Conflicts Identification among Stakeholders in Goal Oriented Requirements Engineering Process

Presented in 11th Japan Muslim’s Researcher’s Interdisciplinary Symposium (JMRIS 2019), Keio University, Tokyo, Japan

Muhammad Suhaib

Abstract: Requirements Analysis are the most important part of Software Engineering for both System Application Development, and project requirements. Conflicts often arise during the requirements gathering and analysis phase. This research aims to identifying conflicts during requirements gathering phase in software development life cycle. Research, Development, and Technology converted the world into a global village. During requirements elicitation/gathering phase it’s very difficult to understand the main objective of stakeholders, after completion of requirements elicitation task final results are used for Software Requirements Specification (SRS), SRS is the highly important outcome of the requirements analysis phase. this is the foundation between the developers and stakeholders or customers, proposed methodology will be helpful to identify those conflicts in very easy manner during the initial phase of the project.

Keywords: Goal Oriented Requirements Analysis, Conflicts Identification Model, Requirements Analysis, Requirements Engineering.

I. INTRODUCTION

This Paper presents a model for identify conflicts among OR Connected sub-goals in goal oriented requirements analysis, a very useful technique to identify conflict among sub-goals during the requirements analysis phase in Software engineering development process. Our method contains five steps, in the proposed method analyst set the initial goal first as per stakeholder needs, stakeholder goal on the top view of goal-graph. The second step which will comes after establishing the initial goal as per customer need decomposed and refinement process to goals of the stakeholder in to sub-goals to objective to reach the parent goal. 3rd step stakeholder will provide the operating values to the or connected sub-goal. The ‘+’ sign shows supporting and ‘−’ sign shows the non-supporting values, forth step Identifying conflicts among sub goals in initial phase of software development / requirements gathering phase in very way and simple way.

A Process of software Requirements Analysis is the most important and initial part of Software Development that examines together project and software requirements.

II. PROBLEM STATEMENT

Nowadays some researches in Goal-Oriented Requirements Analysis have been emerging simplify to investigate and to recognized stakeholder’s needs but still there are some problems that must be solve. present GORA researches are not advantageous for all kind of stakeholders, very less mention about identify potential conflicts identification among sub-goals due to quality attributes as per stakeholder needs.

III. OBJECTIVE

The objective of this research is to present an easy method for identifying conflicts among Sub-Goals in Goal-Oriented Requirement Analysis. Since we studied that software development stage is the most important and crucial stage where we cannot avoid errors and conflicts & can create the cost-effective and best utilizing tool for organizations. But we noticed that many problems and conflicts occur when the accurate and actual information doesn’t flow from the stakeholder to the developer. The study proposed the method of potential conflict identification among or connected sub goals in goal-oriented requirement analysis (GORA). However, quality attributes (non-functional) will be using in this study.
IV. RELATED WORKS

There are multiple techniques available for the Requirement Analysis. Many methods provide guidance to analyze the requirement. This proposed conflict identification method is also top-down approach like other Goal Oriented Requirements Analysis researches such as Attributes Goal Oriented Requirements Analysis

[1] Jennifer Horkoff, Fatma Başak Aydemir, Goal modeling has been adapted and applied to many sub-topics within RE and beyond, such as agent-orientation, aspect-orientation, business intelligence, model-driven development, security, and so on. Despite extensive efforts in this field, the RE community lacks a recent, general systematic literature review of the area. As a first step towards providing a GORE overview, we present a Systematic Literature Map, focusing on GORE-related publications at a high-level, categorizing and analyzing paper information in order to answer several research questions, while omitting a detailed analysis of individual paper quality.

[2] D. Amyot, S. Ghanavati, J. Horkoff, G. Mussbacher, L. Peyton and E. Yu established evaluation method, Agent-goal models offer a way to systematically and graphically capture this information, even as it evolves through continued elicitation. However, the complexity of resulting models makes it difficult to evaluate the achievement of key stakeholder goals within a model without applying systematic analysis procedures. Existing approaches to agent-goal model evaluation focus on automated procedures, without explicitly promoting model iteration and domain elicitation. We argue that “Early” Enterprise modeling requires analysis procedures which account for the incompleteness and informality of early agent-goal models, facilitating iteration, elicitation, and user participation. We introduce a qualitative, interactive evaluation procedure for agent-goal models, using the i* Framework in our illustrations.

