

ARGUMENTS OF PERSUASION IN LABOUR MEDIATION*

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ABSTRACT

In this paper we present a process model of the reasoning underlying arguments of persuasion and its embodiment in a computer program, the PERSUAOER, which gives counsel for the resolution of impasses in collective bargaining. We show how goal trees can be searched to produce arguments involving economic quantities.

1 ARGUMENTATION STRATEGIES

Arguments of persuasion are those used by the participants in cooperative problem solving. While others have worked on argumentation, none so far has worked on persuasive arguments. The work of Flowers, et al. (1982) was concerned with adversary arguments and Spohrer and Riesbeck (1984) have investigated understanding causal relationships among economic quantities based on arguments given in newspaper articles.

"Convincing" someone to accept a proposition can be effected by two strategies: 1) showing that the proposition furthers the person's goals, or 2) indicating how refusing the proposition threatens his goals. In labour negotiations, the second strategy is crucial. This paper presents a procedure for constructing threatening arguments during labour mediation.

Collective bargaining is the process through which a company and a union arrive at a contract. Argumentation is used to persuade the opposing party to grant concessions, to support one's own demands, and to thwart attempts by the opposition to gain concessions from one's own side. A mediator, called in to help the two sides reach an agreement, tries to convince each party to accept the necessary concessions. The final agreement incorporates the tradeoffs that each party found acceptable. By the time the mediator appears, most secondary issues have been settled. The mediator's job is to convince the parties to accept compromises on the last important issues.

Events 1 and 2 below illustrate how a mediator uses threatening arguments to do this.

EVENT 1. The company refuses to accept a particular wage settlement. The mediator argues that inefficient plant operation will occur from the resulting employee dissatisfaction.

EVENT 2. The union refuses to accept a wage settlement. The mediator argues that if the company grants higher wages, it will become noncompetitive and will be forced to lay off workers.

1.1 REPRESENTING THE PARTIES' GOALS

To generate an appropriate argument, the arguer must know the goals of the parties in question. We represent these goals in goal trees. In the subsequent two figures, we depict partial goal trees of a union and a company.

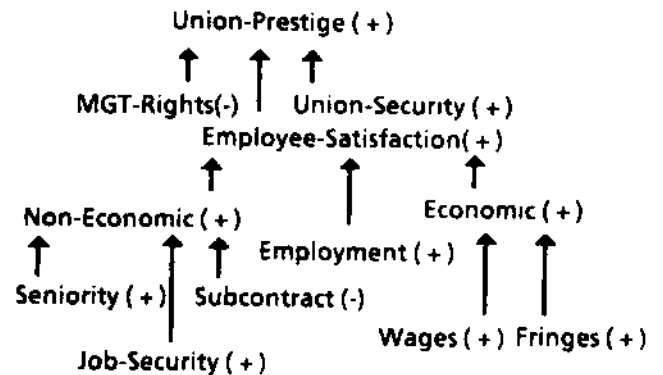


Figure 1 UNION GOAL-TREE

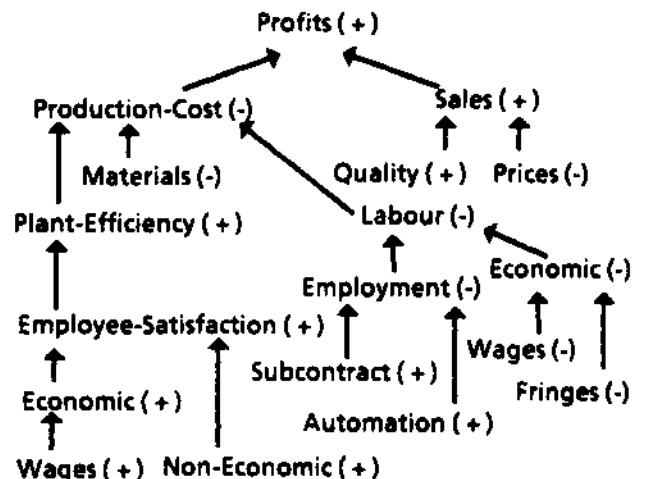


Figure 2 COMPANY GOAL-TREE

*This work was supported by NSF Grant No. IST-8317711 and by ARO Grant No. DAAG 29-85-K-0023.

