A Improved Navigational Approach for Component Based Web Requirement Engineering

Anuj Kumar[1], Sandeep Dalal[2]

**[1]M.tech Student, Department of Computer Science and Applications,
M. D. University, Rohtak-124001, Haryana, India**
Anujdhankhar88@gmail.com

**[2]Assistant Professor, Department of Computer Science and Applications,
M. D. University, Rohtak-124001, Haryana, India**
Sandeepdalal.80@gmail.com

Abstract

Web Engineering is one of most growing field in research area. Now the Web Engineering is associated with requirement engineering called, web Requirement Engineering. Requirement engineering has emerged in order to better understand how the software interacts with the other parts of the system, and what needs to be further developed in a systematical way. In proposed work, navigational development technique with model driven approach for web requirement has been used. The main ideas of MDA consist of dividing the specification of the system functionality from its implementation on a specific technology platform, as well as control the evolution from abstract models to implementations. The proposed work is the Model Driven Approach for the Web Requirement Engineering. According to this model the Web Requirement Engineering along with development phase and the testing phase is attached. It means at the time of gathering the requirement of the webpage, a new web page will be developed along with all the conditional aspects. The proposed work used the Java Server Pages or JSP, net-beans IDE and apache server for developing NDT-tool. Out of the box, it provides built-in support for developing in Java, C, C++, XMI and HTML.

Keywords: Web Requirement Engg., Component Based Approach, Navigation Approach.

Introduction

WEB REQUIREMENT ENGINEERING

As software plays a more important role in today's systems, more cost' and effort are invested in software development. Since the 1970s, people have realized that getting the right requirements is a prerequisite for successful software development. It is essential in software development to gather, analyze, and properly; document important requirements. The challenges in software development shift from implementation to defining the behavior of software in its environments. Requirement engineering has emerged in order to better understand how the software interacts with the other parts of the system, and what needs to be further developed in a systematical way.

Definition Requirements engineering

It is a systematic process of developing requirements through, an iterative, co-operative process of analyzing the problem, documenting the resulting observations in a variety of representation formats and checking the accuracy of the understanding gained".

Requirement Engineering Techniques

A requirement is defined as a condition or capability that must be. met or fulfilled by a system to satisfy a contract, standard, ' specification, or other formally imposed documents. The requirements defined for a system should be: 'correct, consistent, verifiable and traceable. Requirement engineering is the, process of eliciting, understanding, specifying and validating customers' and users' requirements. It also identifies the technological restrictions under which the application should, be constructed and run. It is an iterative and co-operative process-with the objective to analyze the problem, to document the results in a variety of formats and evaluate the precision of the results produced.

The iterative process of requirement engineering consists of three main activities

- requirements elicitation
- requirements specification
- requirements validation

Requirements Elicitation

The capture or the elicitation of requirements is the activity by means of which the development team-

89

IJCSMS International Journal of Computer Science & Management Studies, Special Issue of Vol. 12, June 2012
ISSN (Online): 2231 –5268
www.ijcsms.com

collects from any available source-the functionality the system needs to provide to the future users. This topic covers what sometimes is termed as requirements capture, requirements' discovery or requirements acquisition.

Here we use techniques such as: (1) Interviews, (2) Questionnaires; (3) Focus groups, (4) Joint Application Development and (5) Modeling.

Interviewing is a traditional and frequently applied technique. By means' of interviews analysts are able to understand the problem and get information about the objectives of the application to be developed. The interviewing technique and certain guidelines of how to use them correctly, JAID (Joint Application' Development) can be regarded as an alternative to interviewing. It is a group technique that requires the participation of all stakeholders of a project, i.e. analysts, designers,' users, system administrators'and customers. The requirements are captured in a set of sessions over several days. In each session, the high level requirements are analyzed and the problem field and the documentation are established.

Brainstorming (focus group) is also a group meeting technique similar to JAD. It consists of collecting non-evaluated ideas and information of all stakeholders of the project. The number of participants of such brainstorming meetings should not exceed' 10 (stakeholders of the project); one of them has to assume the role of moderator, but should not control the session.

