Preview Analysis in Requirement Engineering

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Abstract: This paper describes the role of preview in software engineering. It defines the role of requirement discovery in detail that encompasses following: 1) Requirement discovery 2) Requirement analysis 3) Requirement negotiation 4) Requirement definition. Requirement lies under many category and specific to system. In Requirement discovery we will be dealing with all the fact gathering methods. Preview also gives affect of problems associated with requirement discovery that are unexpected requirements, incomplete requirements, confusing requirements, weak coordination mechanism, and untraceable requirements and sometimes wrong. Future work in this paper defines the points to be considered for better requirement discovery.

Keywords: Requirements Discovery, Requirement Analysis, Requirement Negotiation, Requirement definition.

I. INTRODUCTION

This paper illustrates preview in software engineering. Preview defines process and requirement viewpoints that gives analysis method which mainly focuses on the following points1) Requirement discovery 2) Requirement analysis 3) Requirement negotiation 4) Requirement definition. Viewpoints are also used to structure and organize the system. Preview is a pragmatic adaptation of the traditional methods. The older viewpoint-oriented approaches are quite inflexible, which makes it difficult to implement it to existing system. Preview is not prescriptive about the methods and notations to be used; therefore it makes it easier to be integrated into existing requirements analysis. Preview focuses to improve the quality of requirements specification by providing a structure for the early phases of the requirements process.

Figure1. Process of Preview

Figure 1.defines the preview process in detail that describes that after the discovery of requirement if we find the requirements not acceptable then requirement negotiation is carried out or else we will briefly define the requirements according to the System. Now we will explain the preview process in detail:

It focuses on identification, analyzing and understanding what user requires from the system. The system analyst, owners, user or the stakeholders do it. There is a criteria to define system requirements for requirement discovery that is given below:

Consistent – not ambiguous,
Complete – describe all possible system resources and responses,
Feasible–can be satisfied in all circumstances, conditions and constraints,
Required – truly acceptable according to the purpose of the system,
Accurate – defined correctly,
Traceable – directly map to features and functions of system.
Verifiable – defined so that it can be can be demonstrated during testing.
Requirement discovery deals with all the types of requirement:
Functional requirements identify the necessary task, action or activity that must be accomplished.
Non-functional requirements are requirements that specify criteria that can be used to analyze operational behavior rather than specific behaviors.
Performance Requirements give the degree of certainty in their estimate, the degree of criticality to system success, and their relationship to other requirements and their measure of success.
Structural Requirements explains the necessary structure of a system
Behavioral Requirements explain the necessary behavior of a system
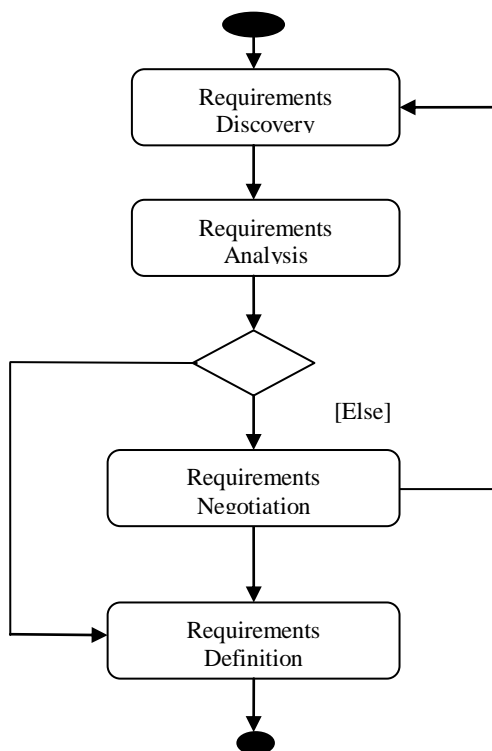Design Requirements for processes expressed in technical data packages and technical manuals.

Derived Requirements that are implied or transformed from higher-level requirement.

Allocated Requirements
This divides the high level requirement into multiple lower level requirements.

A. Process of Requirements Discovery
Four steps in process of requirement discovery are:-
Problem discovery and analysis, Requirements discovery, Documenting and analyzing requirements and Requirements management are explained below in detail.

• Problem discovery and analysis
We will use many diagrammatic tools or graphical tools to identify explore and analyze the problem.
E.g. lshikawa diagram.
• Requirement Discovery
Fact Gathering: It is the process of interviews, research and other techniques to collect information about system requirements.

Fact Gathering Ethics:
Ethical behavior includes the following rules:
1) System analyst must not misuse the information (company plans, employee salaries or medical history, customer credit card etc)
2) He/she must protect the information from outside world.

Fact gathering Methods: - Questionnaires, Interviews, Prototyping, Joint Requirement planning, Research and Site Visits, Observation of existing database and documentation

Questionnaires
A special-purpose method that allows the analyst to collect information and opinions from the users or respondents by asking questions. Fixed-format questionnaire containing questions that have solutions from a predefined value. Free-format questionnaire a questionnaire designed to offer the respondent freedom to answer there is no predefined format.

Interviews
A fact-finding technique through which systems analysts collect information from individuals by face-to-face interaction. This is the easiest way to gather the facts by checking the confidence and loyalty of user in the system. Types of Interviews: Structured interview is done with the set of predefined questions and prior preparation whereas unstructured interview is done with random question; mind is prepared on the stop for it. Open-ended question are those that allows the interviewee to respond in any way that seems corm table for him. Closed-ended question are those that restricts answers to either specific choices or short or from limited options.

