

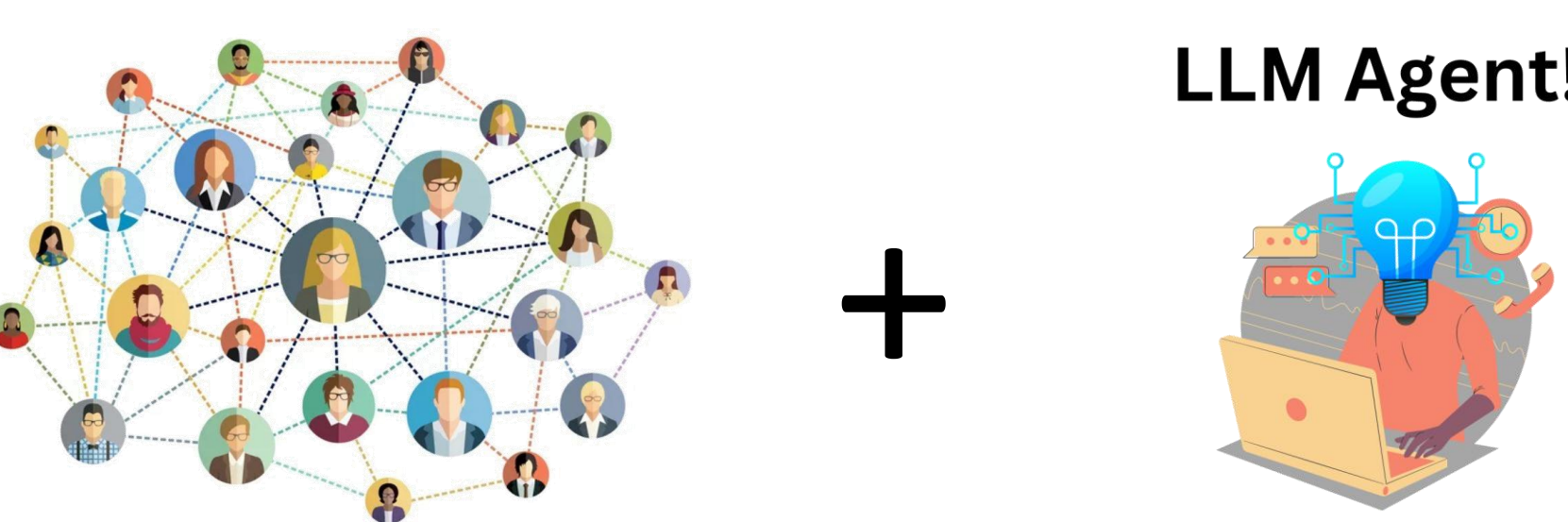
# Simulating Rumor Spreading in Social Networks using LLM Agents

