

QSMSR QUALITATIVE MODEL

Shahbaz Nazeer

Government College University,
Faisalabad, Pakistan
shahbaz_nazir1@yahoo.com

Tahir Abdullah

Government College University,
Faisalabad, Pakistan
tahir_wains@hotmail.com

Abstract—Software architecture design and requirement engineering are core and independent areas of engineering. A lot of research, education and practice are carried on Requirement elicitation and doing refine it, but it is a major issue of engineering. QSMSR model act as a bridge between requirement and design there is a huge gap between these two areas of software architecture and requirement engineering. The QSMSR model divide into two sub model qualitative model and Principal model in this research we focus on Qualitative model which further divide into two sub models fabricated model and classified model. Classified model make the sub groups of the role and match it with components. The Fabricated model link QSMSR Principal Model to an architecture design. At the end it provides the QSMSR Architecture model of the system as output.

Key Words — QSMSR (Qualitative Synergism of Multi -agent Software Architecture and Requirement engineering), Software Architecture, Requirement Engineering.

I. INTRODUCTION

There are many requirements elicitation methods, but we seldom see elicitation performed specifically for security requirements. One reason for this is that few elicitation methods are specifically directed at security requirements Mead, N. R. *et al.*, 2006^[1]

The relationship between architecture and requirements of a system to be is neither clear nor understandable, stakeholders may have contradictory goals nor are expectations, non-functional requirements tough to be mapped to an architectural entity. Chung *et al.*, (2000)^[2]

Software architecture requirements engineering are well-known fields of research, education and practice in the software engineering society. Because of the significant progress on these two fronts, we still need the solid basis, technique and tools to support the synergism achievement of architectural objectives within the context of complex stakeholder associations.

The basic concepts of security in computing, and some characteristics of agents and multi-agent systems that introduce new threats and ways to attack. After this, some models and architectures proposed in the literature are presented and analyzed Cavalcante. R, (2011)^[3].

These requirements are often vague, unfinished, incompatible, and usually expressed unceremoniously. By contrast, requirement activities focus on the totality, reliability and confirmation of the requirements. Early stage requirements engineering activities have objectives and suppositions that are different from those of the later stage. Alencar *et al.*, (2001)^[4]

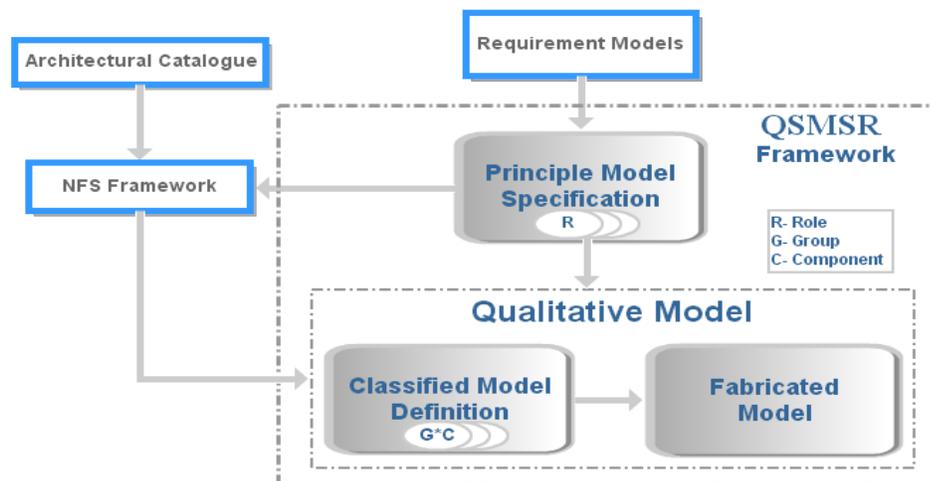


Figure 1: The QSMSR Framework

The QSMSR Framework emphasizes the organizational environment and helps to reduce the gap among Multi Agent Systems (MAS) requirement models and architectural models. To eliminate the gap between these

two fields its follow i* format for doing this basically its gets traditional and modified requirements and then produce the design of that system.

The Organizational Model for Adaptive Computational Systems (OMACS) and the Goal Model for Dynamic Systems (GMoDS). GMoDS is used to capture system-level goals that drive the system. OMACS is an abstract model used to capture the system configuration and allows the team to organize and reorganize without the need for explicit runtime reorganization rules. While OMACS provides an implicit reorganization capability, it also supports policies that can either guide or restrict the

resulting organizations thus limiting unexpected or harmful adaptation. Christopher *et al.*, 2011^[5]

Goal based systems have seen increasing interest in complex, adaptive systems. While there are a number of approaches to eliciting goal-based requirements and to using goals at runtime, there are no frameworks that use goals for requirements while providing a direct mapping to goals used to drive the system at runtime. Scott A. DeLoach *et al.*, 2010^[6]

