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Requirement Gathering and Classification: An Engineering Perspective

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Abstract: ***Gathering the requirement is the vital steps for every successful quality software. Requirement Engineering is the key role for gathering the requirement. The good quality software development require useful data requirement. In recent Software Engineering achieve the data centric with the involvement of big data, artificial intelligence (AI) and machine learning. The most of data gathered from different sources with the evolution of technology, social media and other sources. There are many factors while gathering the requirement to produce the product with good quality. This Paper highlights and extends the research scope of existing requirement engineering to meet the new challenges of requirement clusterization and increase the productivity of product in regards to customer requirement. There is need of applying classification and clustering technique to form requirement clusterization.***

Keywords: Requirement Analysis, Classification, Clustering, Requirement Engineering, Requirement Elicitation.

I. INTRODUCTION

Requirement Engineering is a important phase of software development life cycle. The purpose of requirement engineering is deal between the client and developer. The collection of full and consonant requirements can lead the quality of software product and can fulfill the user requirements. The requirement engineering is a tough exercise that considers the product requirement demands from the number of viewpoints, roles and responsibilities [2]. The proper execution of requirement engineering will have direct effect on the product quality of the software.. In this paper, we highlight the role of requirement engineering and its activities in the development of quality software product. Requirement engineering is the incremental process.

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It is the systematic technique for requirement elicitation, requirement analysis, requirement specification, requirement management .Traditionally, the requirement engineering is performed in the first phase of the software development life cycle [1]. The requirement engineering has dominant impact on the software product. The irrelevant or noise requirement present in a initial stage will be continued to the next stages of product implementation. Identification and modification of error at initial stage is more easier than the later stage in terms of time and cost.

Because of this requirement engineering is the important phase to reduce the errors at the initial stage of the good quality software development. There are many factors while gathering the requirement to produce the Software with good quality. There is a need of applying classification and clustering technique to segregate the requirements of same type. This Paper extends the research scope of existing requirement engineering to meet the new challenges of requirement clusterization and increase the productivity of product in regards to customer requirement. In this we form the cluster of same requirements based on number of requirements' received from the different users.

During the software development the quality of software project is decided in terms of requirement elicitation and requirement managing process.

Research paper provides comprehensive view of the role of requirement gathering in the requirement Engineering. The different sections in the paper are as follows. The Section II focused on the literature review of requirement engineering. Section III describes the taxonomy of requirement engineering. section IV describes various challenges & issues. Section V contains conclusion.

II. LITERATURE REVIEW

In the field of requirement engineering number of researches share their knowledge as follows J Malla Reddy, et al [1], discussed about the requirement engineering concept Huma Hayat Khan, et al [2], discussed the factor generating the risk in the mean time of requirement engineering process in paradigm of Global software development. The work is useful for the people with less experience working in the global software development. Dr. Rajinder Singh [3]. conducted the survey on different software development organizations. He analyzed with evidence how quality of software product co-related with the reengineering process Swarnalatha. K.S, et al [4] proposed the dynamic framework for requirements engineering process model to produce better requirements for any software. The successful implementation of proposed requirement engineering process can have a good impact on the production of quality and quantitative software product.

Dr. Rajinder Singh [5] reviewed crucial processes used in requirement engineering role is the software development with practical survey conducted on Indian companies and evaluated results for better software product.
Haron, et al [6] described the role of people, process and technology during software project requirement. He conducted survey on IT Industry of Malaysia and find out 79.7% of IT Managers are in the requirement engineering process performing the roles of Project leaders and project managers. Dhirendra Pandey, et al [7], presented the paper on requirement engineering and its influence on quality software development. In this I studied different classification methods for requirement engineering.
Abhijit Chakraborthy et al [8], Implementing an effective method on requirement engineering the example of health care system. Saima Amber, et al [9], presented research paper on determination of risks in the requirement analysis process with framework model. In this comparison of model is shown on the basis of risk identification techniques. Dhirendra Pandy, et al [10], described the basic fundamentals and dimensions of requirement engineering process and provide the idea on software requirement specification.

III. ISSUES AND SOLUTION FOR REQUIREMENT GATHERING

Requirement gathering is a crucial part of any project. It will become a challenging attempt to achieve it. Knowledge expert role is to gathering the requirement. There are some common problems while gathering requirements. Every problem will have some solution in same way there are some suggestion to overcome from the problem while gathering the requirement. The good requirement always makes the software project successful.

A. Undocumented Processes

There is poor documentation or no documentation in many organizations about the existing processes. Here requirement gathering become a two step process. Firstly area of information of existing process and then identifying area for improvement and enhance optimization.
To confirm requirements are full and correct, its important to identify main stakeholders and subject knowledge experts and contact with them directly.

B. Conflicting Requirements

The business analyst will play the crucial role in document all the requirements. The ideas of the entire stakeholder will never be same and it leads to conflicting requirements. Business analyst identifies inconsistent requests and let stakeholders decide on priorities.
Business analyst has to listen stake holder's opinion and have some recommendations about what should be prioritized. The opinion of stakeholder will be crucial while gathering the requirement.

C. Lack of Access to End Users

Sometimes end users were too busy in their daily routine task and unable to participate in requirement gathering process. Absence of end users may lead to a few reasons and requires appropriate resolution.
Business analyst will play the crucial role. Defining groups and finding the most suitable end users in each group. Doing as much research as possible prior to the engagement will help to make conversation more structured and insightful.

D. Validating And Tracing Requirement

Requirement gathered are listed should be cross checked before starting the implementation. It avoids the irrelevant requirement. Tracing the requirement will play the vital role. There should be forward as well as backward traceability.

