HOMER-Agent oriented Requirement Engineering

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Abstract: **There has been a keen interest in the field of agent-oriented software engineering since last two years. Considerable attention is being paid to requirement engineering for agent based system. Studies have been done on models and notations for requirement but there have been little studies done on elicitation techniques. This study introduces HOMER, a technique of requirement elicitation which is uniquely agent oriented. The study depicts the integration of an agent oriented software engineering, ROADMAP and HOMER. HOMER addresses the lack of requirement elicitation technique.**

Keywords- Agent, Requirement Engineering, ROADMAP.

I. INTRODUCTION

There has been [1] immense research that conveys the requirement for agent oriented system. An agent helps in providing an intuitive way to look at a software system through human eye.

Through this paper we study about Human Oriented method [4] for eliciting requirements also abbreviated as HOMER with a purpose to provide elicitation support for AOSE models and agent oriented requirement engineering frameworks. This study depicts the way ROADMAP [5], an AOSE technique for analysis and specification of agent requirement is supported by HOMER.

HOMER uses an organizational metaphor like hiring of staff to extract the requirement from clients. HOMER is an elicitation technique for agent based system which finds out requirement in such a way that it can be easily translated into role and goal models which are used by AOSE frameworks that includes ROADMAP.

This paper describes:

What is HOMER and how it's conducted.

- Depicts the integration of HOMER and an AOSE framework with the help of ROADMAP model as an example.

This study also discusses the work that still remains to be done in the field of agent oriented requirement elicitation.

II. AGENT ORIENTED ELICITATION

Organizational metaphor was used to analyze and specify the requirements. The previously developed models lacked elicitation technique [2] which meant to easily elicit requirements for agents by using organization as a guiding metaphor. This lack in elicitation

technique was later overcome by HOMER. In this study HOMER has been presented as an extension to ROADMAP.

A. Background

HOMER was developed to overcome the problem encountered during project ARMS and Daedalus which was conducted at the University of Melbourne.

ARMS was developed in Agent Lab. ARMS is an automated management system develop in order to study their research students, associates and agent – related activities. Daedalus was part of 4th year software engineering project and it was develop to automate home security system. In both the project, during concept phase it was identified that agent based architecture would be a relevant choice. However it was found that during requirement specification phase in both project the elicited requirements were difficult to specify using ROADMAP. The elicitation was performed using standard interview techniqueand was not able to apprehend completely the client's desired solution. It was hard for the clients to express as per the autonomous and open-ended nature of agent based system. Moreover, the requirement were elicit based on desired featured. There is a need to break down the requirement into goals and roles at the time of specification phase in agent based system.

It was implied as an unnecessary step, since the client felt more at ease in reading the specification which use goals and roles, they also have to be at ease while expressing their requirements. In order to understand these issues, we studied an interview questions which will describe the nature of agent oriented system and help in better functioning of agent oriented frameworks. The solution to the problem came from agent oriented elicitation technique also known as HOMER.

B. Aims

This section describes the motives which lead to the development of agent oriented elicitation technique, also known as HOMER. The main goals in developing HOMER are as follows:

Appropriateness: The main aim was to extract requirements for agent friendly system that were appropriate for a AOSE model and to make it appropriate for non-technical clients there is a need to specify the requirement in non technical manner.

Completeness:The aim is to extract a complete requirement from clients. These requirement need to illustrate all the attribute of the system in order to solve the client's problem. Even with the help of supporting agent models, it can be difficult to describe and conceptualize requirements by clients.

Comprehensibility:The final aim is to extract requirements from the clients in a manner which is easy for them to understand, despite what their technical background is and we have to specify the requirement in such a way that it can be easily handled by ROADMAP as well as other agent oriented requirement framework.

C. Elicitation Technique

This section describes, how HOMER is used to extract requirement from

clients. Organizational metaphor is used by HOMER to elicit requirement. Hiring new staff is an organizational metaphor which is used. It is assumed that the project concept phase is complete and the project is agent friendly before using HOMER.

Hire New Staff

The elicitation technique forms the basis of HOMER model. It is based on the metaphor of hiring new staff within an organization. The purpose is to enable the client to identify the problems in terms on which the new staff needs to be hired for solving a problem. For non-technical clients, the context is more in spontaneous way to conceptualize the system. For technical clients, it helps to elicit the requirements in an abstract manner. To identify the client's needs, following questions needs to be discussed:

In order to hire new staff to handle your present problem which position needs to be filled? E.g. Secretary

Each position which needs to fill requires a job description.

What is the ambition of the position? What facet of the problem will be solved by the person? E.g. to efficiently schedule the meeting of the project manager as per the requirement of project manager. It helps the project manager to attend the meeting as possible and it also help in achieving the objective of saving time.

What tasks are to be performed? E.g. Meeting Schedule

For every task mentioned above: what subtask does the main task consist of? E.g. for preparing effective meeting schedules, rearranging meeting place & time, reading important notices regarding meeting.

What are different conditions for this task? E.g. allowing a slack time of 30 minutes between the meetings, first preference to management meeting over other meetings.

a) Which other people within the company would be a helping hand? E.g. Building Supervisor(for room booking)

b) Which people within the company depend on this person? E.g. Project Manager(for schedule information)

c) What knowledge of the company is required by the person in order to perform the task effectively? E.g. filtering project manager's emails, room booking system (existing).

1. What codes of behavior are to be followed by all your employees? E.g. not to overwrite on another's room booking.

   a) Does specific codes of behavior exists for a specific position and what are they? E.g. the secretary should not disclose project manager's schedule.

2. What are the rules and regulation? E.g. no personal email can be send from company email account.

III. 3. HOMER AND AOSE

In the requirement phase while developing a software project HOMER

is required, regardless of the software development lifecycle. Whenever elicitation is required homer can be used.