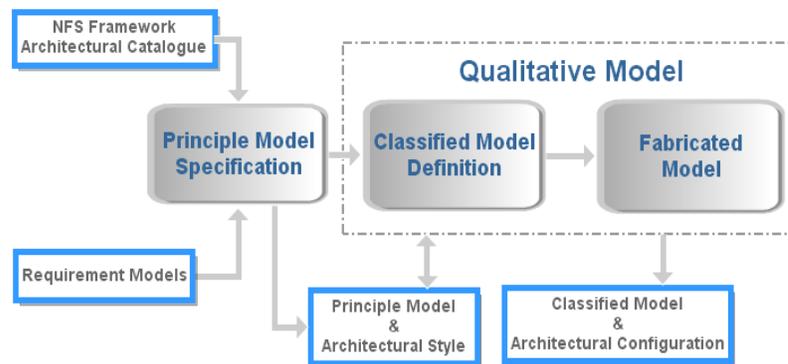


Figure 2: The QSMSR Process Activities

Software that is developed from the beginning with security in mind will resist, tolerate, and recover from attacks more effectively than would otherwise be possible Allen, *et al.*, 2008^[7] QSMSR Model consists of two models principal model and qualitative. The principal model gets the requirement and refines the raw requirements into pure requirements. It provides the architecture catalog for qualitative model. In QSMSR model use different architectural styles for the end results .there are some famous architectural styles are structure-in-5 and joint venture style. Both are the famous architectural style.

Framework is based on two complementary models that separate the concerns of the Social organization from those of the architectural organization. In the Organizational Model, the main goals are identified by understanding a requirement model as the functionality requested for the system. The organization of the social system consists roles and interactions, as intended by the system and its environment. Additionally, the goals and softgoals define the selection of an architectural style. In the Assignment Model, roles are clustered into subgroups. Bastos *et al.*, 2004 [8]

Qualitative Model:

In the Qualitative model, roles are clustered into subgroups. These sub-groups are related to components, based on their similarity with the architectural components. The result is a classified model, which is the allocation of subgroups to architectural components.

Our framework advocates that a system corresponds to an organizational structure, in which actors are members of a group, playing roles in order to perform specific tasks. Roles can be used both as an intuitive concept in order to analyse requirements in multi-agent systems as well as a

behavioral structure in order to derive coherent software architectures.

Furthermore, the QSMSR Framework provides the QSMSR Process to accomplish the transition from classified model from requirements.

The qualitative model is also further divided in two sub model are called fabricated model and classified model. Links the QSMSR Principal Model to an architectural style Assigns sub-groups to architectural components and generates the architectural model of the MAS. Takes Architectural Configuration as input and generates the Architectural Configuration of the MAS.



Figure 3: Qualitative model

The classified divide its activities further in two sub activities correlation analysis and cluster analysis. Clusters roles into sub-groups and matches sub-groups to components. Takes the Principal Model as input and generates the Architectural Configuration as an output.

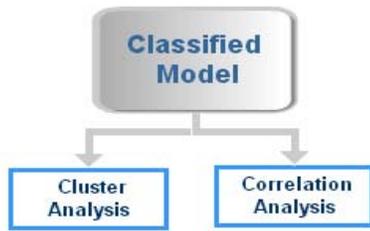


Figure 4: Classified models

The cluster analysis activities are Similarity Correlation Analysis, Centrality Correlation Analysis in this don the correlation and cluster analysis with help of formulas.

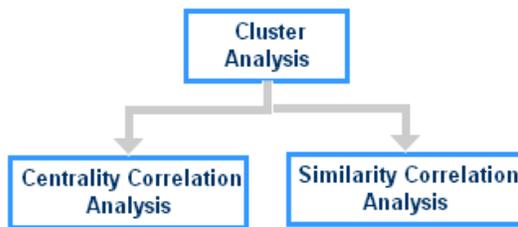


Figure 5: Cluster Analysis

The correlation analysis activities are Similarity equivalence, Centrality Correlation Analysis in this don the correlation and cluster analysis with help of formulas.

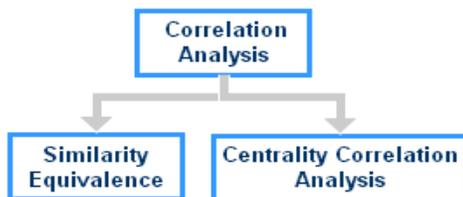


Figure 6: Correlation Analysis

Results:

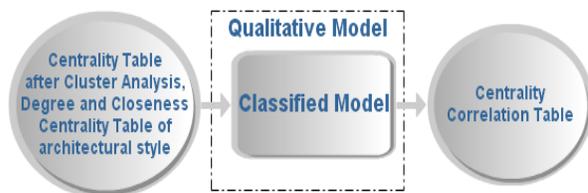


Figure 7: Qualitative Classified model as centrality output

In above figure showed the working of the qualitative classified model that analysis the central actor of the system by using the degree and closeness of centrality table.

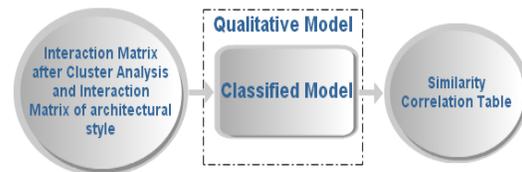


Figure 8: Qualitative Classified model as similarity correlation

In above figure showed the working of the qualitative classified model that analysis cluster of the match that role with different architecture styles and define which roles of the system are the similar to each other.