[3] Prof. Atsushi Ominishi, Muhammad Suhaib Established the method for Potential Conflicts Identification Among OR-Connected Sub-goals in Goal Oriented Requirements Analysis Using Matrix. Conflict identifications are very critical and important in software engineering. Application needs the all wishful functionality implementation. In the proposed model main needs and requirements of stakeholders are considered as initial goal in goal graph and analyst put those goals on the top view of diagram. While initial goals are main needs and requirements of stakeholders, product outcomes must satisfy initial goals in result.

[4] Such recognition has led to a whole stream of research on goal modeling, goal based specification and reasoning or some other purpose, like as requirements elicitation, verification, conflicts, management and multiple forms as well. According to him various software and applications are slumped on account of less quality attributes. An extraordinary piece of the software engineer’s life is spent in keeping up quality attributes of thing. All things considered they are called application’s utilities. It contains versatility, security, performance and constancy.

[5] This process is linear to iterative structure model, this study on two Australian companies on requirements engineering process, this research study contains qualitative mythology, conducted some interviews with the clients based on requirements engineering activities, after that this study analyze with their existing models in requirements engineering, experimental study present that it’s a very meaningful and have knowledge of actual commitments and demands

The above experimental study shows that this is very important to understand the actual need and demand of stakeholders at the time of software development stage. If conflicts identify at the initial level so output will be effective and efficient. Therefore, scientist has proposed multiple factors and models which can be helpful for maintaining the conflict free software development.

V. TRADITIONAL TECHNIQUES

This technique is consisting on traditional method, where analyst gather large generic data. This data include questionnaires, surveys, interviews and uses organizational charts and process for analyzing the data.

VI. GROUP ELICITATION TECHNIQUE

This technique consists of group interviewing instead of individual. This includes brainstorming session and focus group interviews. This is actually the technique to understand the need of stakeholder with agreement and buy-in conditions.

VII. PROPOSED METHOD

Requirement Analysis is the most important and fundamental piece of software improvement and engineering. It causes analyst to distinguish issues and find out determination in order to lessen cost. The very much performed requirement analysis increase the nature of the item too. These days, requirement analysis is the essential demand of the present IT industry.

Proposed method contains four steps:
1. Establishing initial goal as per stakeholder or Customers’ needs and demands.
2. Decomposing parent goal in to sub goals
3. Stakeholder offers contribution values to sub-goals
4. Identifying conflicting sub goal among stakeholder needs.

Initial Goal as per stakeholder needs
Main needs and demand of stakeholders are actually consider initial goals. Analyst put these goals as an objective, at the top of goal graph view diagram. Initial goals are basic requirement of the stakeholder and the results but must satisfy the stakeholder.

Figure 1: Decomposing Initial Goal in to Sub-Goals

By using AND Decomposition
2- Decomposing Initial goal into sub-goals

For achieving the main goal, analyst decompose initial goals into sub-goals. There sub-goals are essential to achieve the parent goal. There are two types of decomposition of these sub-goals called ‘AND decomposition’ and ‘OR decomposition’. The ‘AND decomposition’ decompose the initial goal into sub-goals, AND Decomposed sub-goals must be achieved. Besides, ‘OR decomposition’ also decompose sub-goals into alternatives, however any one alternative is also fine to achieve.

3- Stakeholder Providing values to sub-goals

Stakeholder will provide contribution values to the sub-goal or alternatives. The chart will be formed where each sub-goal will be measure with all participated stake-holder’s contribution values according to his interest. These characteristics, measures and scores will be provided by each stakeholder of the project.

4- Identify Conflicts

The sub goals chart will help to identify the supporting and conflicting sub-goals as per multiple stakeholder needs. The characteristics and score of compare to the sub-goals will decide, which sub-goal is potential conflict and which sub-goal is supporting to achieve parent goal.

Case Study: Japanese Railway(Train) Base Software Development Requirements Analysis (JRBSDRA).
VIII. FINAL EVALUATION

Final Evaluation and Conflicts Identification: In order to identify conflicts, the analyst can now easily identify stakeholders' needs through the final evaluation chart, according to the above chart provided by two stakeholders having their own interests of the system. Conflicts arise as each other for booking a ticket due to characteristics of the goals; international tourists prefer to buy tickets through the web, while local citizens have their own vehicle, so they prefer to use their own transportation which is feasible for them. Initially, apply this method on just two stakeholders to achieve the goal for understanding the established model.

IX. CONCLUSION

This research paper about the conflicts identification among sub-goals due to stakeholders in goal-oriented requirements analysis presents a supportive and very helpful model to conflicts identification during Requirements Elicitation phase in Requirements Analysis. The goal is to understand the established model. Furthermore, in this paper, four steps of the method are described, which are:
1. Establishing initial goals as per stakeholders' or customers' needs and demands.
2. Decomposing parent goals into sub-goals.
3. Stakeholder offers contribution values to sub-goals.
4. Identifying conflicting sub-goals among stakeholders' needs.