Searching goal trees in order to understand and/or predict the behaviour of various actors has been investigated by Carbonell, (1979), Spohrer and Riesbeck, (1984), and Wilensky, (1983). The relationships among goals are adapted from Spohrer and Riesbeck, (1984). A (+) sign corresponds to the goal of increasing the particular quantity to which it refers while a (-) sign corresponds to decreasing the quantity. For example, PROFITS (+) means that the company's highest level goal is to increase profits. A goal is violated by an action when the action opposes its sign. For example, a reduction in employment, EMPLOYMENT (-), violates the union's goal EMPLOYMENT (+).

The children of a node, connected to it through support links, denote the subgoals through which the supergoal is satisfied. For example, in the company's goal tree, diminished labour costs can be achieved either by decreasing the economic concessions granted to the union, ECONOMIC(-), or by decreasing the number of employees, EMPLOYMENT (-). Thus, a path X to Y in a goal tree constitutes a causal chain that produces an explanation of the change in Y in terms of the change in X, assuming no other change has occurred in the rest of the tree.

A conflicting goal has a (+) sign in one goal tree and a (-) sign in the other. When, in one party's goal tree, the same goal exists in more than one place with opposite signs, an internal conflict exists for this party. The company has an internal conflict: it wants to increase economic concessions, ECONOMIC(+), in order to increase efficient plant operation, while simultaneously it wants to decrease economic concessions, ECONOMIC(-), in order to reduce its labour costs.

The above representation, while allowing the arguer to do some qualitative reasoning (de Kleer and Brown, 1982) regarding the parties' goals, is clearly a crude approximation of reality. Not only the direction, but also the amount by which a quantity is being changed, is important for determining the acceptability of a proposed settlement. To simplify our explanation, we will assume that a mediator has a means of generating a reasonable value for each demand, and that her task is to generate convincing arguments for their acceptance.

III GENERATING THREATENING ARGUMENTS

Argument generation is guided by the goals of the parties. In addition, the processing depends on which party must be convinced. To convince the union, the strategy is to discover a company action which threatens one of the union's important goals. To convince the company, the strategy is to discover whether the company's refusal will result in a violation of an important company goal. Since the company controls the hirings, firings and concessions, both of these strategies require a goal directed search of the company's goal tree. The union goal tree is used to find the threatened union goals and their importance. The process assumes that the other party has agreed to the proposed settlement.

Creating an argument to convince the union regarding issue X and change of quantity (*),

(where (*) is either (+) or (-)), is as follows:

- (1) Find out which company goals are violated by the union's refusal.

This is done by following the support links starting with X (NOT*) in the company's goal tree i.e., tracing the consequences for the company of the negation of its goal. The effects of negating X are propagated by changing the signs of X's ancestor goals along the path.

- (2) Find out what compensating actions the company might carry out to offset the effects of negating its goal X.

This is done by considering the children Z_1, \dots, Z_n of each goal Y found in step 1. To qualify as a threatening argument, a potential compensating action Z_i has to satisfy three conditions: 1) it must be controllable by the company, 2) it must violate a union goal and 3) the importance for the union of this violated goal must be greater than the importance of the demand under discussion. If the third condition is not satisfied by Z_i , its children are checked to see whether they satisfy conditions 1) to 3); otherwise, the subtree of Z_i is pruned, and the siblings of Z_i are considered in the same way. If some Z_k proves suitable, a potential argument is saved. Whether or not an argument has been generated, steps 1 and 2 are repeated starting from Y. Thus, the whole set of arguments is generated.

Consider, for example, the generation of the argument used in Event 2. At issue was a decrease in wages. The process starts by following WAGES (+), a negation of company's goal WAGES (-) up the tree. Figure 3 shows the fragment of the company tree after propagation of WAGES (+) has started*

