FIRST PART

ARTIFICIAL INTELLIGENCE AND NEGOTIATION?

Artificial Intelligence and Negotiation?

Grupo de Tecnología Informática
Inteligencia Artificial

GTI IA

- What is artificial intelligence?

Thinking Humanly	Thinking Rationally
Acting Humanly	Acting Rationally

[1] S. Russell, P. Novig. "Artificial Intelligence: A modern approach. 3rd Edition". Pearson. 2010

Artificial Intelligence and Negotiation?

- ## What is negotiation?

Negotiation is a process in which a joint decision is made by two or more parties. The parties first verbalize contradictory demands and then move towards agreement by a process of concession-making or search for new alternatives [2]

Negotiation is a basic means of getting what you want from others. It is a back-and-forth communication designed to reach an agreement when you and the other side have some interests that are shared and others that are opposed [3]

[2] D. G. Pruitt. "Negotiation Behavior". Academic Press. 1981
[3] R. Fisher, W. Ury, and B. Patton. "Getting to yes: negotiating agreement without giving in. 2nd Edition". Penguin Group. 1981

Artificial Intelligence and Negotiation?

- Are both disciplines compatible?
  - Yes!!

  - Goal: Grant software with the capability to negotiate and understand negotiation processes

  - Means: Computational negotiation models
    - Preference/Utility Models
    - Negotiation Protocol
    - Negotiation Strategy

Artificial Intelligence and Negotiation?

- Synergies between both fields:
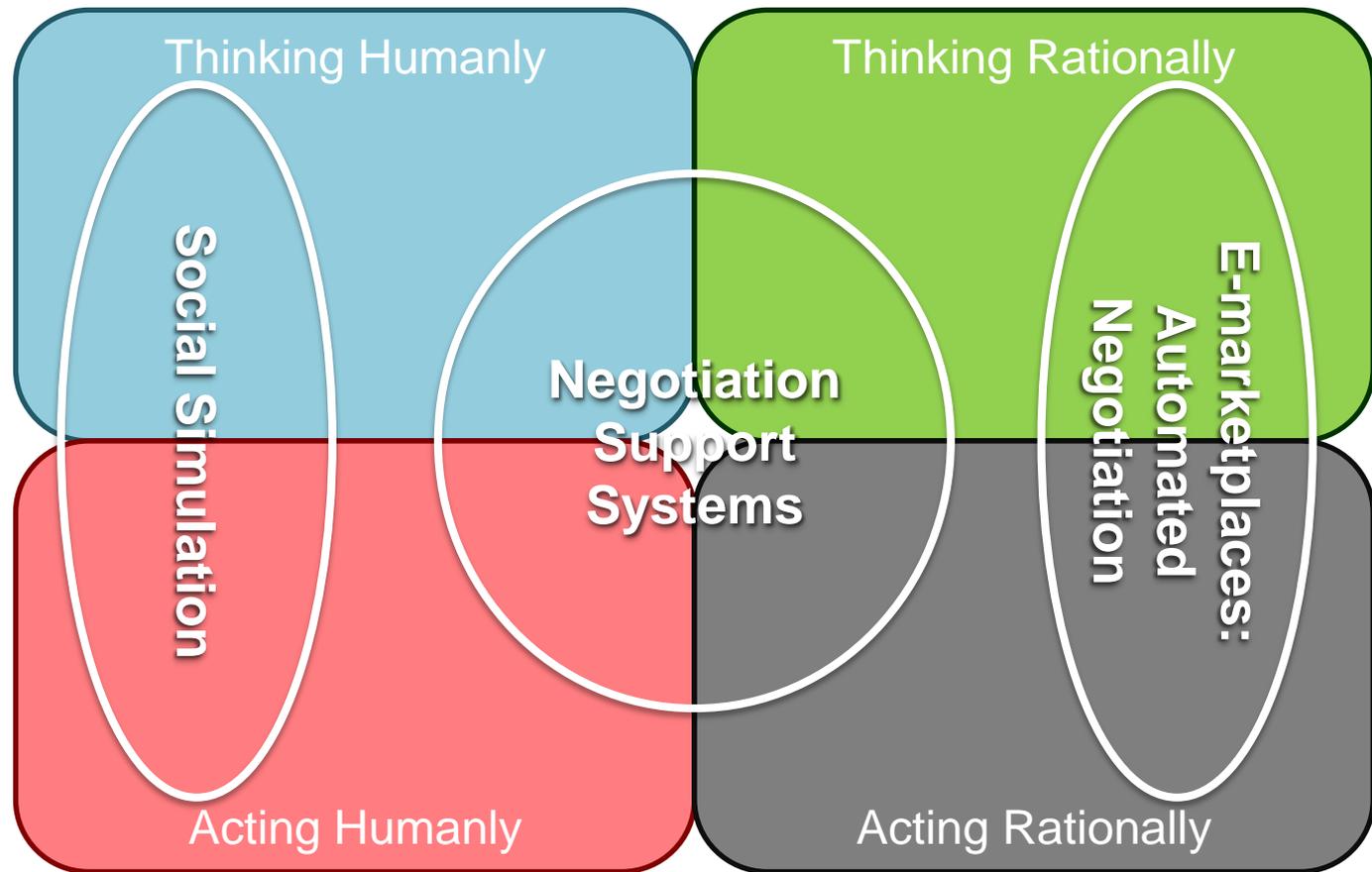
Artificial Intelligence and Negotiation?

- E-marketplaces: Automated Negotiation
  - Thinking Rationally & Acting Rationally
  - Goal: Optimality according to the available information
    - Pareto Optimality
    - Nash Bargaining Point
  - Examples: Ebay, Amazon, etc…
  - Approaches:
    - Algorithmic Game Theory
    - Bounded Rationality Approaches & Heuristics
    - Mechanism Design

Artificial Intelligence and Negotiation?