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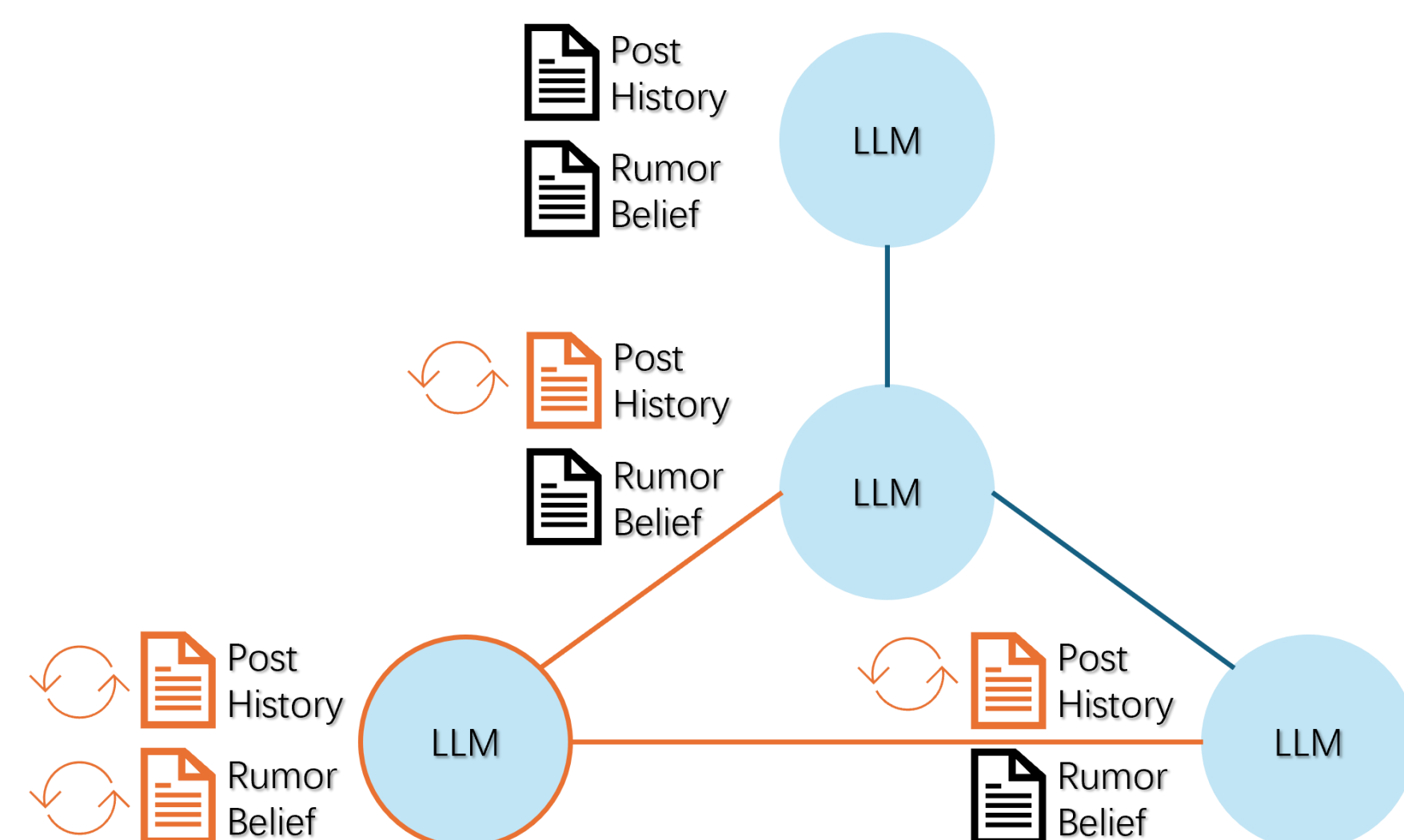
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## Introduction

- Social Network Behavior:** Essential for understanding human interactions in social sciences.
- Limitations of Traditional Models:** Rely on mathematical and statistical approaches, oversimplifying complex social dynamics.
- LLM-agent-based Framework:**
  - LLMs as Agents:** Offer a more realistic way to study human behavior by simulating diverse interactions.
  - Rumor Spread Simulation:** Utilizes LLM-driven agents with unique personas and rumor-acceptance tendencies.
  - Dual-Simulation Approach:** Integrates network structures and individual agent behaviors to analyze misinformation spread.