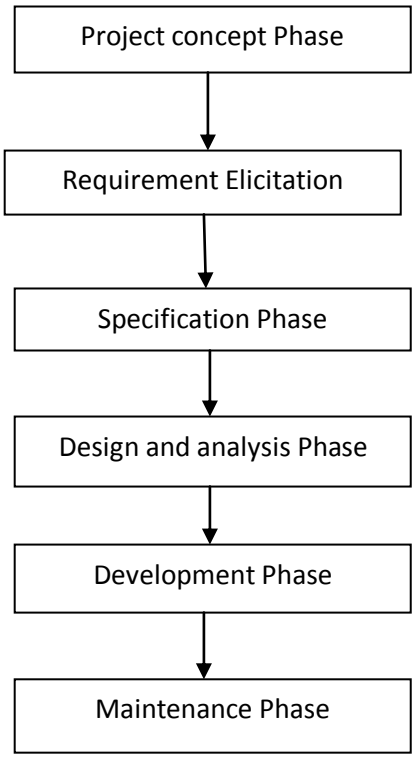

Figure 1: HOMER and development Life cycle

D. ROADMAP

ROADMAP is an AOSE [5] technique developed at the University of Melbourne. ROADMAP is being used as an illustrated example for using HOMER in the study as it is familiar approach.

Agent oriented system is viewed by ROADMAP as a collection of models at every stage in SDLC. It consists of three fields-application specific model, domain specific model and reusable service model. Each model has a particular support in architectural design phase and requirement analysis phase.

HOMER is a supporting pillar in attaining ROADMAP goals and roles models.

These models are a part of application specific component in ROADMAP's requirement specification and analysis. The goal model provides an overview of the system requirement in ROADMAP. The model consists of system and quality goals. The role model is related to position description in ROADMAP. It consists of all goals correlated with positioning and also includes constraints involved in achieving those goals.

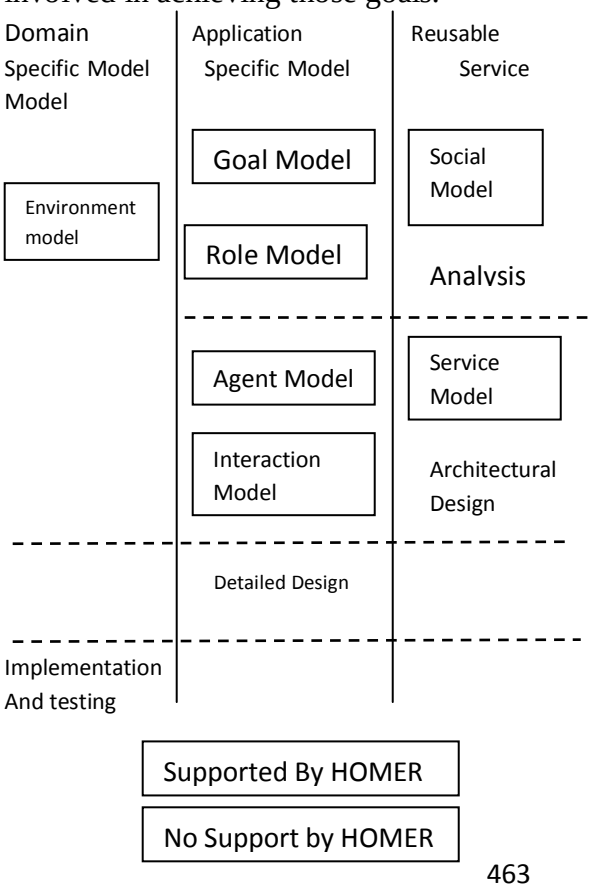

Figure2: This figure depicts the ROADMAP Model

E. Integrating HOMER

This section describes how HOMER is used with AOSE framework, ROADMAP as an example. Firstly HOMER is used drive the elicitation and then role and goal models of ROADMAP can be used for analysis and specification of requirement at software requirement phase.

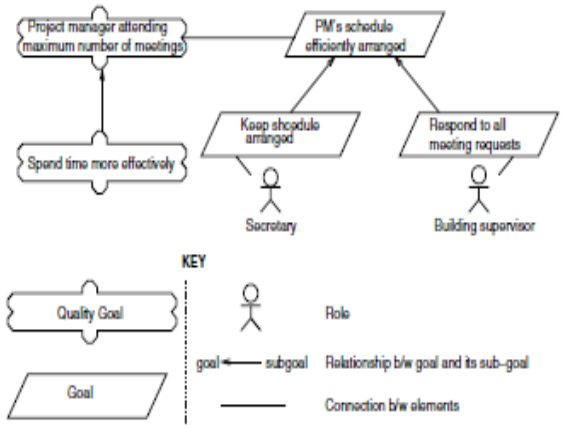

Figure 3: This figure shows the goal model for the secretary.

Role Name	Secretary
Description	Manage the Project Manager's Schedule
Responsibilities	Scheduling Meeting • Booking rooms for meetings. • Acknowledgement of emails requesting meetings. • Insightful of project manager's schedule. • Reorganizing the project manager's schedule to adjust for new meetings.
Constraints	1. Management meetings take first preference over other meetings. 2. A 30 minute slack time must be schedule by secretary while entering meeting into the schedule of the project manager. 3. Room booking is to be made through building supervisor. 4. Schedule to be revealed only to project manager.

Table1. It shows the role schema of secretary.

IV. CONCLUSION

Agent oriented requirement engineering is a unique tool for abstraction that helps a client to see software in human terms. Through the study we see how HOMER is a technique which increases efficiency and ease in designing and developing a solution of clients' problem. We also study the integration of agent based system like ROADMAP and HOMER. HOMER addresses the lack of requirement elicitation technique.

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