{iY_{kl}}$ represent the value of the simple attribute in the data set where

- $i = 1$ to $3$
  - $i=1$ for Students
  - $i=2$ for Faculty
  - $i=3$ for IT Professionals

- $k = 1$ to $35$
  - $l = 1$ to $264$ if $i = 1$
  - $l = 265$ to $643$ if $i = 2$
  - $l = 644$ to $1026$ if $i = 3$
\[ X_i Y_{kl} = k=1 \, k=2 \, k=3 \, \ldots \ldots \, k=34 \, k=35 \]

<table>
<thead>
<tr>
<th>Range</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>i=1 and ( l = 1 ) to 264</td>
<td>1 2 1 3 4 3 3 2</td>
</tr>
<tr>
<td>i=2 and ( l = 265 ) to 643</td>
<td>1 2 5 2 4 3 1 2 1</td>
</tr>
<tr>
<td>i=3 and ( l = 644 ) to 1026</td>
<td>5 3 4 2 1 3 4 2 4</td>
</tr>
</tbody>
</table>

**Figure 2.1  Web 3.0 Data set structure for Students, Faculty and IT Professionals**

Figure 2.1 shows the Web 3.0 data set structure with sample values in which the sample value 1 represents very low satisfaction, 2 represents a low satisfaction, 3 represents medium satisfaction, 4 represents high satisfaction and 5 represents a very high satisfaction.

**2.6 SUMMARY**

The necessity of parameter identification and analysis for modeling is presented generically and specific to Web 3.0. The issues related to Web 3.0 are identified which has a proportional impact of Web 3.0 design and development. Web 3.0 environment and various parameters pertaining to Web 3.0 application design in line with the user group’s requirements are analyzed. The parameters can be further categorized into clusters based on their functionality and processed.