The Effect of Goal Revelation on Computer-Mediated Negotiation

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Study Focus

Value of goal revelation in bilateral strategic negotiation.

- Allocation of scarce resources,
- Uncertainty about participants’ interests and dependencies,
- Outcome depends on joint agreement.

Contributions

- An argument-based goal-revelation protocol that outperforms non-revelation protocols.
- An open-source empirical test-bed for investigating decision-making.

Goal Revelation is Costly

A company is negotiating a takeover of a struggling competitor.
Unions fear liquidation.
Company reveals it is committed to keeping competitor afloat.
Unions demand no job-cuts.

Colored Trails (CT) [Grosz and Kraus ’04]

Colored Trails is a test-bed for investigating decision-making in task settings

CT is a family of games

- includes a board of colored squares and goals
- players are allocated colored chips; surrender chips of appropriate color to move around the board.
- proposer player can suggest an exchange to responder player who can reject or accept
CT Scenario Example

- 100 point bonus for getting to goal
- 10 point bonus for each chip left at end of game
- 15 point penalty for each square in the shortest path from end-position to goal
- Performance does not depend on outcome for other player.

Scoring and Payment

Colored Trails: Motivation

Analogue for task setting in the real world
- chips represent resources; paths represent plans; getting to goal equals task completion.
- vivid representation of large strategy space.
- Promotes cooperation as compared to abstract representations (e.g., normal form tables) [Gal et al. 2007]

Flexible formalism
- manipulate dependency relationships by controlling chip and board layout.
- family of games that can differ in many aspects.

Setting

Two possible alternating offer protocols.
- Position based negotiation (PBN)
- Interest based negotiation (IBN)

Played the same set of games in both conditions.
- Players cannot see each other’s goal.

Hypothesis:
- Revealing goals will lead to the realization of different paths and to more agreements.
Random locations and each has a randomly located goal visible at first to them alone. Each layout with a palette of 4 colors for board tiles and player chips. Two players start out in be conservative with their resources. Negotiate discourage the players from dragging out negotiations and encourage the players to transactions allow multiple paths of movement towards the goals force at least one of the players to.

The state diagram for this protocol is shown in Figure 4.1. The games played in the experiments are set up to facilitate a large space of possible transactions in reverse or wait until his opponent makes the same proposal again. The state dismissed and the responder may not retract his rejection; he must either propose the same proposal in which case the negotiation continues with the responder given the role of proposer. Alternatively, the responder can reject the proposal and vice versa. The responder or proposer can also opt out of the negotiation during their turn in which case the negotiation terminates in a conflict allocation. Alternatively, the responder can reject the proposal and vice versa. The responder or proposer can also opt out of the negotiation during their turn in which case the negotiation terminates in a conflict allocation. Alternatively, the responder can reject the proposal and vice versa. The responder or proposer can also opt out of the negotiation during their turn in which case the negotiation terminates in a conflict allocation.
Methodology

In each condition, 12 subjects played the same 65 different board layouts.

Board layouts were generated according to various criteria (e.g., dependency relationships).

Subjects were compensated in accordance to performance.
Results: Interest Based Negotiation

43% Games with Revelation

81% of revelations lead to agreement

Solicitors engage in helpful behavior to dependent revealers

Results: Between Condition

Conclusion

Interest-based negotiation works:
- Allows parties to reveal their interests in a controlled fashion.
- Mechanism for dependent parties to seek help from independent parties (see paper for details).
- Outperforms position-based protocols.

Future work
- Randomized protocols for goal revelation.
- Computer agents.

Colored Trails

Interesting for people to play:
- analogous to task settings;
- vivid representation of strategy space
- Possible for computers to play

Can vary in complexity
- repeated vs. one-shot setting;
- availability of information;
- communication protocol.
Colored Trails

Public Beta release (~500 downloads)
Used by researchers in US, Canada, Holland, Belgium, Australia, Lebanon, Israel, Jordan, Dubai, Iran(?).

On-going projects
  • evolution of group solidarity as a function of common interaction,
  • modeling interruptions in user-system interaction,
  • advice-seeking in complex strategic environments,
  • coalition formation under uncertainty,
  • cross-cultural effects of human-computer decision-making

A road map
  • deployment on the web
  • scaling up to hundreds of subjects
  • public depository of experimental designs