Beyond Self-Talk: A Communication-Centric Survey of LLM-Based Multi-Agent Systems

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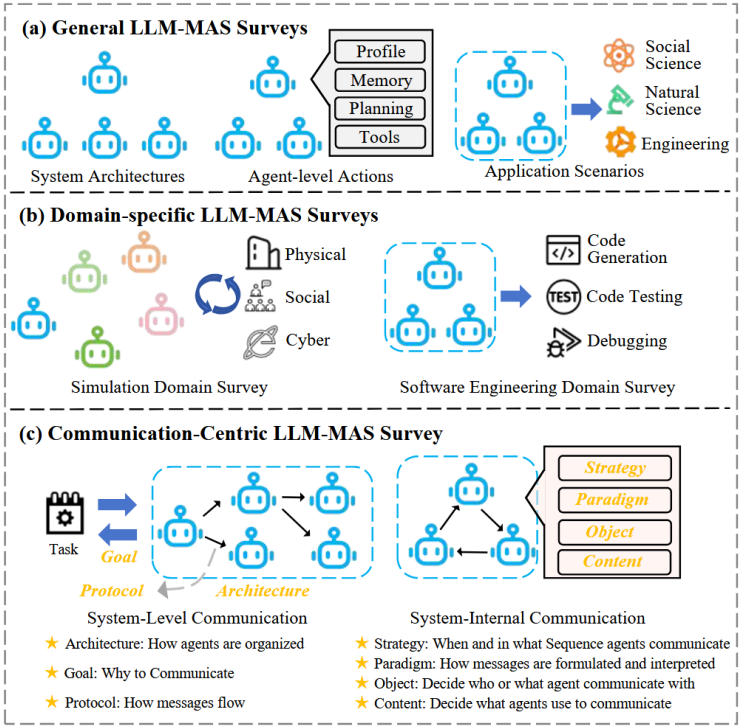
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Problems & Ideas

- Problems:
  - Existing surveys mainly organize LLM-based multi-agent systems by application domains, system architectures, or agent capabilities and pay limited attention to how agents communicate, coordinate, negotiate, and collaborate
  - A systematic communication-centric framework is still lacking for understanding LLM-MAS across different tasks and scenarios.

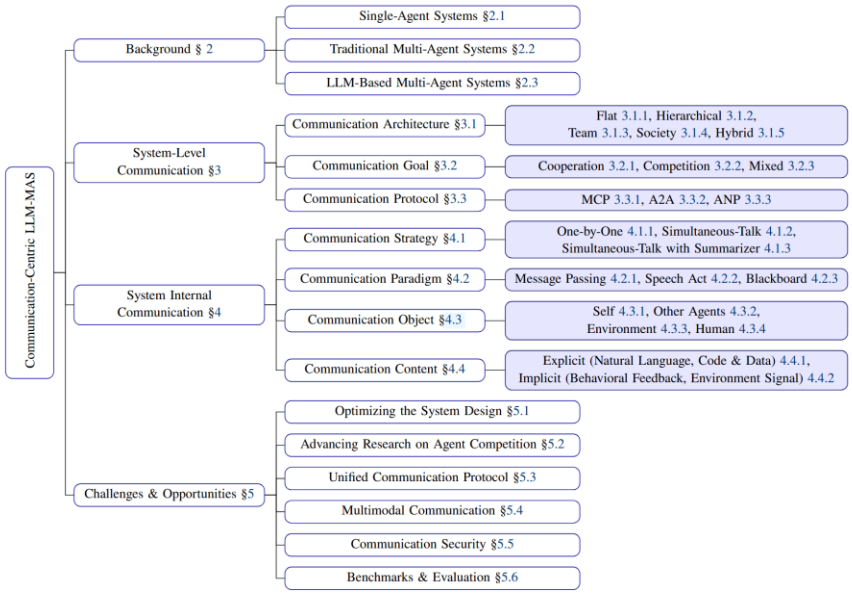
- Ideas:

This survey reviews LLM-MAS from a communication-centric perspective. It distinguishes two levels of communication: system-level communication and system-internal communication and analyzes how communication shapes the efficiency, robustness, scalability, and security of multi-agent collaboration.



Main Contributions

- Contributions:
  - This survey proposes a two-level framework for understanding communication in LLM-MAS;
  - At the system level, it analyzes communication architectures, goals, and emerging protocols;
  - At the system-internal level, it examines communication strategies, paradigms, objects, and content;
  - It identifies key challenges, including interoperability, multimodal communication, security, and benchmark evaluation.



A two-level framework for analyzing communication in LLM-based multi-agent systems.