A Goal-Based Model Of Interpersonal Relationships

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Abstract

Interpersonal relationships are a pervasive dimension of human behavior and decision making. Actors make choices based both on personal goals, and on goals derived from interpersonal relationships. We present a goal-based model of decision making that combines the motives of the actor with agendas adopted through relationships. A unifying feature of the model is the use of importance as a means of ranking both goals and relationships. We describe a computer simulation of the model in the domain of Congressional roll-call voting.

1 Introduction

In making a decision, a person must often consider the goals of others. An actor's relationships with other people will influence such decisions. In this paper, we discuss a specific model of interpersonal relationships. This model serves as the basis for a computer simulation in the domain of Congressional roll-call voting. VOTE uses knowledge representations of selected members of the House of Representatives, their voting records, ideologies, and relationships with constituency groups to derive and justify voting decisions. Here is a brief example.

```
> (vote 'udall 'plant-closing)
* Member:        Morris K. Udall
* Bill:          Plant Closing Layoff Notice Bill
* Requires employers of more than 100 workers to give 60 days
* notice of a plant closing or layoff lasting more than 6 months.
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— intermediate output deleted —

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* English rationale:

Morris K. Udall votes for bill S-2527, Plant Closing Layoff
Notice Bill.  He believes the adverse effects of this bill are
far outweighed by other issues.  He readily endorses the
proposal of requiring 60 days notice prior to closing a factory.
Udall is strongly in favor of the legitimate rights of decent
working people.  Udall strongly supports the principle of
fairness in society.  He believes in the principle of government
regulations in the national interest.  At the same time, he
realizes that the country as a whole approves of the principle
of free enterprise and capitalism.
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In arriving at a decision, VOTE infers the implications of a particular bill for the relevant constituency groups. VOTE has a natural language generation capability for expressing the justification of the decision. In this paper, we first discuss the model of goal-based decisions and interpersonal relations that underlies the VOTE program. We then examine the representation of relationships in VOTE in the context of the Udall/Plant-closing example.

2 Goals, Importance, and Relationships

In making a decision, an actor often faces trade-offs. Decisions may involve conflicts among goals and resources. A realistic model of decision making and planning must account for a multitude of goals. However, all goals are not created equal. We use *importance* as a measure for ranking goals.

> **Principle of Importance.** The importance of a goal is proportional to the resources which the actor is willing to expend in pursuit of that goal.

That is, the relative importance of goals is determined when goals compete for the same resource. The more important goal is allocated the resource, all other things being equal. Importance here is equivalent to Wilensky's *value* [Wil83].

Given two alternatives, an actor contemplates which choice is *better*, that is, which choice achieves the more important set of goals. We should note that the definition of *better* is not always an easy proposition. The straightforward methods of decision analysis [Rai68] of assigning weights and probabilities to outcomes often finesse issues of cognitive significance, such as memory and attention constraints.

People are interdependent. Many of a person's common goals require the help of another person. Given that individuals differ in goals, resources, experience, and other areas, it is natural that the relationships between individuals will be idiosyncratic as well. We argue that interpersonal relationships will reflect the underlying idiosyncratic goal structures of the individuals.

However, even though interpersonal behavior will exhibit wide variation as a function of the individuals involved, we can derive a set of standard dimensions, such as the following.

- *Goal achievement.* We commonly view relationships as examples of cooperative behavior. That is, we get others to achieve goals for us, and we in turn may satisfy their goals, either directly or indirectly. We vote for a candidate whose record reflects our beliefs.

- *Goal development.* Some relationships cause us to develop new goals for ourselves, rather than merely satisfy the goals of another actor. A political leader may inspire people to adopt a new cause.

- *Importance.* We wish to ascribe importance to a relationship in a manner uniform with our use of importance to describe goals and resources. That is, the more important a relationship, the more likely a person will be to allocate resources for goals affected by that relationship. The US is more likely to send aid to Israel than to Sri Lanka.

- *Symmetry.* Relationships are bilateral. Two people are involved. However, each party may have a different view of the relationship, as well as a different view of the other party's role in the relationship. For example, a Congressman may not treat his relationship with the NRA with the same importance that the NRA does. Such a relationship would be asymmetric.

We wish to distinguish between interpersonal relationships and interpersonal role themes [SA77, Dye82]. A relationship is binary, that is, between two parties. A role theme is n-ary, that is, a collection of relationships. For example, the waitress role theme has numerous relationships: with the customer, with the chef, with the maitre d', with the bus boy, with the manager, with other waitresses, with the customers of other waitresses, and so forth. Associated with each of these relationships are interleaving goals. That is, there are two actors who engage in plans that affect each other's goals. In effect, each actor has *adopted* some of the perceived goals of the other actor.