Modeling is a technique which was developed to define requirements more than for capturing them. It is used to represent the-environment by actors and the scope of the system by use cases.

Questionnaire and Checklist is 'a technique, that consists of -preparing a document with questions for which only short and concrete answers or even with a limited choice of answers (checklist) is possible.

Objectives

- NDT is being enriched with a new approach to the derivation of test cases from its requirements model.
- It is the concept that can be implemented by every web engineering application.
- It is a specific approach for the requirements treatment. It is based upon the use of UML and other standard approaches.
- So the approach in the form of a model as well as tool is represented in the proposed work.
- As searching is the most required criteria in web engineering, so searching Optimization

is the main focus of proposed work

Related Work

In recent years, the growing interest in the Internet has led to the generation of a high number of propos its which offer a frame of reference for the Web environment, the most representative ones in chronological order. In the beginning, the overall tendency was oriented toward the structured paradigm. Lange D. (1995), gave. a proposal of Enhanced Object Relationship Methodology (EORM) in which described OOHDM that a 'hypermedia application is built in a four-step process that favors the use of an incremental or prototype process model. Each step -focuses on a particular design concern, and an object-oriented model is built. Classification, aggregation and generalization/specialization are used throughout the process to enhance abstraction power al)d reuse opportunities, Koch, N., (1995) gave a comparative study. of the most relevant methodologies for hypermedia and Web development' published in the last few years. Most of these methods focus on the design f hypermedia applications; only a few cover more aspects of the life cycle, such as requirements capture, implementation and / or testing. One common characteristic is the separation of the domain analysis from the specification of the navigation space structure as well as from the design of the user interface. A brief description of each of these methodologies is given as well as a set of comparisons. We compare the main concepts, the phases of steps of the model, CASE Tool support as well as, the modeling technique, notation and graphical representation. D. Schwabe and G., Rossi (1998) ' proposed an approach to use of an object-oriented approach for hypermedia ' applications 'design including web.-based, based on the Object Oriented "Hypermedia Design Method (OOHDM). We are discussing the problems encountered while designing large scale, dynamic web-based applications, which combine complex navigation patterns with sophisticated computational behavior. We argue- that a method providing systematic guidance to design is needed. Next, we introduce ' OOHDM, describing its main activities, namely: "conceptual design, navigational design, abstract interface design and implementation, and discuss how OOHDM designs' can be implemented in the Vilain P. ET. al. (2000) has proposed a Diagrammatic Tool for Representing User Interaction in UML and describe Interaction overview diagram: a type of activity diagram in which the nodes represent

interaction diagrams. Although others, such as UML-Based Web Engineering (UWE). Lowe D. and Henderson B., (2001) proposed the nature of Well system development is significantly different from conventional software development. Amongst other factors, there is substantial uncertainty in both clients understanding of their -needs and developers' understanding of the system domain. We discuss these differences and -the' impact that they have on the development processes that, are adopted for commercial Web systems. Escalona M.J. et., al. (2002) gave a survey to the development of information systems has changed a 'lot in-the last years. Now a days applications are often developed in distribute¢ environment. It is quite common, they are distributed Via Internet and they usually have hypermedia and multimedia elements in huge databases. They are characterized by having complex functional and security, requirements, many and undefined users who have different degree of knowledge. The e systems are named Global Information Systems. The developments of these complex's global information systems must be like a software project, based on a development methodology, to get the application suitable to the 'client's requirements. Dokas M. (2002) developed the process for Web based expert systems and specifically focuses on the developing process of their corresponding Web sites. As a case study, the architecture of a Web site/application, which includes the Landfill Operation Management Advisor (LOMA) expert system, will be presented. Based on the gained experience, useful tips will be given on the construction of such ' Web sites/applications. Moreover, some explanations will 'be recorded supporting the assertion that Web based expert systems can be considered as a category of Web engineering applications. Vidgen R.(2002) gave reports on the extension of the Multiview framework to web based information systems. The aims are firstly to investigate the appropriateness of Multiview - a pre-Internet analysis-and design methodology - to web-based information systems. Selberg S.A. and Austin M.A. (2003) have proposed to much of the current focus of Internet research is on the developing "Semantic Web," which offers much potential for supporting automated websearch services. These "inference services" could automate tasks such as logical search and automatic validation. "Requirement engineering and semantic web" Escalona M.J. and Koch N. (2004), proposed a web systems have additional requirements for the navigational and multimedia aspects as well as for the usability as no training is possible. Most of the .methodologies that have been proposed for the

