ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Distributed Computing

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Democratic Opinion Modeling with Agent Societies

How can multiple AI agents coordinate to make better decisions than any single agent could achieve along? This project focuses on building distributed multi-agent systems where Large Language Models (LLMs) collaborate to solve complex real-world decision-making problems with or without centralizing sensitive information. While traditional AI excels in single-agent scenarios, real-world challenges often require distributed intelligence where multiple perspectives must be coordinated subject to constraints such as communication bandwidth and preserving privacy and autonomy. This project combines distributed computing principles with modern AI to create novel coordination mechanisms for multi-agent decision-making.

However, in many applications, coordinating multiple agents presents fundamental challenges beyond individual agent capabilities. How do we design effective protocols for multi-agent deliberation and consensus-building? How do different group sizes and communication structures affect collective decision quality? What happens when agents have diverse expertise, conflicting preferences, or varying levels of confidence? In this project, we aim to leverage distributed computing principles to develop a research platform for multi-agent coordination, and address many interesting open problems[1], such as scalable deliberation protocols, bias detection in group decisions, and optimal information sharing strategies.

The project will collborate with researchers from Singapore. The work is expected to lead to a research publication with the student(s) as the author(s).

Requirements: Strong programming skills, knowledge in Machine Learning and LLMs, interest in distributed systems and multi-agent AI.

Interested? Please contact us for more details!

Contact

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[1]The topic details can be discussed and specified with the student.