> **Principle of Interpersonal Goals.** Adopted goals are processed uniformly as individual goals, with a priority determined by the importance of the relationship.

Thus, the importance of the relationship determines what relative importance will be assigned to the adopted goals. The principle of importance applies to adopted goals, meaning that a person will expend resources in pursuit of an adopted goal in proportion to the importance of that adopted goal.

The principle of interpersonal goals encompasses various goal-based phenomena related to importance, such as the following:

- *Resource allocation.* An actor will be willing to expend more resources on an adopted goal if the affected relationship is of greater importance. You are more likely to help a friend than a stranger.

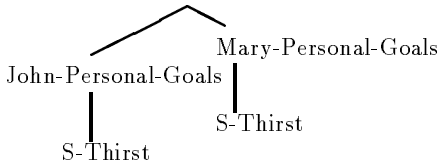

Figure 1: John-Mary Relationship: Mary Regnant

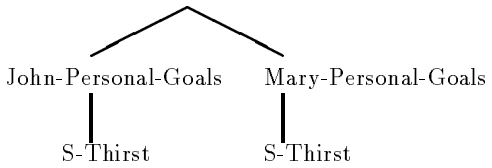

Figure 2: John-Mary Relationship: Egalitarian

- *Cognitive resources: attention.* You would expect to spend more time thinking about the interests or problems of a close friend than those of an acquaintance.
- *Cognitive resources: memory.* It should be easier to remember information about a friend than about a casual classmate.
- *Affect.* You will be more likely to experience an emotion relating to an adopted goal if the relationship is of greater importance. Also, the intensity of the emotion will reflect the importance of the relationship. You are more upset at the death of a parent than that of a neighbor.

Most of our examples will focus on the phenomenon of resource allocation, however, we claim that the cognitive phenomena are similarly extended to this goal-based model of interpersonal relationships.

Consider a simple example. John, who is thirsty, has a girlfriend, Mary, who is also thirsty. They both want some milk. If there is only enough milk for one person, John may give all the milk to Mary, indicating that he has adopted her goal of satisfying her thirst, and decided that his relationship places her needs above his. This situation is depicted in figure 1, which indicates that John has adopted Mary's goals at a level higher than that of his own personal goals. They have equal desires to satisfy thirst, but it is important to John to satisfy Mary's goals in general. Therefore, he will sacrifice his own desires.

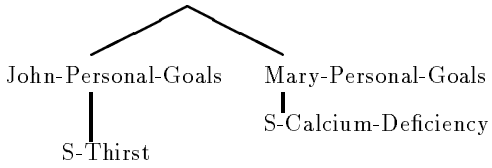

Figure 3: John-Mary Relationship: Unequal needs

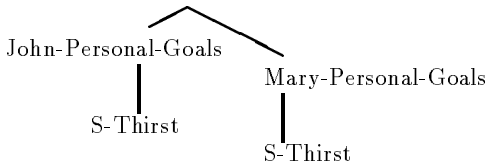

Figure 4: John-Mary Relationship: John Regnant

Alternatively, John may have an egalitarian view of their relationship, suggesting that they share the milk. This situation is diagrammed in figure 2.

However, if Mary has an acute calcium deficiency, making her need to drink milk more pressing than John's, John would give her the milk. Figure 3 portrays this state of affairs. The relationship is egalitarian, but Mary has a greater need.

In another scenario, John may have just had an argument with Mary, making him lower the importance factor of their relationship; so while John might be willing to expend resources in achieving high-priority adopted goals, such as in saving Mary's life, he is not going to let his own interests take a backseat, and he drinks all the milk himself. Figure 4 illustrates this situation.

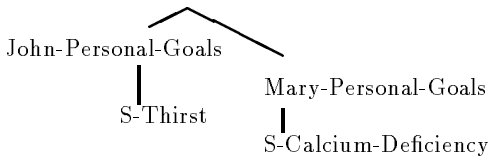

Figure 5: John-Mary Relationship: John Callous

Finally, figure 5 illustrates an extreme situation in which John is simply selfish. Here John places his own less important needs over the more critical needs of Mary.

This model of goal adoption suggests a hierarchy of relationships.

High-priority: Spouse, Children
Self
Parents, Siblings, Close Friends
Colleagues, Partners
Classmates, Neighbors
Low-priority: Strangers

This ordering is merely an example. It indicates someone who cares more for his children than for his parents. It also suggests that the person will put the well-being of his wife and children ahead of his own. The hierarchy of relationships is idiosyncratic and may vary among people and cultures, and even within the same individual at different times in life.

3 Congressional Constituencies

We now turn to the application of the model of interpersonal relationships to a specific computer program, VOTE.

We first should note that Carbonell used goal hierarchies to model political ideologies in adversarial relationships [Car79]. His POLITICS program focused on counterplanning — taking measures to keep your opponent from achieving his goals while preventing him from blocking your own plans. The representation offered here is compatible with Carbonell's model. However, the focus of the VOTE program is on cooperative behavior, rather than counterplanning. Outside the domain of foreign policy, it is usually more important to help your friends than to thwart your enemies.

VOTE, written in T [Sla87], comprises over 12,000 lines of code, and over 8,000 lines of data. The VOTE program relies on a set of interrelated databases, including issues (over 200 currently in the database), constituency groups (150), bills (41), members (68), and decision strategies (20). We note that many decision strategies are required since the explanation of the decision depends on the strategy. It is not enough to use one simple strategy of summing the weights of the conflicting issues and relationships.

In VOTE, we use the names and records of real members of Congress, and attribute relationships and issue stances to them. The coding decisions were made by an expert informant with experience as a political consultant and White House staff member. By way of disclaimer, we should state that these data are merely illustrative, and are not meant to represent the beliefs of actual members of Congress. Thus, we make no claims for the accuracy of these coding decisions, nor of the voting behavior or explanations exhibited by the program. The purpose of VOTE is not to predict individual voting decisions, but rather to

demonstrate the feasibility of a particular model of interpersonal relationships and decision making.

Stances and **Relationships** provide mappings for issues and groups, respectively. Associated with a particular instance will be a level of importance from A (high) to D (low), and a polarity (pro or con).

For example, VOTE has the following representation for the relationships for Representative Udall.