development of Web applications focus on the design paying less attention to the requirements engineering. Sower J. et. a142105) proposed web engineering Method a method for developing 'content management system (CMS)' based Web applications. Critical to a successful development of CMS-based Web applications, is the adaptation to the dynamic business. We first define-CMS-based Web applications and identify their specific characteristics. Rossi G. (2005) presented an Object-Oriented Method for Designing Hypermedia Applications, the tendency of designing hypermedia application moved to the object oriented and- designed the tools connectivity that are defined the all hypermedia applications. Chen P. (2006) presented a HDM was an extension of Entity –Relation Diagrams (ERDs) in the representation of hypermedia concepts.

.However, research work has since improved and approaches have started to offer a complete life cycle oriented to the new Internet systems. "The Entity-Relationship Approach: Towards a Unified Behavior of Data," is defined the behavior diagrams. Schauerhuber A. et. al. (2006) proposed a metamodels for WebML which is based on the Meta Object Facility (MOF). WebML accomplishes the following aims: First, it represents an initial step towards a -transition to employing MDE techniques (e.g., model transformations or language extensions through profiles) within the WebML design methodology. Second, it represents an important step towards a common Meta models for Web modeling. Schmidt D.C. (2006) has proposed a work on Model Driven Engineering which discusses different kinds of mappings between models. It explains why process and architecture are tightly connected. It discusses the importance and nature of tools. Codd E.F. (2007) gave a comparative study; we can conclude that Web methodologies still present a relative lack of maturity and high ambiguity in some aspect such as in the definition of the covering of a life cycle the performance of activities and tasks the use of models and techniques, and handling of other aspects with The Relational Model for Database Management. Escalona M.J. et. al.(2007) presented important fact is the analysis of the phases treated by each approach that shows the route of the different phases of the life cycle treated by each methodology. Phases of requirements treatment, analysis, design, implementation, and tests are presented in the columns and approaches are given in the rows. It is necessary to add that the separation between phases is based on the comparative study presented in Vallecillo A. et. al. (2007), has proposed a work based on the strengths, of current model driven. Web Engineering methods and the existing experience and

knowledge in the field. This paper presents the background, motivation, scope, and objectives of MDWEnet. Isakowitz T. et. at. (2007) proposed the Relation Management Method (RMM) were structured.. Structure diagrams emphasize what things must be in the system being modeled: class, object, component, packet structure diagrams. RMM: A Methodology for the Design of Structured Hypermedia Applications. Retschitzegger W. and Schwinger W., (2007) described the number of approaches for Web environments have grown very fast in the last years: HDM, OOHDM, and WSDM were among the first, and now a large number can be found in the literature. With the definition of MDA (Model-Driven Architecture) and the acceptance of MDE (Model Driven Engineering) techniques in this environment, some groups are working in the use of metamodels and transformations to make their approaches more powerful UWE (UML-Based Web Engineering) or OOWS (Object-Oriented Web Solutions) are only some examples. However, there are few real experiences with Web Engineering in the enterprise environment, and very few real applications of metamodel's and MDE techniques. In this chapter the practical experience of a Web Engineering approach,. NDT, in a big project developed in Andalusia is presented. Besides, it shows the usability of metamodels in real environments. Ceri S. et.al. (2008) has proposed Web Modeling Language (WebML) and the .shadowed approaches, Hypermedia Design Model (HDM) the initial interest of groups was focused 'In offering new models and suitable techniques to deal with hypermedia 'system. Garcia J.A.; (2008) presented; a tool, NDT Driver, which implements the transformations, of a Model-Driven -approach called NDT. It analyzes how this tool is used in companies and how it facilitates the application of Model-Driven paradigm in enterprise environments. The Model-Driven paradigm has been used in different areas of Software development. One of these areas is Web Engineering, which is commonly named Model-Driven -Web, Engineering (MDWE). Although research groups obtained very relevant results in the application of this paradigm in Web development, the Model-Driven paradigm does not-result friendly enough id enterprise. Garcia J.A.,(2009) gave a survey of the ' paradigm of Model Driven Engineering (MDE) and it is specifically related to NDT. NDT is a methodology included within the MDE paradigm. The aim of this paper Is to present a software tool to facilitate the work of 'requirements-engineers during the requirements validation ' in. a software project. The requirements validation activity take's place within the requirements phase of the life