- Social Simulation
  - Thinking Humanly & Acting Humanly
  - Goal: Mimick human behavior to provide predictions
    - Emotions, cultural factors, social identity theory, etc.
  - Examples: Supply chain simulation
  - Uses:
    - Pilot experiments
    - Train real negotiators
    - Predict the effect of new environmental conditions

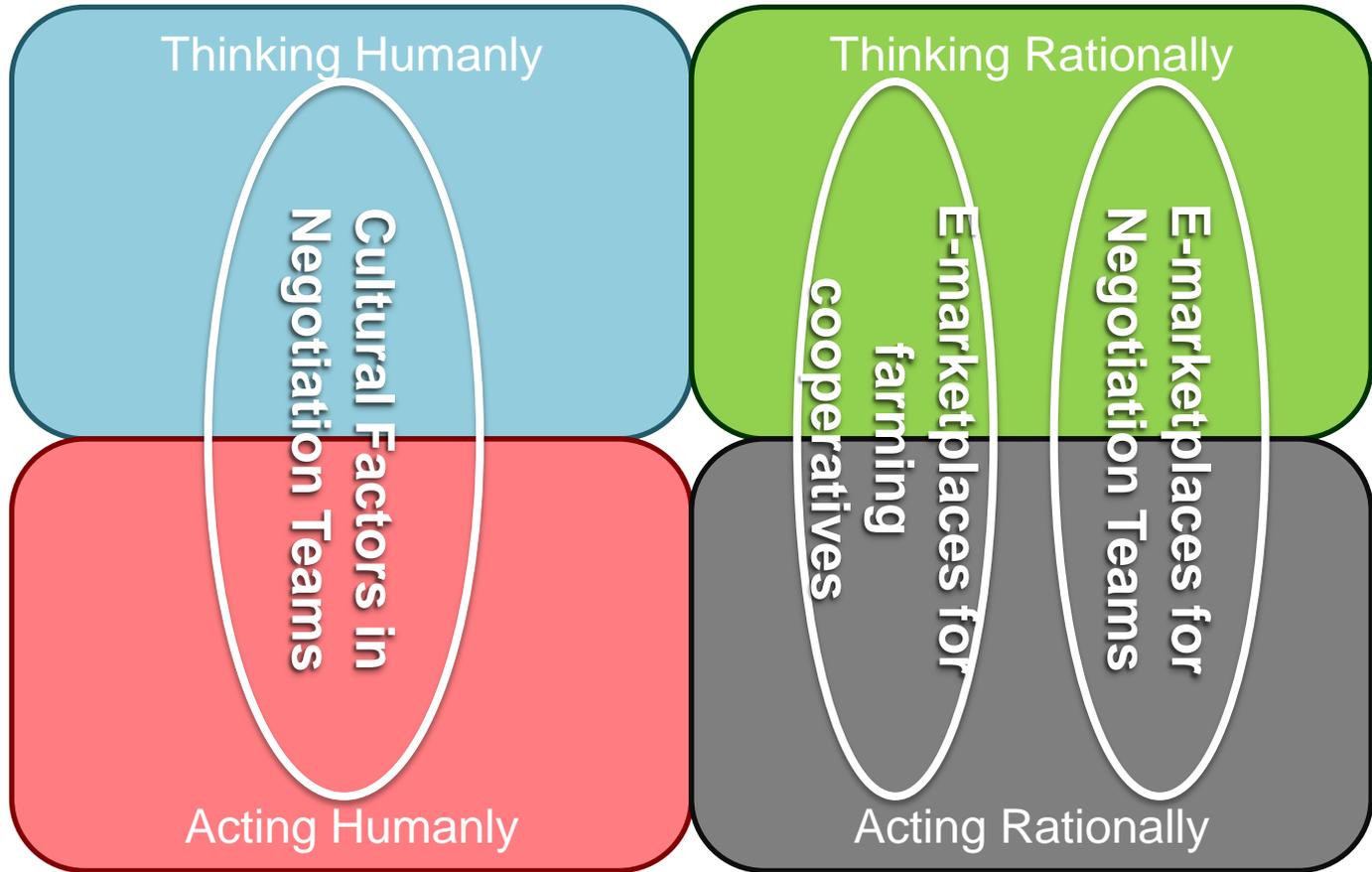# **Artificial Intelligence and Negotiation?**

- Negotiation Support Systems
  - All-rounder!
  - Goal: Support one/all parties to reach an efficient agreement
  - Examples: AutoMed, Persuader
  - Approaches:
    - Enforcement/Recommendation
    - Best Response Mechanism
    - Reasoning about the opponent

SECOND PART

CURRENT PROJECTS

Current Projects

- Work in progress:

Current Projects

- E-Marketplaces for Negotiation Teams
  - Thinking Rationally & Acting Rationally
  - Electronic marketplace for groups (e.g., travelling friends, customer coalitions, etc)
  - Scenario: 1NT vs 1 Opponent
  - We propose 4 different team dynamics and study (experimentally) their optimality in different environments
  - Partners:

Current Projects

- E-Marketplaces for Farming Cooperatives (early stages)
  - Thinking Rationally & Acting Rationally
  - Get closer cooperatives and consumers
  - Take into account cooperative members' interests
  - Partners:

Current Projects

- Cultural Factors in Negotiation Teams
  - Thinking Humanly & Acting Humanly
  - Computational models: How cultural factors affect team dynamics
  - Cultural Factors based on Hofstede's work
    - Power Distance
    - Individualism/Collectivism
  - Partners:

THIRD PART

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