AGFL - Agent Goals from Lexicon - Eliciting Multi-Agent Systems Intentionality

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Abstract. "Agent-Oriented Software Methods" deals with agents' goals, commitments, beliefs, and abilities, but very few of these methods properly deal with the elicitation of these concepts. We believe that to build a goal model, first of all, we must accurately elicit and work with goals in several levels. Our approach named AGFL – Agent Goals from Lexicon is an indirect inquire process that can recognize goals via a simple elicitation strategy. In order to support this activity we will develop a software tool integrated with C&L, a software tool for lexicons and scenarios management. We posit that our approach helps the elicitation process and helps the production of more solid i* models.

Keywords: early requirements, GORE, Goal Oriented Requirements Engineering, MAS, Multi-Agent Systems.

1 Introduction

There seems to be a consensus that dealing with intentionality at early stages of software projects is a reasonable idea. When talking about intentionality we are directed to consider a goal-oriented approach and therefore, we need to understand and define why we are using goal modeling. The goal concept has come to play a critical role in Requirements Engineering (RE). In RE, goals are considered a significant construct. Various researchers consider GORE one of the best ways to produce quality software and therefore because MAS deals with agents' goals, the GORE approach seems particularly applicable to MAS.

This work is a summary of an earlier paper [4], the figures were adapted from there, and references were reduced in order to use four pages.

2 Objectives of the research

We face a common misuse, in the software engineering community, of the goal concept. Many people believe, wrongly, that a goal is like a function or an action that stakeholders can perform. Our research uses goals and softgoals in the same way used by the i* Framework [6]. And, in order avoid free style representations, which allow a goal to be represented like a function or an action; we adopted pre-defined frames that

have the purpose of driving the requirements engineers to represent stockholder's intentionality.

One important gap in GORE approaches is the fact that GORE methods do not deal specifically with intentionality elicitation. All of them, no exception, are strongly oriented towards modeling.

Another motivation for this work relies on the common misuses of i* models pointed out by Estrada [1] and Pastor [5]. Ideally i* models should be divided into small pieces avoiding scalability problems and also improving the stakeholders' understanding.

3 Scientific contributions

In this work we introduce a method named AGFL – Agent Goals from Lexicon [4] showed in Figure 1, which is formed by tree steps. In the first activity ***"Elicit Actors' Goals"*** the engineer captures goals (and softgoals), separates them by actors, and organizes them in a chronological order.

For pushing up AGFL intentionality elicitation, the proposed method selected the Language Extended Lexicon (LEL) [2] because LEL promotes the capture of hints to find goals. As LEL captures the application vocabulary elements and classifies them as: subject, (someone who does the action) object, (something that receives the action) verb, (that means the action) and state (that is a result of the action), it provides a proper base to find application goals.

Our idea is simple: "ACTIONS CHANGE STATES AND STATES ARE GOALS". "A goal is a condition or state of affairs in the world that an actor would like to achieve" Yu [6].

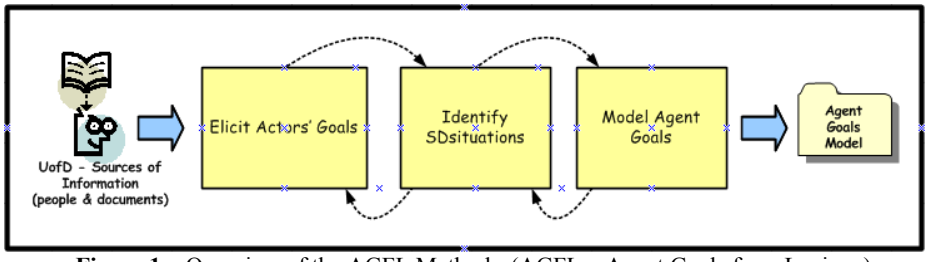

Figure 1 – Overview of the AGFL Method - (AGFL – Agent Goals from Lexicon)

In the second activity ***"Identify SDsituations"*** the engineer identifies goals (and softgoals) arrangements that are connected in order to implement situations of dependency called SDsituations – Strategic Dependency Situations [3].

Situations of dependency occur in the organizational environment and the central idea of SDsituations is: "each dependency link (goal, softgoal, task or resource) that involves actors is not isolated"; it is part of one well defined situation of collaboration called one "strategic dependency situation" or one SDsituation [3]. One SDsituation is composed by one or more dependency elements, and any SDsituation can be identified separately from other SDsituations forming a chain of interdependencies. An SDsituation can be characterized as part of the business unity. It means that we should identify several separate SDsituations but one depends on the others critically. Interdependencies among SDsituations may be physical, logical or temporal and can be represented in a specific diagram [3].

In the last one ***"Model Agent Goals"*** the requirements engineer builds diagrams, a kind of state charts that considers actors/agents, in order to represent chains of goals (and softgoals) relationships. The diagrams are called "INTENTIONALITY PANELS" and they are a simpler view of the i* Framework SR model.