cycle in a software project. The developed tool is called NDT-Glossary arid it implements an automatic procedure to generate, from the requirements defined in a project developed with the NDT methodology. OGATA S. and MATSUURA S., (2010) gave evaluation of a Use-Case-Driven Requirements 'Analysis, Tool Employing Web UI Prototype Generation. They compare the proposed method with traditional use case modeling to evaluate the effectiveness of the proposed method environments.

The present work deal with those problems which are faced by a web developer regarding -requirements. So to solve the problem there is need for development of a NDT-Tool. The NDT-Tool accepts the user requirements by the user interface. Then on the basis of user requirements, it will develop a dynamic web page automatically. NDT Tool' is a case tool which allows to apply navigational development techniques and to generate results, documents and models automatically.

Conclusion

The proposed work is the development of a navigational tool that will solve most of the problems faced by a web developer. The proposed system ' will accept the user requirements and also accept the web template provided by the Navigational tool. Now on the basis of user requirements it will develop a dynamic web page automatically. The complete system is automated. The approach offers a Web requirements solution based on a MQdel-Driven paradigm that follows the most accepted tendencies by Web engineering.

Future Scope

The proposed work is defined with the development of a requirement in a user friendly environment where input fields and its labels will be defined by the user graphically. This work can be enhanced by the security phase of the requirement. It means on user requirement apply 'the security lock with security phase.

References

[1]Lange D., (1995), "An Object-Oriented Design Approach for Developing Hypermedia Information Systems," Proc. 31st Ann. Conf. Systems Science, Sprague R.

[2]Jacobson, I., (199%), "Modeling with Use Cases: Formalizing Use Case Modeling". Journal of

92

IJCSMS International Journal of Computer Science & Management Studies, Special Issue of Vol. 12, June 2012
ISSN (Online): 2231 –5268
www.ijcsms.com

Object Oriented Programming.

[3] Koch, N., (1995),"A Comparative Study of Methods for Hypermedia Development" Technical Report 9905, Ludwig-Maximilian-University, Munich, Germany

[4] Schwabe D., Rossi G.(1998), "Developing Hypermedia Applications using OOHDM Workshop on Hypermedia Development Process", Methods and Models, Hypertext 98, Pittsuburg, USA.

[5] Lowe, D., Hall, W., (1999), "Hypermedia and the Web. An Engineering Approach" John Wiley & Son

[6] Vilain P., S chwabe D., and Sieckenius C.,(2000), "A Diagrammatic Tool for Representing User Interaction in UML,"Proc. Third Int'l Conf. Unified Modeling Language.

[7] UWA, (2001), "UWA Requirements Elicitation: Model, Notation and Tool Architecture." www.uwaproject.org

[8] Sawyer P., Kotonya G.,(2001), "Software Requirements" Chapter 2 of the IEEESWEB ok Project Report.

[9] David Lowe, Brain Henderson, (2001) "Characteristics of Web Development Process" SSG: Infrastructure for E-Business E-Education and E-Science.

[10] Escalona, M.J., Mejias, M., Torres, J. (2002), "Methodologies to develop Web Information Systems and Comparative Analysis" Informatik/Informatique num. de I/I