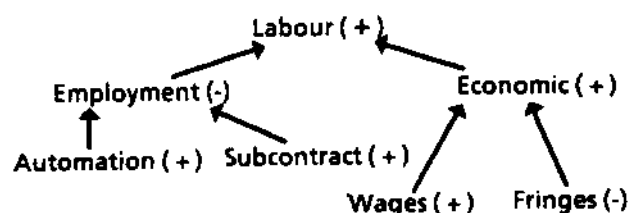


Figure 3 COMPANY SEARCH TREE

WAGES (+) leads to ECONOMIC(-). FRINGES (-) is considered as a possible action of the company to offset the increase in economic concessions. Thus, a possible argument might be: "If the company is forced to grant higher wages, it will reduce the granted fringes". Generating this argument depends on whether the company can reduce the fringes. Assuming that the fringes were not under negotiation in this case, the argument is rejected and the search continues from ECONOMIC(-). LABOURS) is reached, whose child, EMPLOYMENT(-) is controllable by the company and conflicts with the union goal EMPLOYMENTS). Assuming EMPLOYMENTS) is more important for the union than a wage increase, the argument "If the

company is forced to grant higher wages, then it will lay off workers" is generated.

Generating an argument to convince the company about issue X is similar: the X (NOT*) path is followed in the company's goal tree. The mediator points out to the company the deleterious results that X (NOT*) has on one of its higher level goals.

IV AN EXAMPLE FROM THE PERSUADER

The PERSUADER is a program that generates appropriate contract proposals and tries to persuade the parties involved in the negotiation to accept them. In this example, it is handling an impasse in negotiations between a transit company and its union. The PERSUADER has generated a fair wage value, which the company has accepted and the union refused. The goals are organised as in figures 1 and 2. Importance of goals is expressed on a 0 to 10 scale. Here we see the PERSUADER trying to generate a threatening argument for the union.

Importance of #<M-WAGE-GOAL 22416471>
is 6 for #<M-LOCAL 22405743>
Searching #<M-TRANSIT-COMPANY 22412106> goal tree.
Matching #<M-WAGE-GOAL 22416471> ...
INCREASE in #<M-WAGE-GOAL 2241671>
by #<M-TRANSIT-COMPANY 22412106>
results in INCREASE in #<M-ECON-GOAL 224224741>

At this point, the PERSUADER considers fringe benefits but rejects it because it is not involved in the negotiation. It continues its search from #<M-ECON-GOAL 224224741>.

INCREASE in #<M-ECON-GOAL 224224741>
results in INCREASE in #<M-LABOR-COST 22420554>
To compensate, #<M-TRANSIT-COMPANY 22412106>
will DECREASE #<M-EMPLOYMENT 22420562>
which is contrary to #<M-LOCAL 22405743> goal
Importance of #<M-EMPLOYMENT 22420562>
is 8 for #<M-LOCAL 22405743>
One possible argument found

V THE CONVINCING POWER OF ARGUMENTS

When the argument-generating process described above produces more than one potential argument, the best one must be chosen. One strategy is to try the "weakest" argument first, presenting "strong" arguments only if the weaker ones fail. This requires a means of ranking arguments according to their "convincing" power. The ranking follows the order of importance of the goals that the arguments threaten. In particular, the importance of the goals of a company (union) depends on the financial situation of the company, the state of the industry, the labour supply and the general economic climate. For example, the goal of reducing labour cost is more important for a company in an industry with high labour cost; if there is abundant labour supply in an area, the goal of employment is stronger for a union in that area. In this case, a threat to the union of layoffs has the greatest convincing power. Without enough information, the default ranking of arguments, from weakest to strongest, is:

1) Appeal to universal principle

Here, the arguer appeals to some moral belief of the interlocutor. For example, a particular wage value may not afford the workers a "decent living standard".

2) Appeal to precedents as counterexamples

Counterexamples point out contradictions between the claimed and the actual behaviour, thus threatening the credibility goal of a party.

3) Appeal to "prevailing practice" standard

Arguments based on this standard address economic goals. For example, a company cannot underpay its employees for fear of losing them to competitors; a union cannot insist on concessions much above what is given in the industry for fear of lay-offs.

4) Threat of Strike (Lockout)

A strike threatens to stop production, necessary for company profits. A lockout threatens the existence of the union. The mediator's role here is to convey to the recalcitrant party the dire consequences of the action.

VI SUMMARY

To generate a threatening argument to convince a union, the company's goal tree is searched to find company actions that will offset the effects of a union demand. To convince a company, the deleterious effects on the company of its demand are found by searching its goal tree. Though we have not addressed it, generation of arguments based on furthering of goals, can be done by a similar search.

ACKNOWLEDGMENTS

I wish to thank Janet Kolodner and Bob Simpson for helpful discussions and comments.

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