

# Demystifying LLM-based Multi-Agent Collaboration

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## Introduction

This work surveys the **collaborative dimension** of LLM-based Multi-Agent Systems (MASs) and introduces an extensible framework for understanding and designing multi-agent collaboration towards artificial collective intelligence.

- Collaborative Aspects and Mechanisms
- General Framework for MAS
- Real-World Applications
- Lessons Learned and Open Problems

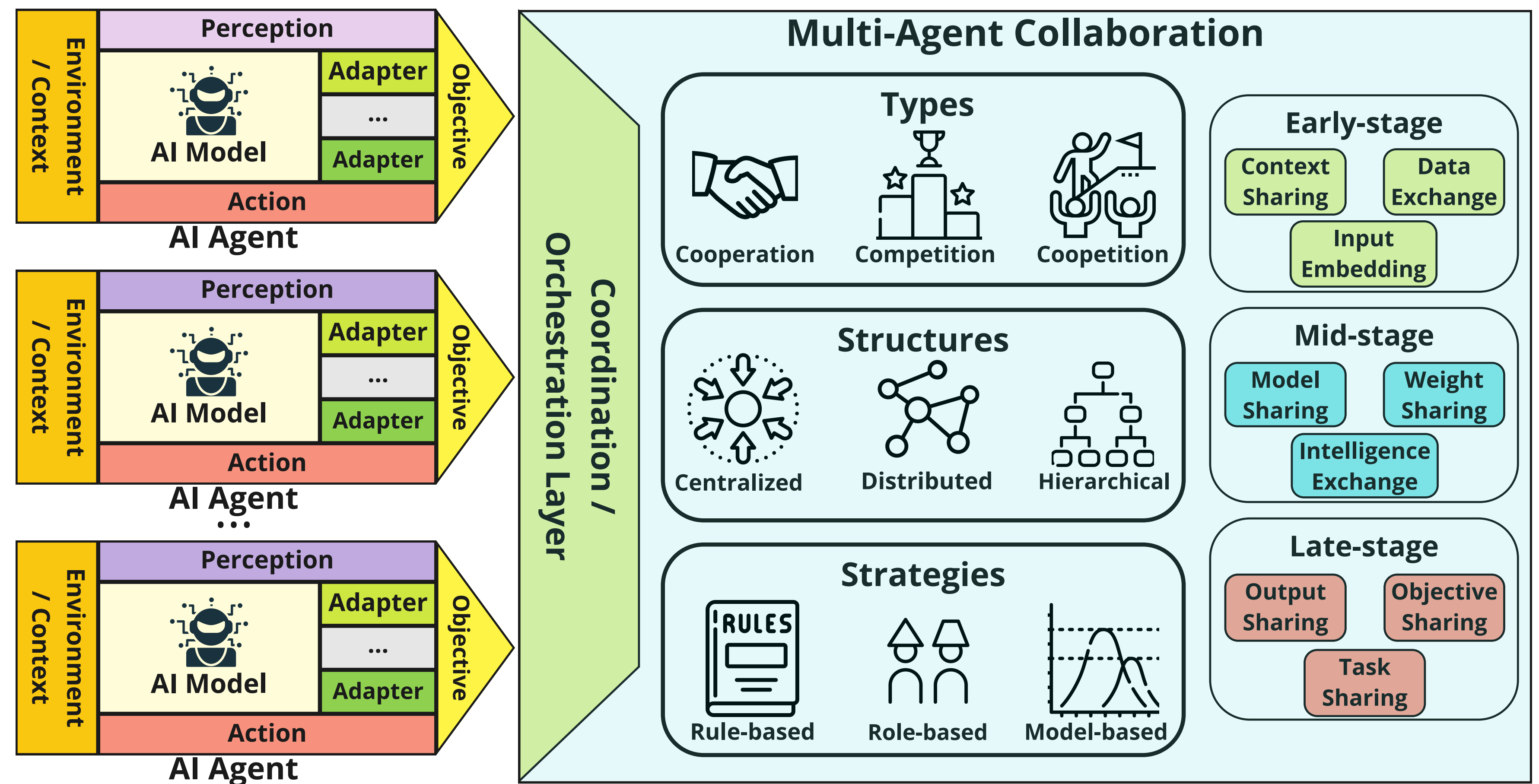


Figure: Our Proposed Framework for LLM-based Multi-Agent Collaborative System (MAS)

