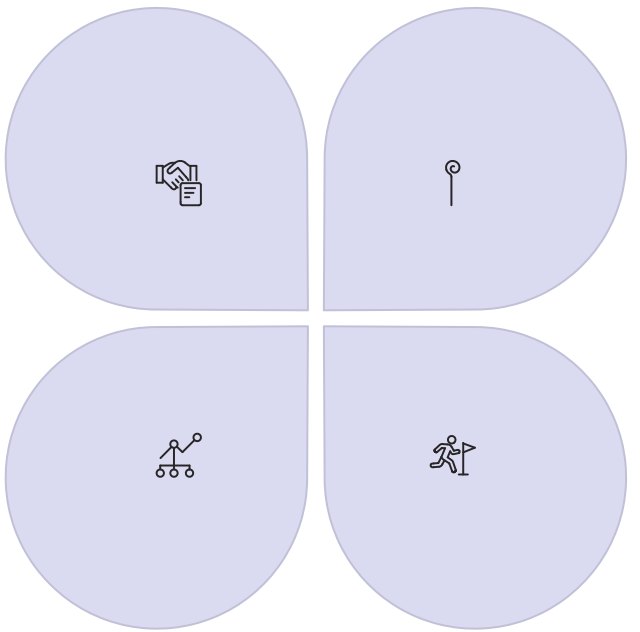
Thematic Cluster 2: Agentic Behavior & Interaction

This cluster explores the **emergent agency** of LLMs in interactive or multi-agent settings. It studies negotiation, cooperation, competition, and coordination between artificial agents, providing insights into pragmatic communication, strategic behaviour, and collective intelligence.

Negotiation

Strategic dialogue and agreement-reaching between autonomous agents



Cooperation

Collaborative behaviors and shared goal achievement

Coordination

Multi-agent alignment and collective intelligence emergence

Competition

Adversarial interactions and strategic advantage-seeking

P3. The Negotiation Arena

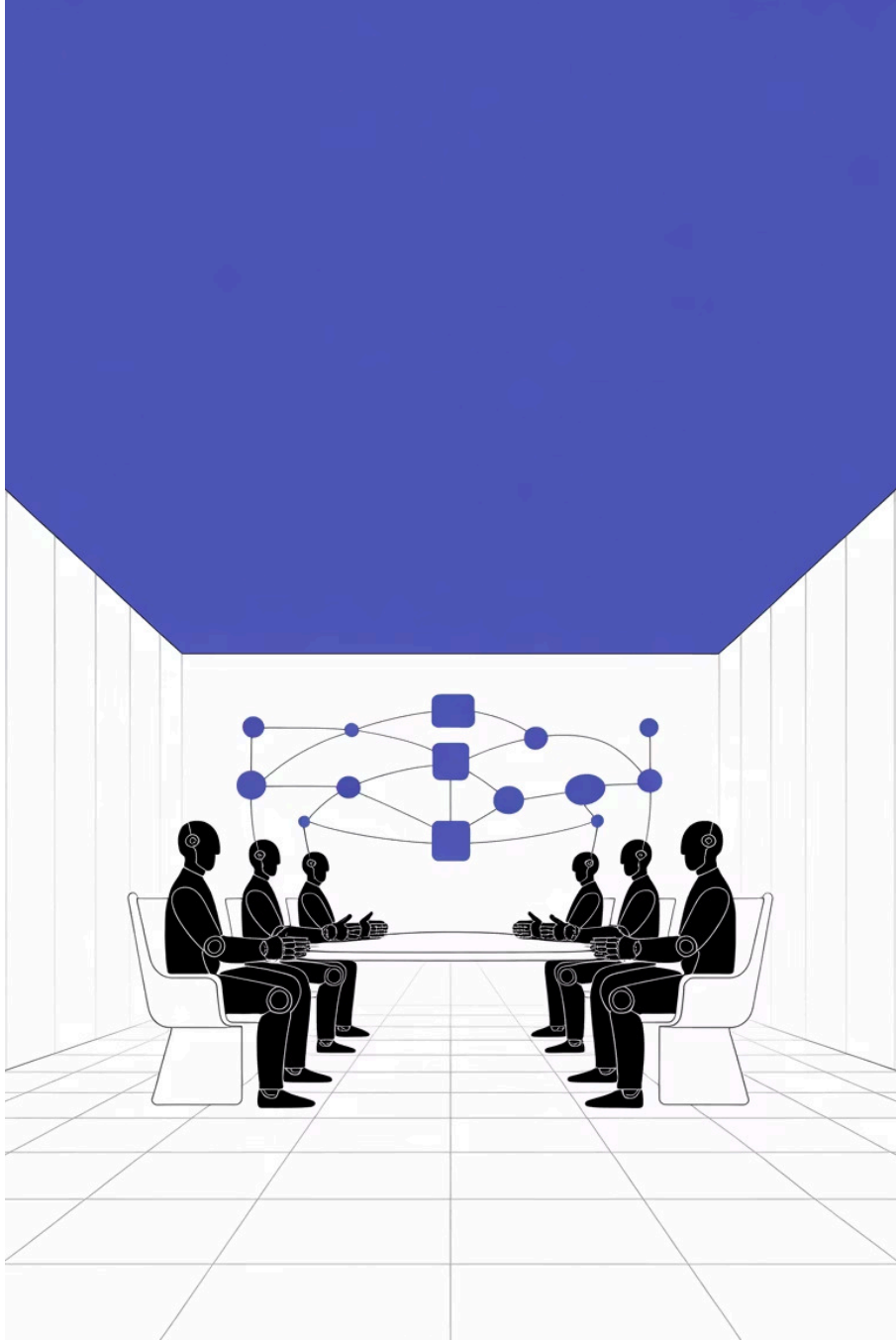
This project investigates how **Large Language Models (LLMs)** behave as autonomous agents engaged in negotiation, cooperation, or strategic dialogue. Two or more models are placed in simulated scenarios where they must **reach an agreement, trade resources, or align on decisions** despite having distinct goals or incomplete information.