E. Stakeholder Design

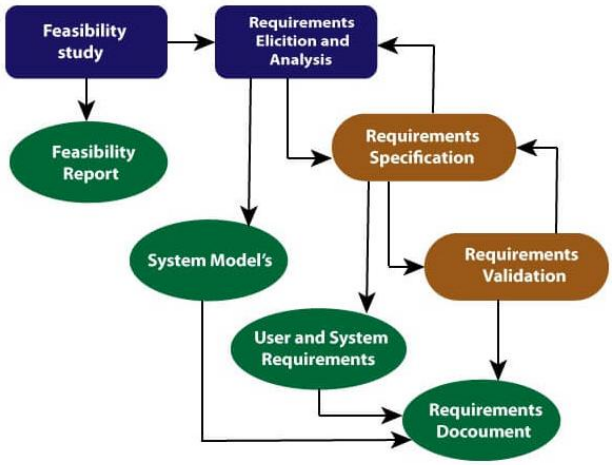
Stakeholders or end user have the need to utter how the system should work rather than providing details about what the system should do.
Hearing to stakeholders about possible solution can be perceptive but may also redirect actual problems and better solution designs.

F. Communication Issues

This includes language difference, unclear assumptions, and wrong vocabulary that lead to misunderstand between stakeholders and a business analyst.
The best solution to overcome from this is to establish two way communications.

IV. REQUIREMENT ENGINEERING PROCESS

Requirement engineering process consist of four steps they are
Feasibility Study
Requirement Elicitation and analysis
Software requirement specification
Software requirement validation



Requirement Engineering Process

A. Feasibilty Study

The feasibility study is used make the reasons for creating the software that satisfy the user requirement. It should be flexible to change and consistent to established the standards. There are three types of feasibility study. They are Technical Feasibility, Operational Feasibility, Economic Feasibility, Technical Feasibility determines the latest technologies which are required to gather the customer requirement within the time and budget.

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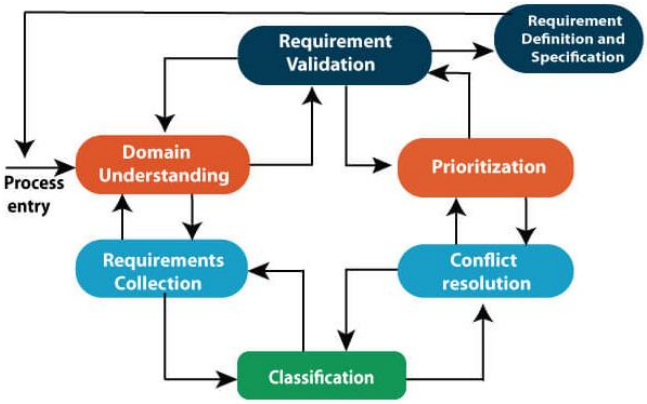
Operational feasibility examines the range in which the required software performs a series of level to solve business problems and customer requirements.
Economic feasibility deals with the financial analysis of the organization. It decides whether the necessary software can generate financial profits for companies.

B. Requirement Elicitaion and Analysis

In this requirement are recognized with the help of stakeholder, customers and existing system. In this gathering of requirement is done. Analysis of requirement begins with requirement elicitation. The requirements are analyzed to find the missing, incomplete, inconsistencies. Problems of Elicitation and Analysis Only right people must involve gathering all requirements. Sometime stakeholders don't know what they required. Knowledge experts can involve gathering the requirements. Sometimes requirement is not specified in the detailed manner. Conflict requirements arise due to different opinion. During analysis process requirement can change.

Elicitation and Analysis Process



C. Software requirement specification:

Requirements are collected from the different sources. A document is prepared by the software analyst after the requirements collected is known as software requirement specification. The requirements received from the stakeholder are in natural language. It is the job of the analyst to translate the requirement in the technical language .It will help to the development team to understand technical language very easily. ER diagrams, data flow diagrams, data dictionaries will be used. E-R diagram is a detailed logical representation of the data for the organization. It mainly consists of data entities, relationship and their associate attributes. Data flow diagrams represent the flow of data through a system. DFD'S are mostly used for modeling the requirements. Data Dictionaries are repositories to store information about all data items defined in DFDs. It should ensure that the stakeholder and developers uses the same definition and methods at the requirement stage.

D. Software Requirement Validation

It is the process of checking that requirements defined for development, define the system that the customer really needs. Requirement validation performs to check issues related to requirements. Some of the requirement validation techniques are Automated consistency analysis Prototyping
Test Case generation Requirement inspection A complete Software Requirement Specification should be:
-Clear
-Consistent
-Correct
-Modifiable
-Verifiable
-Traceable

V. CONCLUSION

From above study, it is concluded that requirement gathering is the crucial steps in software project. The Various factors that contribute to the requirement engineering process based on the knowledge of requirement engineer and commitment of stakeholder. Requirement gathering can be used for software development process to produce a quality product.

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Dr. J.Malla Reddy Jogannagari Malla Reddy, obtained M.Tech(CSE) from JNTU, Hyderabad. and awarded Doctor of Philosophy in Computer Science & Engineering from Lingaya's University, Faridabad. At present working as Professor in Computer Science & Engineering Department, Mahaveer Institute of Science & Technology, Hyderabad, Telangana .He also designated as OSD. Having 26 years of industry and teaching experience .His area of specialization in Software Engineering, Object Oriented Analysis Design, Data Base Management Systems and Management Information Systems. He published various research papers in reputed National and International Journals & Conferences. His strength is to adopt the new challenges technologies and make it available to the students.

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