## Multi-Agent Collaboration Mechanisms

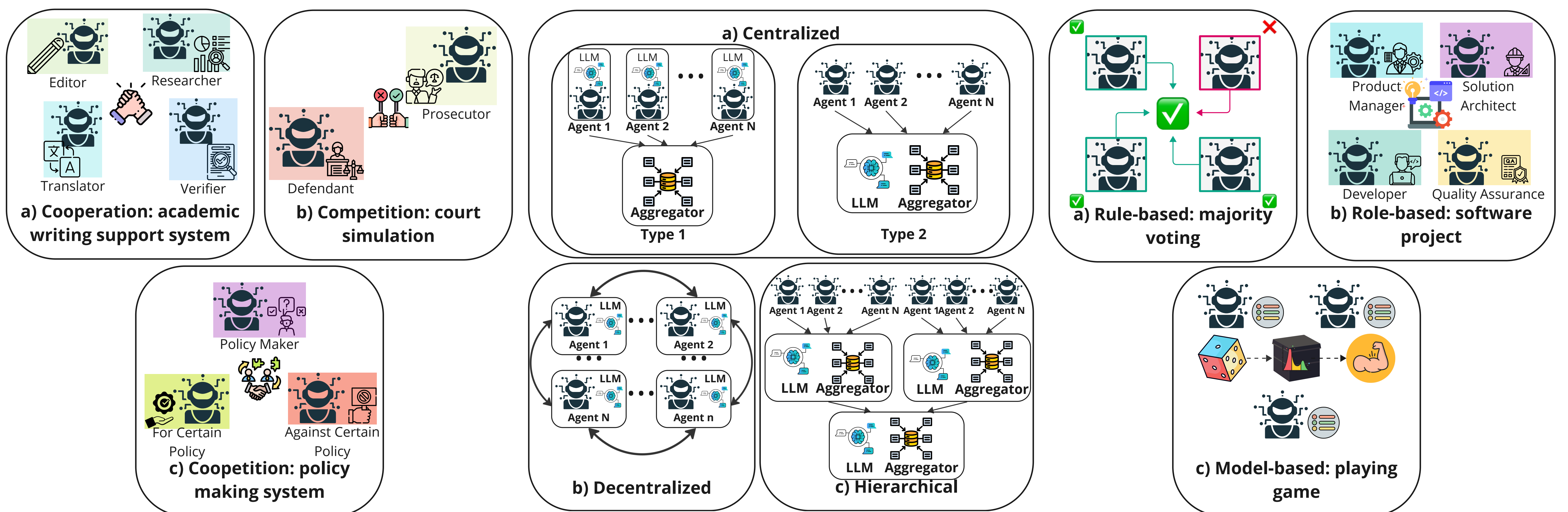


Figure: Collaboration Types

Figure: Collaboration Structures

Figure: Collaboration Strategies

## Lessons Learned

- Effective Collaboration Channels
- Collective Domain Knowledge
- Adaptive and Scalable Role and Collaboration Channel Assignment

## Open Problems

- Road to Artificial Collective Intelligence
- Comprehensive Evaluation and Benchmarking
- Ethical Risk and Safety

