Negotiation Agents

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Question

• Negotiation research가 다루는 세 가지의 broad topic을 간단히 설명하라.

Agents

• Autonomous
• Rational
• Self-interested

Negotiation-Definition

• The process by which a group of agents communicate with one another to try and come to a mutually acceptable agreement on some matter

Negotiation- Ground

• Agents may share common resource
• Agents are self-interested
• Agents are autonomous
• Agents has bounded rationality

Negotiation- Desired characteristics

• Effectiveness
  – All participants should get fair profit

• Efficiency
  – Negotiation process should not take too much resource
Topics on automated negotiation

- Negotiation protocol
- Negotiation objects
- Agents’ decision making models

Negotiation protocol (1/5)

- The set of rules which govern the interaction
  - Permissible types of participants
    - negotiators, third parties
  - Negotiation states
    - accepting bids, negotiation closed,
  - Valid actions of the participants in particular states

Negotiation protocol (2/5)

- Dutch auction
  - Other agents can only accept/reject others’ proposals
  - Agents don’t need complex decision selection model
  - Negotiation can be very time consuming and inefficient since the proposer has no means of ascertaining why the proposal is unacceptable.

Negotiation protocol (3/5)

- Offer/critique, offer/counteroffer
  - Recipient provides feedback on the proposals it receives
  - Feedback can take the form of:
    - critique: comments on which part of the proposal the agent likes or dislikes
    - counter-proposal: an alternative proposal generated in response to a proposal

Negotiation protocol (4/5)

- Offer/critique
  - A: I propose that you provide me with service X under the following conditions.
  - B: I am happy with the price of X, but the delivery date is too late.
- Offer/counteroffer
  - A: I propose that you provide me with service X
  - B: I propose that I provide you with service X if you provide me with service Y.

Negotiation protocol (5/5)

- Augmentation-based negotiation
  - provide arguments to support their stance
    - justify their negotiation stance
    - persuade one another to change their negotiation stance
    - common types: Threats, rewards, appeals
Negotiation objects (1/4)

- The range of issues over which agreement must be reached.
  - Common instances
    - EC environment
    - Dynamic cooperation generation
    - Resource allocation

Negotiation objects (2/4)

- EC environment
  - Price settling
  - Auction
  - Automated bargaining

Negotiation objects (3/4)

- Resource allocation
  - Proportionality
  - Envy-freeness
  - Equitable
  - Efficiency

Negotiation objects (4/4)

- Dynamic cooperation generation
  - Problem recognition
  - Group forming
  - Plan generation
  - Execution

Agents’ decision selection model (1/3)

- The decision making apparatus the participants employ to act in line with the negotiation protocol in order to achieve their negotiation objectives.

Agents’ decision selection model (2/3)

- Traditional model
  - Define complete negotiation space a priori and solve optimization problem
  - Not usable in practical situations
Agents’ decision selection model (3/3)

- Heuristic method
  - Protocol-dependent
    - Dutch auction protocol:
      - Offer/critique
      - Offer/counteroffer

Conclusion