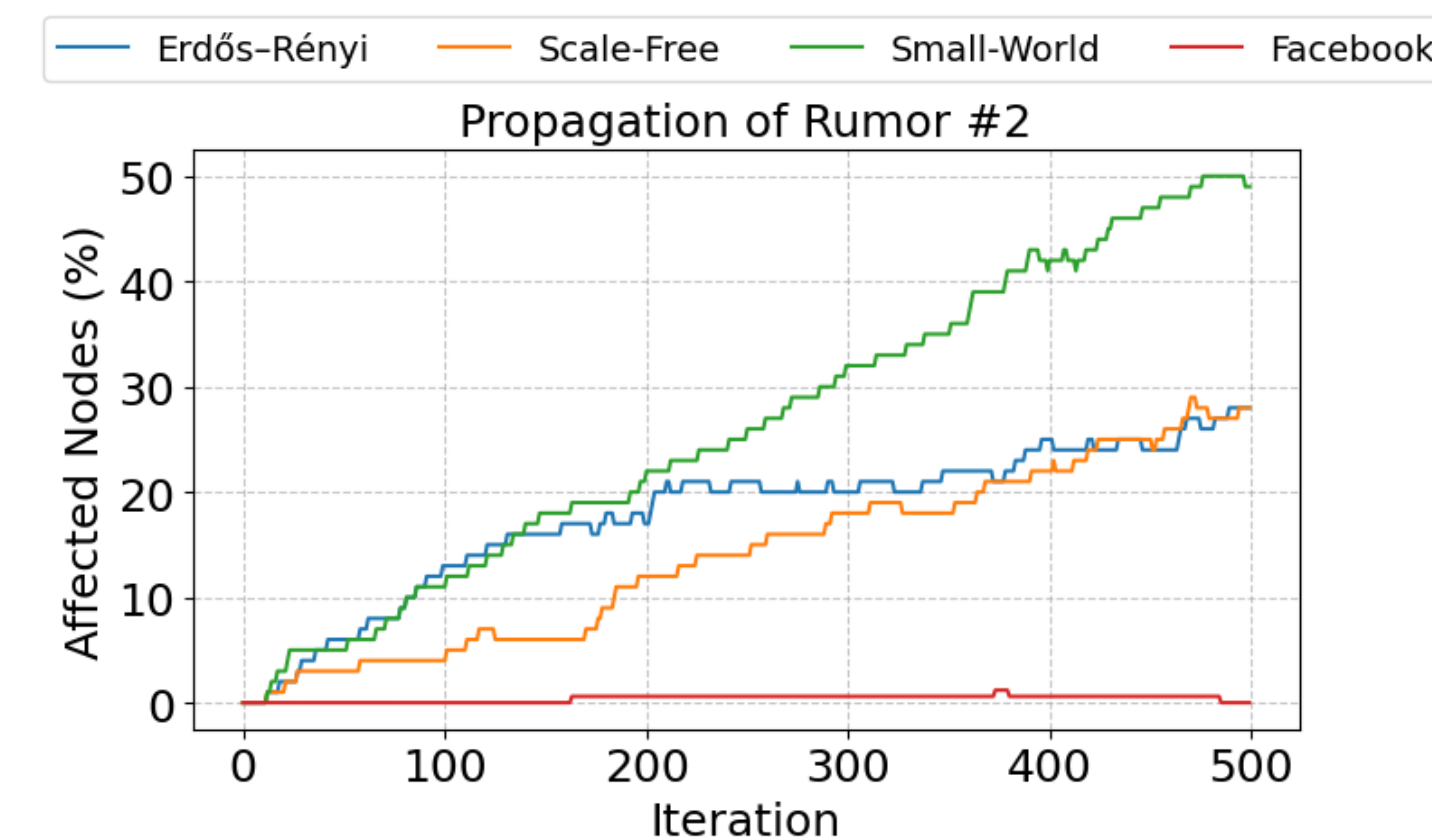


## Design

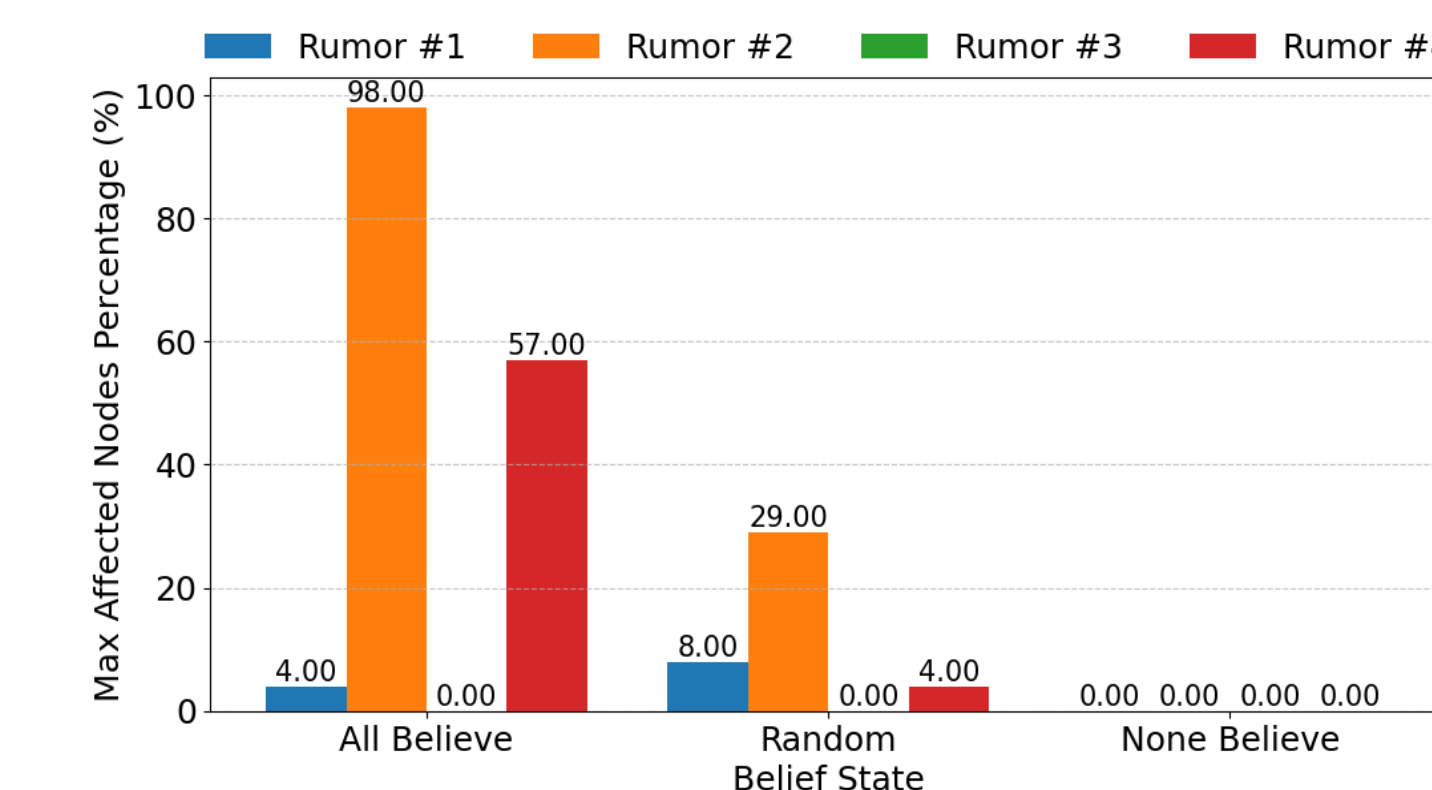


## Results

Effect of Network Structures



Effect of Spreading Schemes



Effect of Initialization Schemes

