

# Reinforcement Learning for Automated Negotiation

## SCML as an Example

AJCAI 2023 Tutorial

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NEC-AIST  
AI Cooperative  
Research Laboratory

# AI 2023

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# Outline



## 1 Motivation and Logistics

# Why Now?

- ① Industries are moving online.
- ② Automation: Factory floor → The back office.
- ③ Human-Human Negotiation is cumbersome, and inefficient.
- ④ Automated Negotiation opens new possibilities:
  - Too fast for people: Repeated smart contracts.
  - Too large for people: complete supply chains



# The Automated Negotiation Challenge

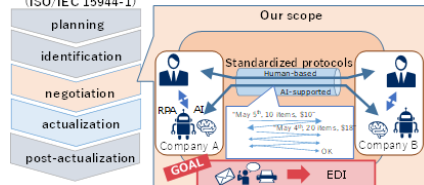
## Why is it hard?

- Mechanism Design Problem:
  - Better than haggling?
- Negotiator Design Problem:
  - Generality  $\times$  Effectiveness

## Why is it interesting?

- Easy to state yet hard to solve.
- Multiple levels of abstraction and complexity.
- Several concrete open questions.
- Vibrant yet not saturated research space.

Five fundamental activities of a business transaction (ISO/IEC 15944-1)



attribution: UNECE eNegotiation Project



Automated Negotiating Agents Competition: 2010-

# Outline



- ① Theoretical Session (25min) Break (5min)
- ② Development Environment (25min) Break (5min)
- ③ RL for SCML (55min)
- ④ Concluding Remarks (5min)

# Materials



- ① **Tutorial Website:** <http://yasserm.com/tutorial-ajcai2023/>
- ② **Github Repository:** <https://github.com/yasserfarouk/ajcai2023autoneg>
- ③ **Handouts:** <https://github.com/yasserfarouk/ajcai2023autoneg/raw/main/handouts.pdf>
- ④ **Negmas Documentation:** <http://www.yasserm.com/negmas>
- ⑤ **SCML Documentation:** <http://www.yasserm.com/scml/scmldocs>
- ⑥ **SCML Competition:** <https://scml.cs.brown.edu>