Discovery prototyping
The act of building a small-scale, representative or working model of the users' requirements in order to discover or verify requirements. Prototyping helps to model the requirements in a more structured way.

Joint requirements planning (JRP)
It is a structured process in which group meetings and discussions are conducted to gather and verify requirements. JRP is a subset of a more comprehensive joint application development or JAD technique that contains the systems development process entirely. Steps to Plan JRP:

Select a location away from your workplace.
Arrange several rooms equipped with tables, chairs, whiteboard, overhead projectors, Needed computer equipment, Select the participants having idea about the meeting, Each Participant should be free from regular duties, Prepare the agenda, Brief the documentation, Agenda should be distributed among all participants.

Randomization: a sampling technique in which their is no predefined or structured plan to sample data.
Stratification :a systematic sampling technique that attempts to reduce the variance generated by the estimates generated out from the sampling—for example, choosing documents or records by formula.

Observation: a fact-finding technique wherein the systems analyst either participates or observes the user while performing its activities.
Observation Guidelines Find what, why, when, how to be observed, Grant permission from appropriate supervisors or managers, Inform those who will be observed while observation, Keep a low profile,
Take notes during or immediately following the observation, Review observations, don't interrupt the individuals during work.

• Documenting and Analyzing Requirements:
Analyzing requirements to resolve problems,
Missing requirements,
Conflicting requirements,
Infeasible requirements,
Ambiguous requirements,
Overlapping requirements,
Documenting the draft requirements: Use cases,
Decision tables, Requirements tables,
Formalizing requirements: Requirements definition document, Communicated to stakeholders or steering body.

• Requirements Management:-the process of managing change to the requirements. It is a process that is carried out to add or modify requirements .to create a updated system it is compulsory to have updated requirement

B. Requirement analysis
It is a process of software engineering that defines tasks which determines the conditions or needs for a new or alter product Requirements should be documented, actionable, measurable, testable, traceable, related to identified business needs or opportunities, and defined to a

level of detail sufficient for system design Requirement analysis includes following activities:

Eliciting requirements the process of interacting with customers and users to determine what their requirements are.

Analyzing requirements: determining whether the stated requirements are according to the criteria of requirement discovery

Recording requirements: Requirements must be stated in natural language or in form that is acceptable to user.

C. Requirement Negotiation

Requirement Negotiation arises when there is any inconsistencies between requirements or incompleteness of these requirements will lead to re-entry of the requirement discovery phase, to refine or discover further information we have to check out our mistakes or negligence if still our requirement is not up to date then we will have to carry out the two above processes of preview again. This process involves heavy discussion between analyst and user which defines whether the things required by the user are received by the analyst as it is or going out of the track. Verification and validation of the system requirements are cross checked during the discussion. It is also possible that user will make a little change in the requirements as per the comfort level of the analyst so that whole process needs not to be repeated.

D. Requirement Definition

Compliance and consistent requirements will be integrated and then formulated in a well defined document. This phase focuses on the documentation part. Requirements Definition Document – A formal document that communicates the requirements of a proposed system to key stakeholders and serves as a contract for the systems project. This phase can be named as Requirements definition report or functional specification.

II. PROBLEMS ASSOCIATED WITH PREVIEW

1) Incomplete requirements: while requirement discovery if the requirements are not complete it will lead to a wrong system development. During testing phase many unmentioned requirements are resolved. These new requirement give rise to many issues between software components and hardware.

2) Unexpected Requirements: Sometimes during requirement analysis some requirements are not according to the system and they are analyzed as unexpected. Due to which our process unexpectedly causes an incorrect behavior or did not achieve the required precondition for the expected or the exact execution of the system.

3) Confusing Requirements: This is a severe problem associated with preview which leads to confusion between user and analyst. What user requires is not understood by the analyst. It indicates the false positive condition where the software failure is not determined from its working because it executes correctly. Or sometimes software's behavior unexpected. Communication problem is one of the main reasons behind confusion.

4) Wrong Requirements: when the user itself is not clear about the requirements then it is difficult for the analyst to get the exact one this is possible under many circumstances: user is new to the system, user is having lack of interest in the system and many more.

5) Coordination Mechanism weak: Coordination between the stakeholders and the user is very must for effective communication and relation .if it is not so then requirement gathering mechanism is not so effective.

6) Untraceable Requirements: After the whole sdlc process it is found that some of the requirements are not traceable according to the system which gives rise to the adhoc situation.

7) Requirements without updation: Systems need to be updated for competing the changes in the outside world so requirements remain unchanged because they are gathered earlier.

III. FUTURE SCOPE

Future work in this paper defines the points to be considered for better requirement discovery.

1. Refine the rules of requirement discovery to improve the quality of recognition and classification.
2. Extention of data must be done in more structured way.
3. Every requirement gathering tool should be use with the accurate knowledge of it.
4. Good communication level should be achieved between user and analyst.
5. Requirement should lie either in problem domain or in solution domain.

IV. CONCLUSION

This paper concludes that Preview/Requirement discovery requires analyzing the system carefully. Every step of Requirement discovery should be done at good level of precision. The requirements from system engineering must be fully integrated into the development process rather than managing it into a separate tools. Effective Requirement discovery introduces the changes not only to the software but also operational procedures and documentation. Requirements management is a prerequisite for quality-oriented development.

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