## Acknowledgment

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## Application Domains

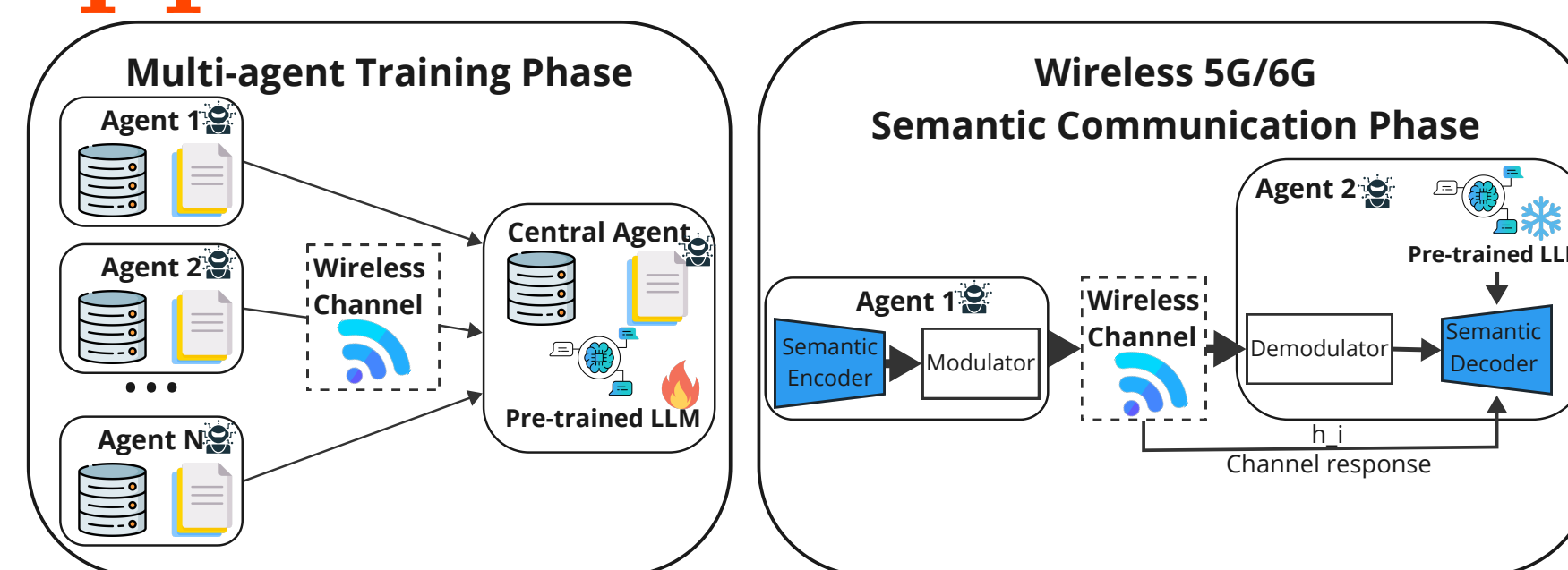


Figure: 5G/B6G and Industry 5.0

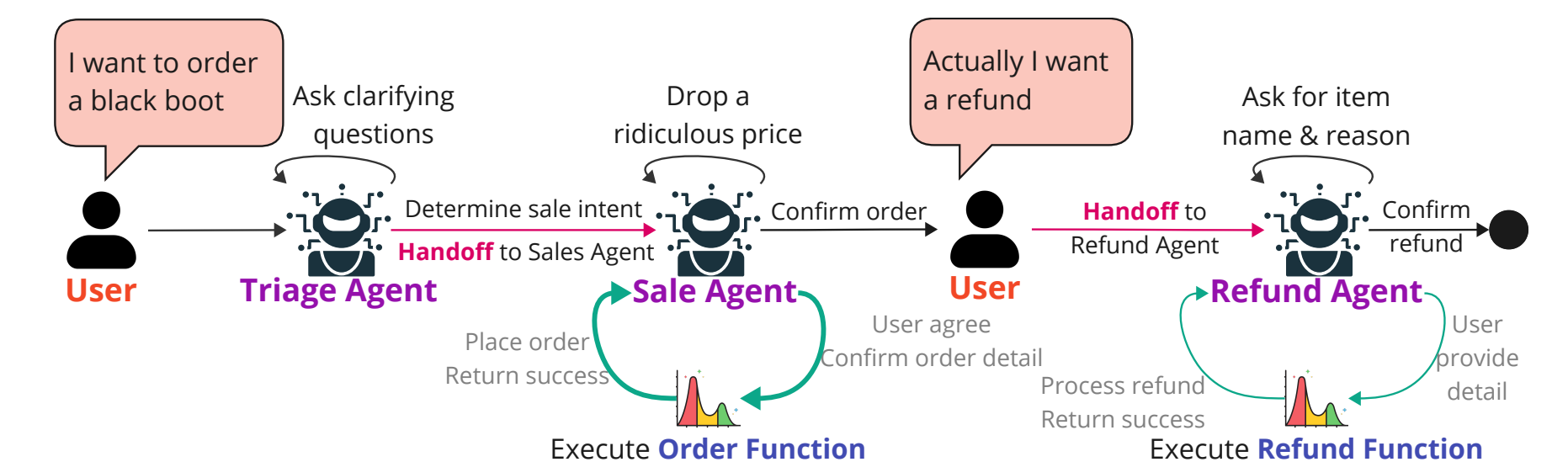