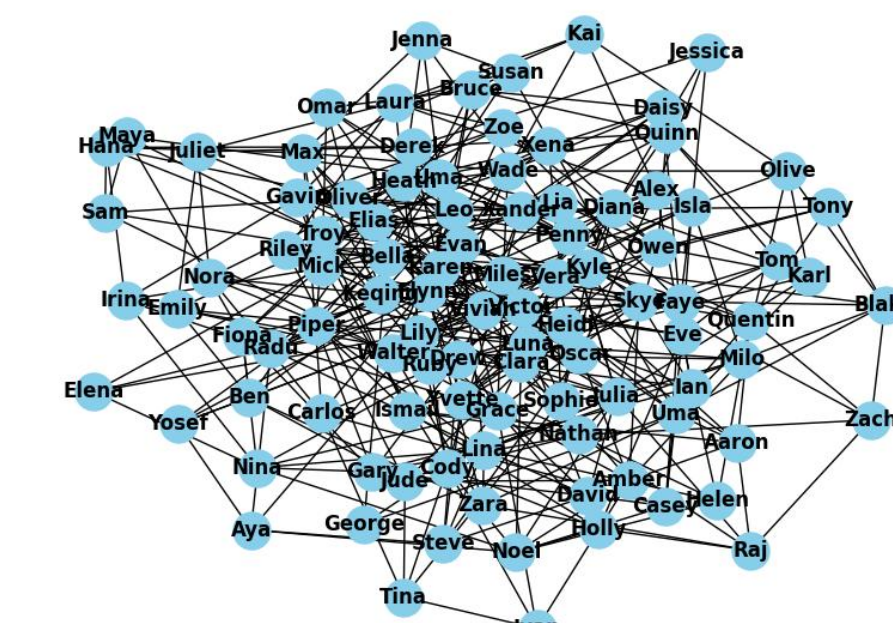


- 4 Different rumors
- 4 Different Network Structures
- 2 Initialization Schemes
- 2 Spreading Simulation Schemes
- 168 Nodes + 1656 Edges

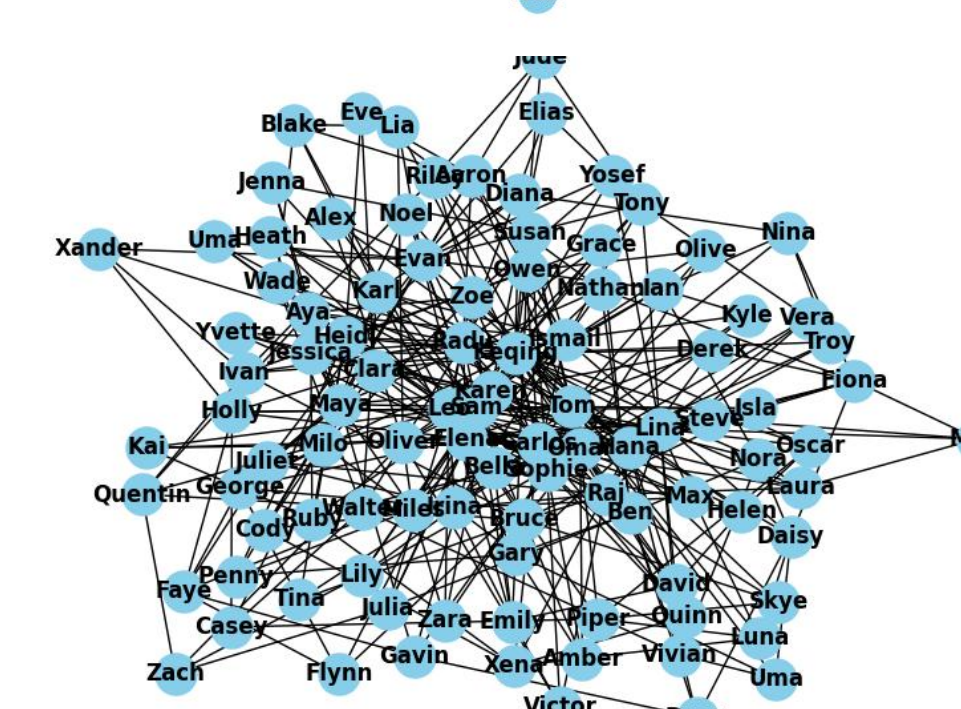
## Networks

	Erdős Rényi	Scale Free	Small World	Facebook #686
# Nodes	100	100	100	168
# Edges	396	390	200	1656
Avg Degree	7.92	7.80	4.00	19.71
Diameter	4	4	7	6
Avg CC	0.08	0.16	0.21	0.53