The AGFL method suggests that intentionality should be drawn in parts based in SDsituations in a new diagram, called "Intentionality Panel" – IP diagram [4]. This diagram is a reduction of the SR model, it considers the i* "means-ends" structure being represented only by the structure end (goal or the softgoal) and the relationships between goals and softgoals are thus represented. An "Intentionality Panel" – IP diagram, is a kind of state-chart because it has different states linked together in a chain actors/agents' goals and softgoals.

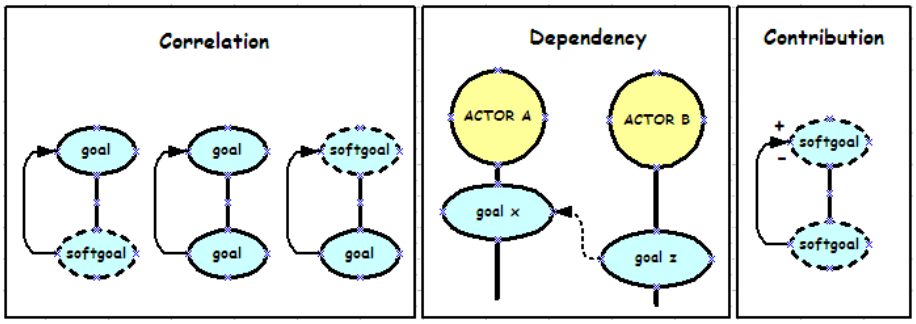

Figure 2 – It shows how the i* SR model can be reduced into one IP diagram.

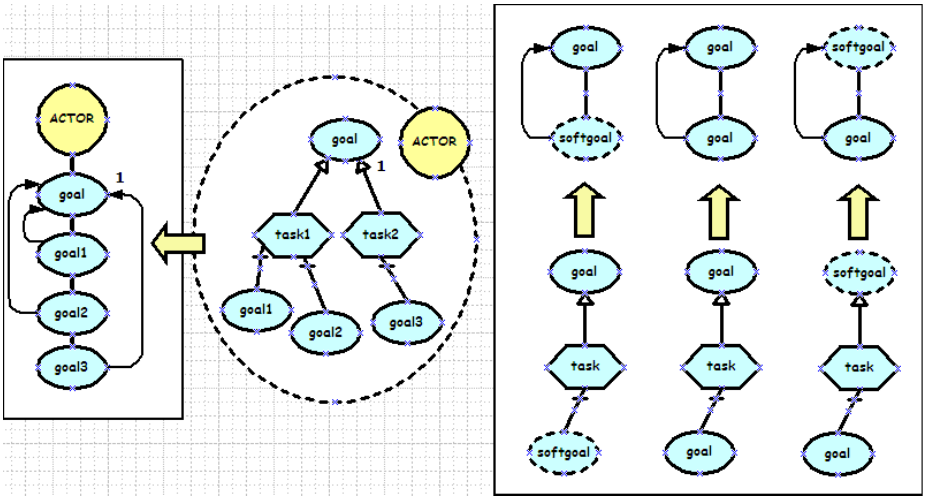

Figure 3 – In the right are represented the correspondences between SR model and the Intentionality Panel in the representation of **correlation**. In the left alternatives are represented. By one hand, goal[1] and goal[2] together they have correlation to the main goal be achieved but on the other hand, with ID=1, goal[3] has an alternative correlation to the main goal to be achieved

The first one activity ***"Elicit Actors' Goals"*** is partially supported by the C&L tool software, which is a management tool for lexicons and scenarios. C&L is an open tool

developed by the Requirements Engineering Group at PUC-Rio and is available at http://pes.inf.puc-rio.br/cel/.

4 Conclusions

The method, AGFL, brings goal elicitation as the prime concern, towards properly supporting MAS development. The main contribution is to elicit agent goals by a method based on the Language Extend Lexicon [2] of the domain, which follows the simple idea represented bellow: "actions point to goals".

We have applied the AGFL method for the Insurance Company case study as a proof of concept. Our results are encouraging; however, more research in the use of the AGFL is necessary. We need to apply the strategy in different situations in order to get practical evidence of the benefits of applying the approach in real cases. While carrying out these experiments we will also evaluate how well the approach scales to more complex problems.

5 Ongoing and future work

We plan to continue the work in this direction by performing more analysis using the method AGFL. We need to apply the strategy in different situations in order to get practical evidence of the benefits of applying the approach in real cases. While carrying out these experiments we will also evaluate how well the approach scales to more complex problems.

Based in the method, we intend to implement a software tool supporting traceability and the baseline for requirements evolution. The baseline traceability support should allow the process **forward**: *UofD* → *LEL* → *SDsituations* → *IP diagram* and **backward**: *IP diagram* → *SDsituations* → *LEL* → *UofD*.

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