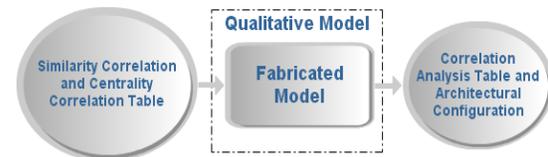


Figure 93: Qualitative Classified model as correlation analysis

In fabricated model Architectural Configuration as an input and allocate the architectural model .it compares the architectural sub configuration with architectural sub model and then the model selected which is best in the best.

DISCUSSION

To eliminate the gap between requirement and the system design we use the QSMSR framework. QSMSR first of all describe the system than divide the system into sub modules and describe the each sub model and match that module with architecture styles. Than it purpose the architecture design of the system. by doing this QSMSR divide its work further into two model principal model and qualitative model each sub model has its own we discuss the each phase of QSMSR model followed by the figures.

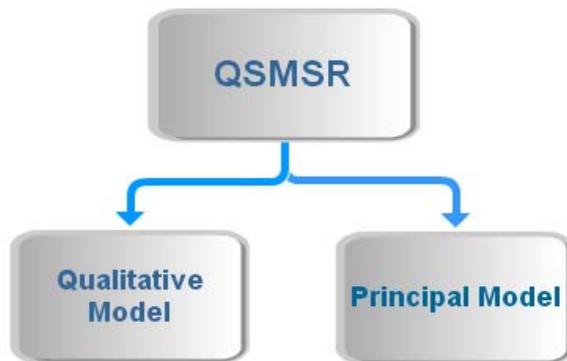


Figure 10: QSMSR basic models

In above figure the main structure of the QSMSR model is discuss that the QSMSR divide into two sub models that are principal model and the qualitative model.

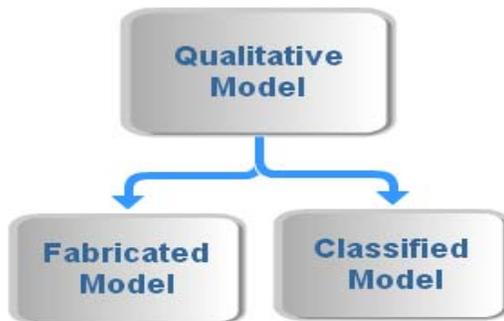


Figure 114: Qualitative model

The qualitative model is also further divided in two sub model are called fabricated model and classified model.

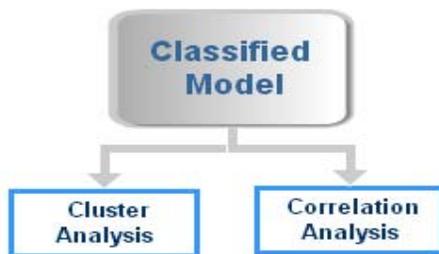


Figure 12: Classified models

The classified divide its activities further in two sub activities correlation analysis and cluster analysis.

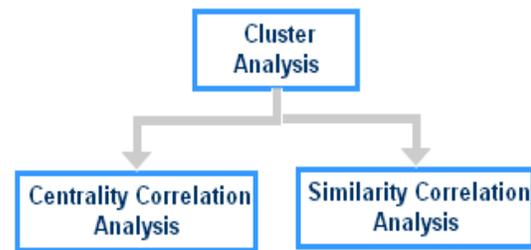


Figure 13: Cluster Analysis

The cluster analysis activities are Similarity Correlation Analysis, Centrality Correlation Analysis in this don the correlation and cluster analysis with help of formulas.

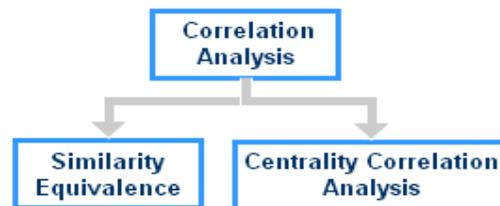


Figure 14: Correlation Analysis

The correlation analysis activities are Similarity equivalence, Centrality Correlation Analysis in this don the correlation and cluster analysis with help of formulas.

CONCLUSION

The QSMSR Qualitative model gets the QSMSR principal model and roles of the actor as the input and than generate the architecture on the basics make the architecture configuration and correlation of group of the roles.

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AUTHOR’S PROFILE



Shahbaz Nazeer

I am presently serving as Lecturer in College of Computer Science & Information Studies, Government College University Faisalabad, Pakistan. He is MS (CS) with specialization in Software Engineering from GC University, Faisalabad Pakistan and BS (CS) (Gold Medalist) with specialization in Software Engineering from GC University, Faisalabad Pakistan.



Tahir Abdullah

I am presently serving as Lecturer in College of Computer Science & Information Studies, Government College University Faisalabad, Pakistan. He is MS (CS) with specialization in Software Engineering from University of Agriculture, Faisalabad and M.Sc.(CS) with specialization in Software Engineering from University of The Punjab, Lahore.