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Research Paper

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Object Oriented Requirement management Tools for maintaining of status of requirements

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Abstract— The field of requirements engineering is one of the most critical disciplines in the solution development lifecycle and has a documented impact on the success of projects. A software developer facing the problem maintaining of status of requirements, a software tool is proposed for the same issue. Hence, we are focusing on the requirements engineering techniques in order to present the most practical way to facilitate requirements engineering processes. The proposed tool maintains the status of all requirements of the software like feasibility, unambiguousness, validity, approval, implementation, testing and completeness etc.

Keywords— feasibility, validity, priority, unambiguousness

I. INTRODUCTION

Object Oriented Requirements engineering is one of the most important disciplines in the system lifecycle and when done well it will set the foundation for a successful project or program of work, ultimately ensuring that great value is delivered to the users and other stakeholders. Expert system has the least focus on requirement engineering. In fact, requirement engineering is important to get all the requirements needed for an expert system. If the requirements do not meet the clients' needs, the expert system is considered as fail although it works perfectly. Agile requirement engineering aims at applying agile thoughts to traditional requirement engineering. It is the optimization and improvement of traditional requirement engineering, getting it fit to the continuous changes of requirements [1]

Most requirement documents are written in natural languages and represented in less structured and imprecise formats, including requirement phase. Artifacts created in phases of software life cycle are required to be modeled and integrated, so the traceability, consistency, and completeness can be ensured[2].The role of customers and other stakeholders is becoming increasingly significant during requirement engineering activities. Methods of eliciting requirements are now more co-operative. There are many techniques to obtain requirements from customers. Selecting the right techniques according to the characteristics of the project is very important. In some complex problems, combination of requirement engineering techniques should be applied for efficient and successful requirement engineering process [3].Requirement engineering is the most effective phase of software development process. It aims to collect good requirements from stakeholders in the right way. It is important for every organization to develop quality software products that can satisfy user's needs. Requirements engineering for software development process is a complex exercise that considers product demands from a vast number of viewpoints, roles, responsibilities, and objectives [4]

Successful RE requires a very good understanding of the business domain, the environment in which the system will be running, and the needs of the project's stakeholders (customers, users, developers, etc.). In traditional development, the following is assumed: (1) the customer precisely knows from the beginning, what they need from the system; (2) the development team understands the customer’s needs correctly and clearly; (3) only one or more stakeholders are in charge of elaborating the requirements; and (4) there is a strict separation of different functions with little focus on cross-functional teams [5].Requirements engineering is difficult. It’s not just a simple matter of writing down what the customer says he wants. The importance of good requirements and the underlying dynamic nature of the process mean that we must be as accurate as possible, Requirements are important because they provide the basis for all of the development work that follows. Once the requirements are set, developers initiate the other technical work: system design, development, testing, implementation, and operation.

II. Related Work

To obtain high quality products along with higher productivity, it is necessary to carefully elicit, specify, analyze and manage software requirements. This not only simplifies system design and implementation, but also reduces the number of defects that are identified later in the implementation stage[6].In order to fulfill user's requirement, it is very important to manage requirement effectively. It involves different disciplines such as psychology, languages and communications, organizational behavior and management [7]. Requirement engineering is a crucial activity, which can affect the entire life cycle of software development project. The main objective of requirement engineering is to collect requirements from different viewpoints such as business requirements, customer requirements, user requirements, constraints, security requirements, etc. Information is also one of the important requirements of requirement engineering process to develop quality and updated software [8]. The researchers gradually realize that the requirements engineering processes are very complex and the related technologies are in a great variety. Thus, in order to analyze and compare different types of requirements engineering processes more deeply, a simple, clear, unified description method of requirements engineering process is needed [9].