```
Relations:     ((PRO B MEMBER:MEMBER.1025 ADA)
                (PRO A MEMBER:MEMBER.1025 ACLU)
                (PRO B MEMBER:MEMBER.1025 COPE)
                (PRO C MEMBER:MEMBER.1025 CFA)
                (PRO C MEMBER:MEMBER.1025 LCV)
                (CON B MEMBER:MEMBER.1025 ACU)
                (CON B MEMBER:MEMBER.1025 NTU)
                (CON B MEMBER:MEMBER.1025 NSI)
                (CON B MEMBER:MEMBER.1025 COC)
                (CON B MEMBER:MEMBER.1025 CEI)
                (PRO C MEMBER:MEMBER.1025 DEMOCRATS)
                (CON C MEMBER:MEMBER.1025 REPUBLICANS)
                (PRO C MEMBER:MEMBER.1025 COUNTRY))
```

VOTE can express these relationships in English as follows.

```
Morris K. Udall unwaveringly endorses the ACLU's strong defense
of the Bill of Rights.  He feels strongly in favor of the
progressive agenda of COPE, as well as the ADA as a proponent of
basic American values.  He is strongly against the narrow special
interest of the Chamber of Commerce, the CEI business special
interest lobby, the ACU's right-wing reactionism, the National
Taxpayers Union, as well as the NSI as an example of the radical
right.  Udall opposes Republicans.  Udall approves of the
Consumer Federation of America, the League of Conservation
Voters, the country, and members of the Democratic party.
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In considering the Plant Closing bill given in the opening example, VOTE arrived the following set of stances in favor of the decision (`Reason:`), and one stance in opposition to the decision (`Downside:`).

```
Reason:        (((PRO B GROUP:COPE PLANT-CLOSING)
                 (PRO B GROUP:DEMOCRATS PLANT-CLOSING))
                ((PRO B GROUP:COPE LABOR)
                 (PRO B GROUP:ADA LABOR)
                 (PRO B GROUP:DEMOCRATS LABOR))
                ((PRO B GROUP:COUNTRY FAIRNESS))
                ((CON B GROUP:CFA DEREGULATION)))

Downside:       ((PRO C GROUP:COUNTRY FREE-ENTERPRISE))
```

The key issues supporting this bill were plant-closing (the issue itself, as opposed to the particular bill), labor rights, fairness, and opposition to deregulation. There were proponents for each of these issues: COPE (the Committee On Political Education of the AFL-CIO), the Democratic Party, Americans for Democratic Action, the normative views of the country, and the Consumer Federation of America. Each of these groups had a positive relationship with the Congressman, and the resulting decision reflects their interests and issue agendas.

The downside stance reflects the normative view in support of free-enterprise. While the plant-closing bill involved several other issues not given here, none of them were of interest to this Congressman or his constituents.

4 Conclusion

We have proposed a goal-based model of interpersonal relationships. By allowing adopted interpersonal goals to be processed uniformly with personal goals, the model affords robustness and flexibility. Importance provides a means of ranking both goals and relationships. The VOTE program demonstrates the feasibility of the model in a realistic domain.

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