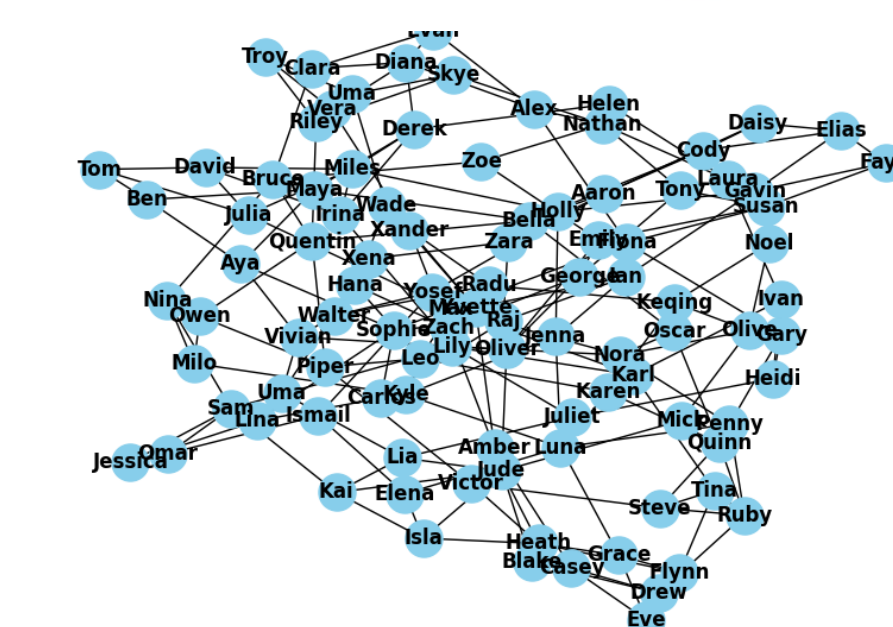
Networks Properties



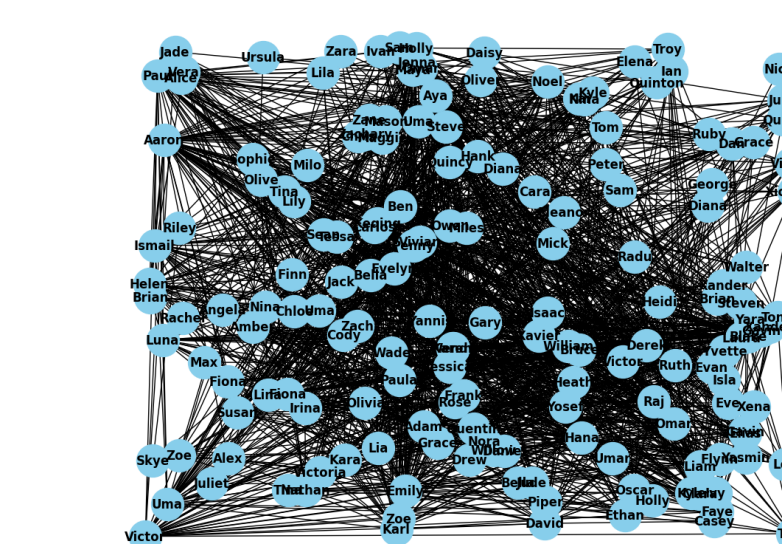
(i) Erdős-Rényi Random Network



(ii) Scale-Free Network



(iii) Small-World Network



(iv) Facebook Network

## Findings & Contributions

- ◆ Design a framework for LLM-agent-based rumor simulation.
- ◆ Evaluate LLM-based agents in mimicking human behavior in rumor dynamics.
- ◆ Identify network structures and configurations affecting rumor spreading.
- ◆ Certain network structures amplify rumor propagation.
- ◆ Diverse agent roles and initialization schemes significantly influence rumor dynamics.
- ◆ Applying fact checkers and filters mitigates rumor propagation.