As one of the processes in software engineering, RE plays a vital role to ensure the overall success of software projects. Writing good requirements is a skill. Software requirements quality affects software product quality. For high-quality software products, software requirements must be complete. Requirement engineering is the most effective phase of software development process. It aims to collect good requirements from stakeholders in the right way. It is important for every organization to develop quality software products that can satisfy user's needs. The growing popularity of the Object Oriented paradigm in the development of complex and large scale information system has led the influence of Object Oriented Requirements Engineering towards elicits and analyzes the requirements of such system. In general, Requirements Engineering is a structured process of eliciting, defining, negotiating, prioritizing and validating requirements of a system. Whereas, object oriented requirements engineering is an approach to encapsulating information about the process and product, as well as functionality into a requirements object [10]

III FUNCTIONAL AND NON FUNCTIONAL REQUIREMENT

Object oriented requirement divided into two parts

Function Requirement:

Functional Requirements are the bridge between the business and technical teams and provide the definition of what the system must do for its users that will in turn meet the business goals. A necessary attribute in a system that specifies what the system or one of its products must do. Functional requirements (FRs) describe abilities of a system that are important to the user community. These functionalities are offered by the system. Sample examples of functional requirements are “Manage customer”, “Manage order”, “Manage employees” etc.

Categories of functional requirements are:

- **User interface perspective: (UI)**
  In the UI perspective, interactions between users and application are described.
- **Data perspective: (Data)**
  In the data perspective, data aspects are described.
- **Functional perspective: (Logic)**
  Functional perspectives describe data flows or logic flows of the system.
- **Behavioural perspective: (State)**
  In the behavioural perspective, statuses of data elements are described.

Non Functional Requirement:

Non Functional Requirements and Quality Attributes describe how well a system will perform when it is operating. These typically define or constrain how the system should be behaving as a whole and include attributes like how well it performs, how secure it is, how many times it develops a fault and how easily it can be extended.

“non-functional requirement” is often used for quality requirements and constraints. Quality requirements describe qualities of a system that are important to:

I. User community, such as usability, learn ability, reliability, etc.

II. Development community, such as scalability, maintainability, reusability, etc.

In the non functional requirement following activity will be checked:

1. **Performance**
   Time taken to perform activities and resource utilization levels.
2. **Security**
   Ability to ensure appropriate confidentiality and integrity of information, to verify when actions were taken and by whom and to authenticate users.
3. **Reliability**
   Measure of application being available when needed. Includes ability of the application to recover from errors, uptime, or failures in interfaces.
4. **Usability**
   The system being used by the target audience with specified duration of training.

5. **Maintainability**
   Ability to change one component without affecting others and without causing unexpected failures, ability to re-use components and testability.
6. **Portability(also known as Transferability)**
   Ease of installing and uninstalling the application, different environments, it can run and ease of migrating it to a new environment.

IV PROPOSED TOOLS

A recent survey [11,12] of 800 IT managers says that 62% of total software fails, which is true. 49% software suffered budget overruns, 47% had higher than expected maintenance costs and 41% failed to deliver the expected business value and ROI. Few software while designing never thought of considering the requirements which cause threats and failures later in the stage at the time of utilizing the product for example- information security, hacking, virus threats, scaling up to the level of usage, maintainability and performance. Software projects fail for various reasons from all the domains and technologies.

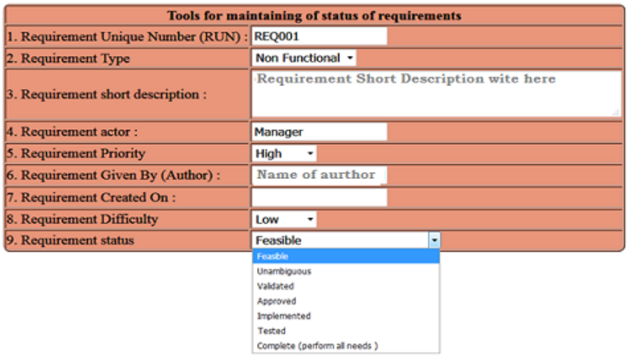
Tool is developed in web based that is available for everyone. In the proposed tool every requirement related to system / software is maintaining status. When the requirement gathers, unique requirement identification number (URID) is allotted to every requirement. After the allotment of URID, toll maintains the information like requirement generated from which stakeholder, is it feasible or not, it is mandatory or optional requirement, Priority of requirement, is it ambiguous, date of requirement generated, expected date to finish or implements the requirements.

