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QSMSR Principal Model

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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. In this research principal model defines how to take input the requirements and to refine it in such a way that the gap is covered.

Keywords: QSMSR (Qualitative Synergism of Multi-agent Software Architecture and Requirement engineering), Software Architecture, Requirement Engineering.

Introduction

The relationship between architecture and requirements of a system to be is neither clear nor understandable, stakeholders may have contradictory goals nor expectations, non-functional requirements are tough to be mapped to an architectural entity, etc Chung *et. al.* (2000) [1].
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) [2].

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)[3].

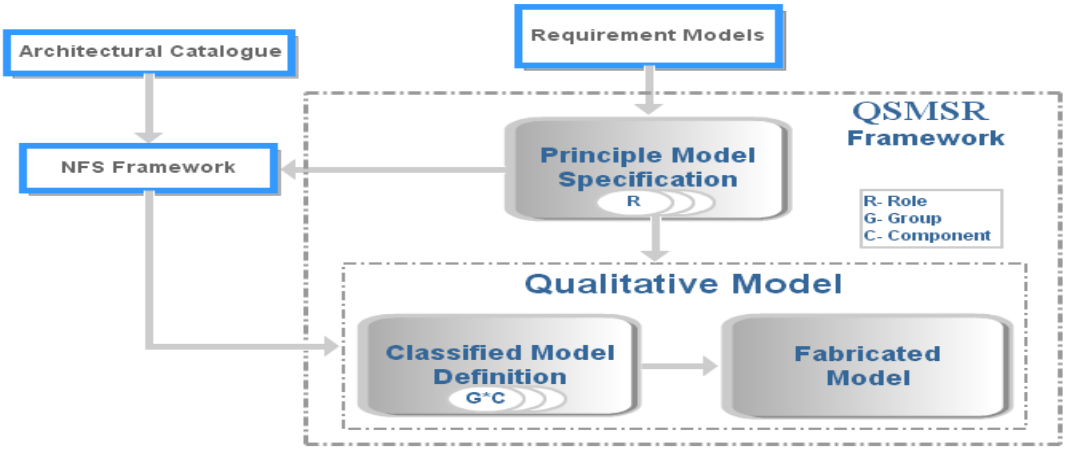

Figure-1 The QSMSR Framework

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

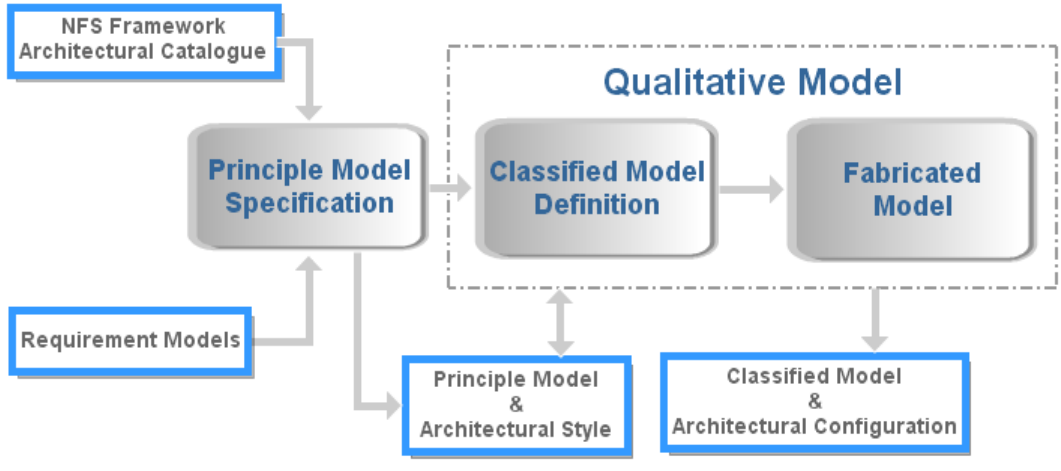

Figure -2 The QSMSR Process Activities

its consist of two models principal model and qualitative. The principal model gets the requirement and refines the raw requirements into pure requirements. And provide 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.

Principal Model

In QSMSR we are focusing on the principal model. The principal model gets the requirements model as the input and than produce architectural catalog. This catalog is further use for much purpose but QSMSR use it for purposing the architectural design of the system. The principal divided into three sub task goal task refinement and role identification and then at the last selection of the architectural selection. These are three main tasks of the principal model of QSMSR model.

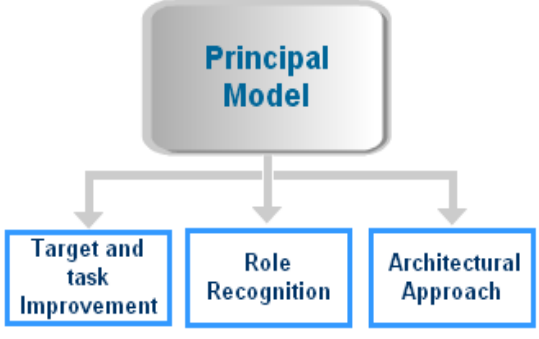

Figure-3 Principal Model

In the goal refinement firstly we analysis the actors and their role after that we refine these goals by their contribution of the system. In this we check which actor involved which type of role and how he interact with the system for this purpose we use the OR Decomposition, AND Decomposition and contribution.
As show in the below figure how a actor contribute to the system. It show how contribute it positively or negatively according to that we select the contribution and refine it. It is root of the sub system.