Figure: Question Answering / Natural Language Generation

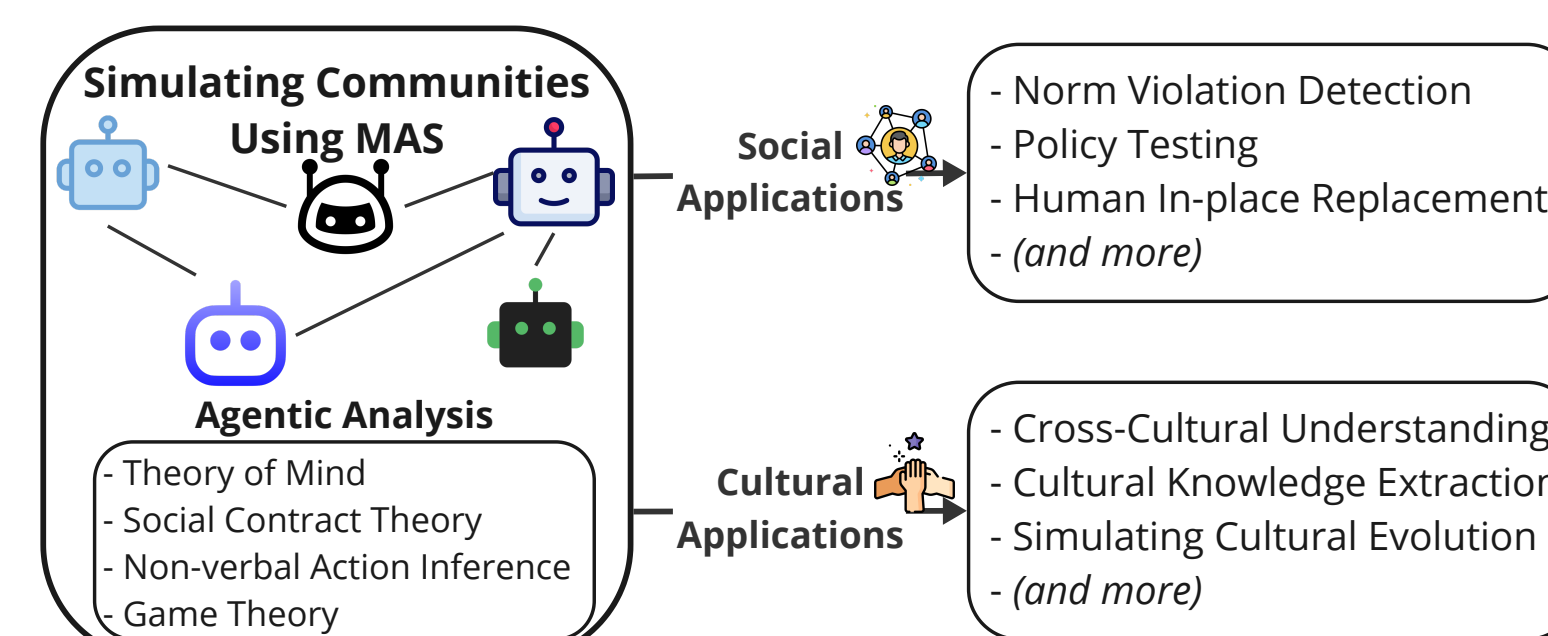


Figure: Social and Cultural Domains



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