Requirement Tool includes:

1. Requirement Unique Number (RUN) Like REQ001,...
2. Requirement Type Like Functional / Non Functional
3. Requirement short description
4. Requirement actor/Object (As per UML use case diagram)
5. Requirement Priority, Low Medium or High
6. Requirement Author / given by
7. Requirement created on date
8. Requirement difficulty level, Low Medium or High
9. Requirement status for
   a. Feasible / Not Feasible
   b. Unambiguous / Ambiguous
   c. Validated / Non Validated
   d. Approved / Not Approved
   e. Implemented / Non Implemented
   f. Tested / Non Tested
   g. Complete (perform all needs) / Not Complete

Tool is design in three parts,
First part to create a status of newly arrived requirement, second part to updating the status of requirement, when it required and third part is to display status all the requirements, when developer wants.

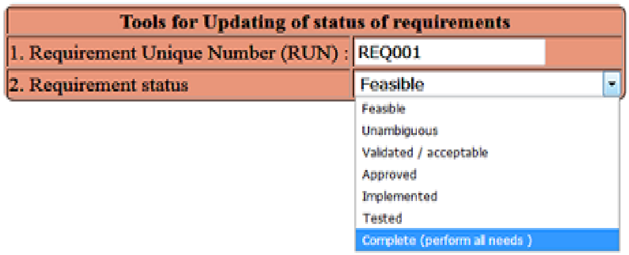
Toll look like as below for the maintaining the status of the object oriented requirement.



Tools for maintaining of status of requirements	
1. Requirement Unique Number (RUN) :	REQ001
2. Requirement Type	Non Functional
3. Requirement short description :	Requirement Short Description wite here
4. Requirement actor :	Manager
5. Requirement Priority	High
6. Requirement Given By (Author) :	Name of aurthor
7. Requirement Created On :	
8. Requirement Difficulty	Low
9. Requirement status	Feasible

Figure 1: Maintaining the status of the requirement

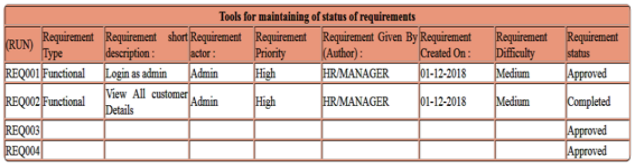
Toll look like as below when status is/are change of requirement:



Tools for Updating of status of requirements	
1. Requirement Unique Number (RUN) :	REQ001
2. Requirement status	Feasible

Figure 2 updating the status of the requirement

Toll look like as below Displaying all the requirements with all details and status as shown below:



Tools for maintaining of status of requirements

(RUN)	Requirement Type	Requirement short description :	Requirement actor :	Requirement Priority	Requirement Given By (Author) :	Requirement Created On :	Requirement Difficulty	Requirement status
REQ001	Functional	Login as admin	Admin	High	HR/MANAGER	01-12-2018	Medium	Approved
REQ002	Functional	View All customer Details	Admin	High	HR/MANAGER	01-12-2018	Medium	Completed
REQ003								Approved
REQ004								Approved

Figure 3 displaying all the requirements details with status

V TECHNOLOGY USED IN PROPOSED TOOLS

Tool in developing in the web based technology to be used for everyone, for every software, technologies used in tools are Hyper text markup language (HTML), Servlet, Java Server page (JSP), and for the storage oracle 11g XE is used.

VI BENEFITS OF PROPOSED TOOLS

Most of the software is failing due to poor management of requirement, anyone involved in the development or management of requirements, whether at a strategic level, a business value level or a system development level will benefit from reading this information about the requirements.

VII CONCLUSION

For the quality and success of the software project, we propose web tool. By using our web tool for maintaining the details and status of the requirement, change status of requirements helpful for all software developers to manage all the requirements effectively. And also check by developer which requirement in which phase in maintaining tools. We hope this tool will help IT professional in improving their knowledge about Requirement Engineering and increase productivity and the success ratio.