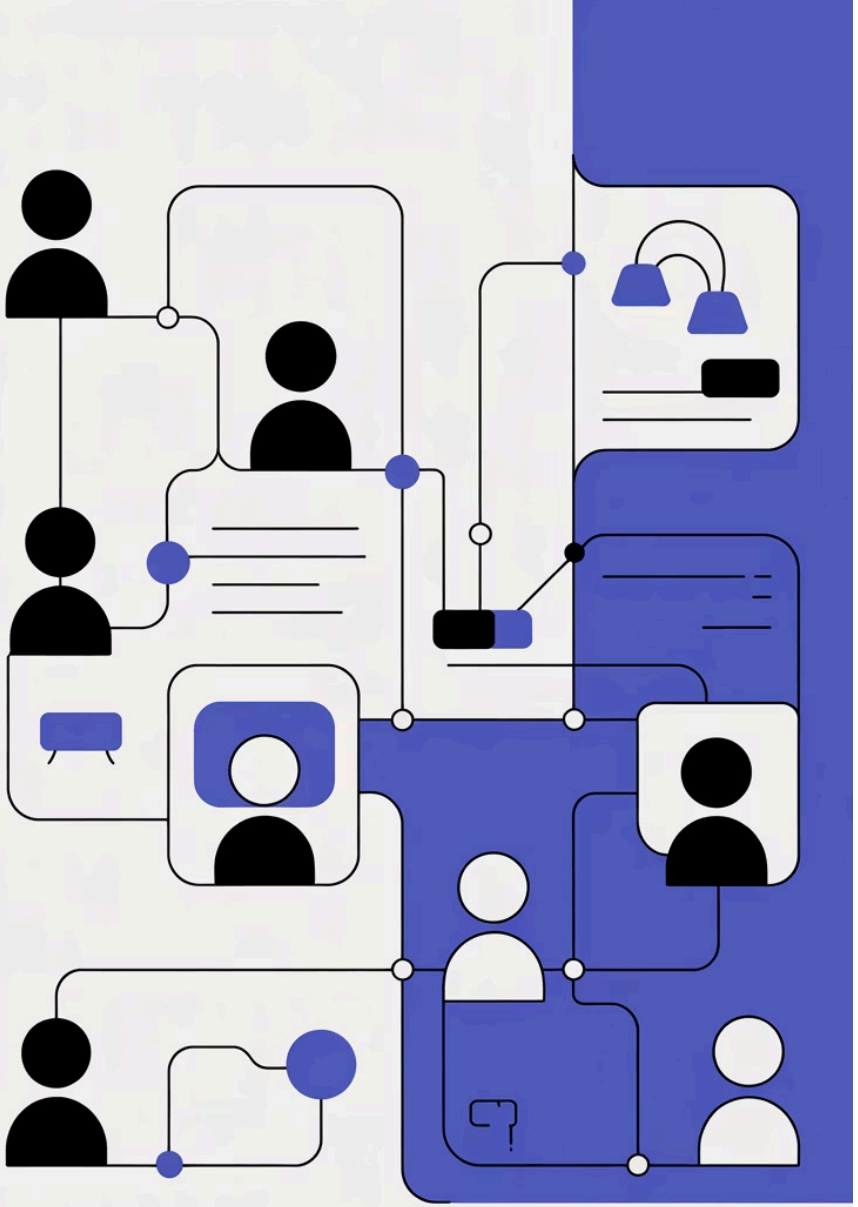
Core Pipeline

Agents instantiated with distinct goals engage in multi-round conversations. Simulations log exchanges, evaluated quantitatively and qualitatively.

Expected Outcomes

Uncover cooperative or adversarial behaviors, identify pragmatic features correlated with negotiation success or failure.





Methodology

1 Scenario Design

Define negotiation settings: resource division, task scheduling, or preference alignment. Each agent receives private information or asymmetric incentives.

2 Agent Configuration

Instantiate LLM agents with distinct personas or objectives. Include optional adjudicator model or human evaluator.

3 Dialogue Simulation

Implement iterative conversation rounds until agreement or impasse. Test cooperative, competitive, and mixed modes.

4 Analysis & Metrics

Measure agreement rate, convergence rounds, utility scores, language complexity. Analyze persuasion tactics and emotional tone.

Dataset & References

Dataset: No fixed dataset required; negotiation scenarios can be **synthetically generated** or adapted from existing dialogue datasets.

References

- Lewis, M., Yarats, D., Dauphin, Y., Parikh, D., & Batra, D. (2017). Deal or No Deal? End-to-End Learning of Negotiation Dialogues. *EMNLP*, 2443-2453.
- Akin, S., et al. (2025). Socialized Learning and Emergent Behaviors in Multi-Agent Systems based on Multimodal Large Language Models. *arXiv preprint arXiv:2510.18515*.
- Gupta, P., et al. (2025). The Role of Social Learning and Collective Norm Formation in Fostering Cooperation in LLM Multi-Agent Systems. *arXiv preprint arXiv:2510.14401*.