REFERENCES

1. Jennifer Horkoff, Fatma Başak Aydemir, Evelin Cardoso, Tong Li, Alejandro Mate, Elda Paja, Mattia Salnitrri, John Mylopoulos, Paolo Giorgini, Goal-Oriented Requirements Engineering: A Systematic Literature Map, RE 2016.
2. D. Amyot, S. Ghanavati, J. Horkoff, G. Mussbacher, L. Peyton and E. Yu, Evaluating Goal Models within the Goal-oriented Requirement Language, International Journal of Intelligent Systems, John Wiley & Sons, Vol. 25, No. 8, pp 841-877, 2010. DOI: 10.1002/int.20433.

3. Muhammad Suhaib, Atsushi Ohnishi: Potential Conflicts Identification Among OR-Connected Sub-goals in Goal Oriented Requirements Analysis Using Matrix, “Goal-Oriented Requirements .International Journal of Progressive Sciences and Technologies (IJPST, ISSN:2509-0119), pp.280-283, September 2018. http://ijpsat.ijsh-journals.org/index.php/ijpsat/article/view/595.

4. Haruhiko Kaiya, Hisayuki Horai, Motoshi Saeki: AGORA: Attributed Goal-Oriented Requirements Analysis Method, IEEE Joint International Requirements Engineering Conference. (RE 02).pp.13-22, 2002.

5. http://www.nyu.edu/classes/jcf/CSCI-GA.2440-001/handouts/10.1.1.3_6502.pdf , Last Access Date 12/01/2019

6. Suhaib, Muhammad, Analysis of Big Data: Challenges and Fundamentals in the Computing System (June 25, 2019). International Journal of Emerging Technology and Innovative Engineering Volume 5, Issue 6, June 2019. Available at SSRN: https://ssrn.com/abstract=3412001

7. Suhaib, Muhammad, Tilt or Touch? An Evaluation of Steering Control of Racing Game on Tablet or Smartphone (September 1, 2018). International Journal of Innovative Research in Computer and Communication Engineering, Vol. 6, Issue 9, September 2018. Available at SSRN: https://ssrn.com/abstract=3409575 or http://dx.doi.org/10.2139/ssrn.3409575

8. F.G.CysneirosA.ZismanandG.A.Spanoudakis“Traceability Approach for i* and UML Models,"Software Eng. for Large-Scale Multi-Agent Systems Workshop Report (SELMAS 03), to be published in ACM Software Eng. Notes http://whitepapers.zdnet.co.uk/0,39025945,60093304p-39000629q,00.htm.

9. B.W. BoehmandH. In “Identifying Quality-Requirement Conflicts,"IEEE Software, vol. 13, no. 2, 1996,pp. 25–35.

10. Suhaib, Muhammad (2019), Effects of Visual and Auditory Response Times in Males and Females by using Tactile and Mouse on Web Based Environment. International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-8 Issue-3, September 2019 Scopus Indexed.

11. Spanoudakiset al.,”Rule-based Generation of Requirements Traceability Relations,“J. Systems and Software, vol. 72, no. 2,2004,pp. 105–127.

AUTHORS PROFILE

Author: Muhammad Suhaib, Born 1988 in Pakistan This Research Paper Presented in 11th Japan Muslims Researcher’s Interdisciplinary Symposium (JMRIS 2019), Keio University, Tokyo, Japan, Working as Sr. Full Stack Developer at T-Mark Inc., Tokyo, JP, Experienced Senior Software Engineer with a demonstrated history of working in the information technology and services industry, Presently doing double Doctoral Program, Ph.D. Student at Kyushu University, Interdisciplinary Graduate School of Engineering Sciences, Ph. D. (Computer Science) Candidate at IIC University of Technology, Doctoral of Business Administration Candidate Major in Healthcare Services from Institute of Theology and Sciences Institute of Florida, USA, Completed Master of Business Administration from IIC University of Technology, Completed Master of Engineering Major in Information Science and Engineering from Ritsumeikan University, Japan, graduated from Dadabhoy Institute of Higher Education, Department of Computer Science, Bachelor of Science Computer Science, graduated from Preston University Karachi, Faculty of Education, Bachelor of Education, Graduate from University of Karachi, Faculty of Arts, Bachelor of Arts. https://orcid.org/0000-0003-2986-4112

https://muhammadsuhaib.com/