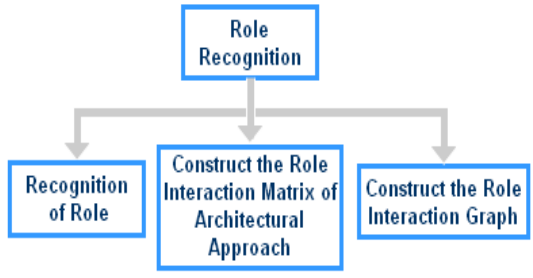

Figure-4 Role identification

In the role identification we define the role of the actors of the system. In MAS the scenario is totally different its too much complex to having the role identification. For this there is some specific tasks are followed by the role identification. Tasks are group together and show depends of these to each other's and similar task are group into one and different task are group in different group. In this we define the roles and define the relation between the roles how roles are interact to each other .in this we check the low level of coupling of the roles. The groups are refining her again as per role and iteration to each other and these are the selected goals that are we accomplish further. The process is processed as further.
The architectural selection has two sub task centrality equivalence and similarity equivalence.

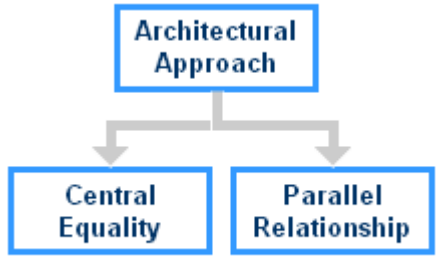

Figure-5 Architectural selection

Architectural selection depends on two task centrality equivalence and the similarity equivalence. In first task we find out the centurial actor of the given problem. For this purpose we draw the role interaction graph and for that graph we calculate the in degree and out degrees of our actor and the actor mostly have the in and out degree we consider it as the as our centurial actor. In second we check

is there any similar actor existed which doing the same task in the system if exist than we eliminate that actor.

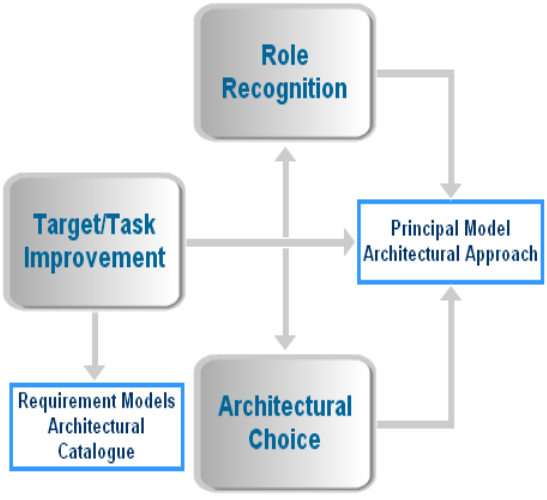

Figure-6 The Principal Model Specification

The process of the QSMSR principal model is defined in above figure in principal model firstly we get the goal and task refinement from the requirement model. For this the QSMSR principal model define the clustering and in other sense you can say define the sub task of the system and than refine it. After the refining process .The principal model gets it as the input for this model. than model applied correlation and clustered analysis on it for this we use the perason correlation formula we apply this formula to all sub task and take the correlation of that sub task and in the same time we have some architectural design or architectural style where the our correlation results are matched. Than we calculate the correlation of the architectural style and match this correlation to our problem than we convert it in to the architectural style. Suppose we have the example where we have the 7 actors but our correlation matched with structure-in-5.and in it we have the 5 location. Than we analysis the problem and check which actors are doing more likely to same work than we merge these actor .for example we have two actor journal reviewer and review handler for the example of journal publisher by seeing these actors as their abstract view we combine it into one and give the name review controller that further have two sub actors handler and reviewer.

Results and Discussion

In below figure we have input SR model and shoe the results to refine the figures of our goal we refine our goal and the refine goals are our out put.

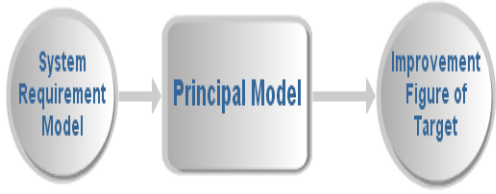

Figure-7 SR Model to Refinement of goal

In this figure the refinement of goal process by the recursively and used as a input of the system and the results are the roles of the system.

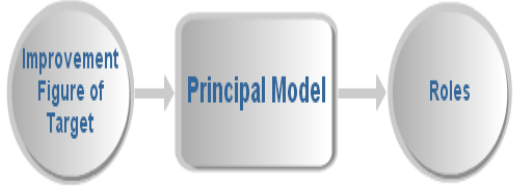

Figure -8 Refinement of goal to roles

In below figure the roles used as the input and the resultant is the role iteration graph.

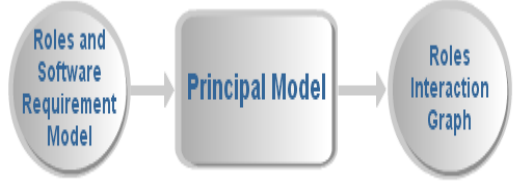

Figure-9 Roles and SR model to Roles interaction graph

In below figure the role integration graph and architecture style is used as the input and the resultant role interaction matrix of architectural style.

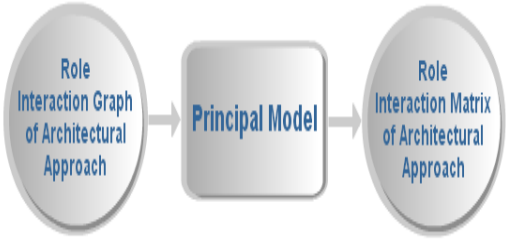

Figure-10 Architectural style and its role interaction to role matrix

Conclusion

The QSMSR principal model gets the requirement model as the input than convert theses requirement in to sub tasks after that applying correlation on these sub modules. It provides the catalog architecture for the QSMSR Qualitative Model.

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