REFERENCES

[1] Haron, Azlena; Harun, Mazlan; Naz'ri Mahrim, Mohd; Sahibuddin, Shamsul; Zakaria, Nor Hawaniah; Abdul Rahman, Noorihan "Understanding the Requirement Engineering for organization: The challenges" IEEE Conference Publications, Computing Technology and Information Management (ICCM), 2012 8th International Conference on Volume: 2, 2012 , Page(s): 561 - 567

[2] Pandey, D.; Suman, U.; Ramani, A.K. "An Effective Requirement Engineering Process Model for Software Development and Requirements Management" Advances in Recent Technologies in Communication and Computing (ARTCom), 2010 International Conference on Publication Year: 2010 , Page(s): 287 - 291 IEEE Conference Publications

[3] Mishra, D.; Mishra, A.; Yazici, A. "Successful requirement elicitation by combining requirement engineering techniques" International Conference on the Topic(s): Communication, Networking & Broadcasting ; Computing & Processing (Hardware/Software) Digital Object Identifier: 10.1109/ICADIWT.2008.4664355
Publication Year: 2008 , Page(s): 258 - 263 IEEE Conference Publications

[4] Runde, S.; Fay, A.; Wutzke,"Knowledge-based Requirement-Engineering of building automation systems by means of Semantic Web technologies" Industrial Informatics, 2009. INDIN 2009. 7th IEEE International Conference on Topic(s): Computing & Processing (Hardware/Software) ; Power, Energy, & Industry Applications.Digital Object Identifier: 10.1109/INDIN.2009.5195815,Publication Year: 2009 , Page(s): 267 – 272,Cited by 3. IEEE Conference Publications.

[5] A. Sillitti, M. Ceschi, B. Russo, and G. Succi, "Managing uncertainty in requirements: a survey in documentation-driven and agile companies," Proc. 11th IEEE Int. Symposium on Software Metrics, pp. 10–17, 2005.

[6] Emilio Insfran • Gary Chastek • Patrick Donohoe • Julio Ce´sar Sampaio do Prado Leite, "Requirements engineering in software product line engineering"Published online: 6 November 2013_ Springer-Verlag London 2013Requirements Eng (2014) 19:331–332

[7] Sen, A.M.; Hemachandran, K. "Elicitation of Goals in Requirements Engineering Using Agile Methods "Computer Software and Applications Conference Workshops (COMPSACW), 2010 IEEE 34th Annual 2010 , Page(s): 263 – 268

[8] Ranganathan, P.; Magel, K., "Understanding requirement engineering (REQ) from a software agent modeling perspective" Software Engineering and Service Sciences (ICSESS), 2010 IEEE International Conference on Topic(s): Computing & Processing Hardware/Software) Page(s): 83 – 85

[9] Chih-Wei Lu; Chu, W.C.; Chili-Hung Chang; Ching Huey Wang "A Model-based Object-oriented Approach to Requirement Engineering (MORE) " Computer Software and Applications Conference, 2007. COMPSAC 2007. 31st Annual International Volume: 1 Topic(s): Communication, Networking & Broadcasting ; Components, Circuits, Devices & Systems ; Computing & Processing (Hardware/Software) ; Power, Energy, & Industry Applications ; Robotics & Control Systems ; Transportation ,2007 , Page(s): 153 – 156.

[10] Joseph E. Kasser, "Object-Oriented Requirements Engineering and Management", Systems Engineering Test and Evaluation (SETE) Conference, 2003.

[11] Andreas Zeller and Ralf Hildebrandt, ―Simplifying and Isolating Failure–Inducing Input‖, IEEE Transactions on Software Engineering, Vol 28, No 2, February 2002

[12] Shull, et al, 2002. ―What We Have Learned About Fighting Defects,‖ Proceed-ings, Metrics 2002. IEEE; pp. 249-258.

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