

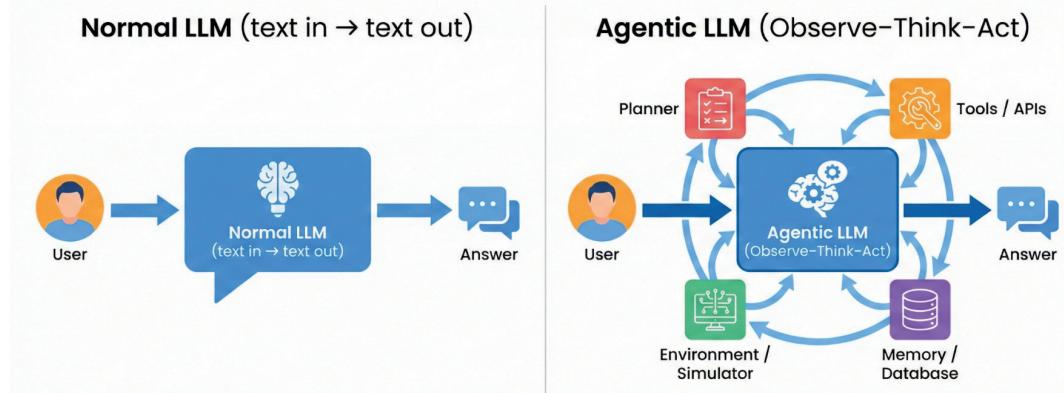


# Multi-Agent AI System based on LangGraph for 5G/6G Applications



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## Introduction



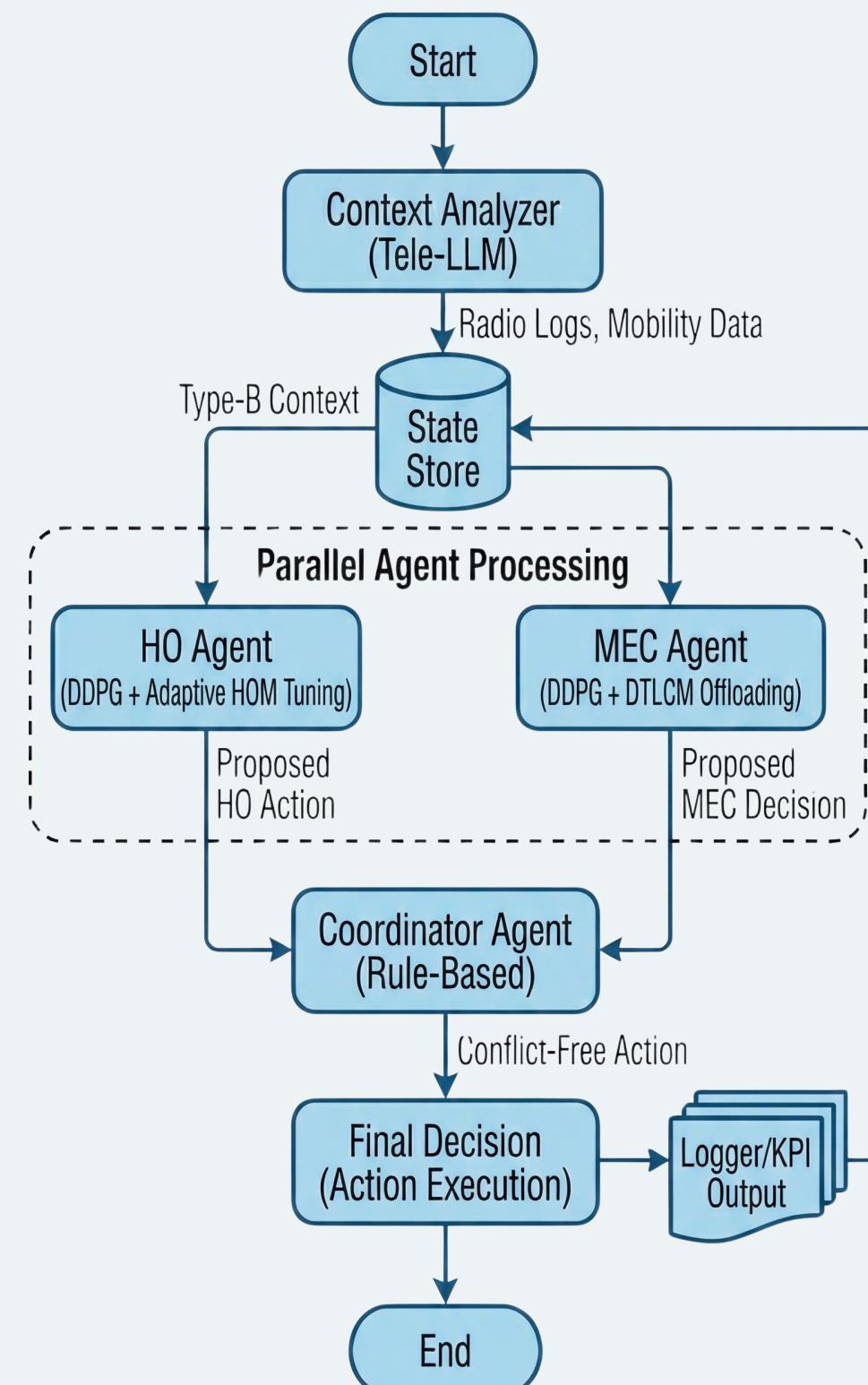
## Problem statement

- Poor context awareness (ignoring service type, user needs, and network context).
- Inefficient resource usage with unnecessary handovers and energy-wasting offloading.
- No coordination between handover logic and computing decisions, causing conflicting actions and QoS degradation.

## Aim of Work

- To build an agentic AI system that jointly optimizes handover and task offloading in 5G/6G mobility scenarios by making real-time, context-aware decisions.
- To develop this agentic system by improving latency, energy efficiency, and overall QoS beyond traditional rule-based telecom methods.

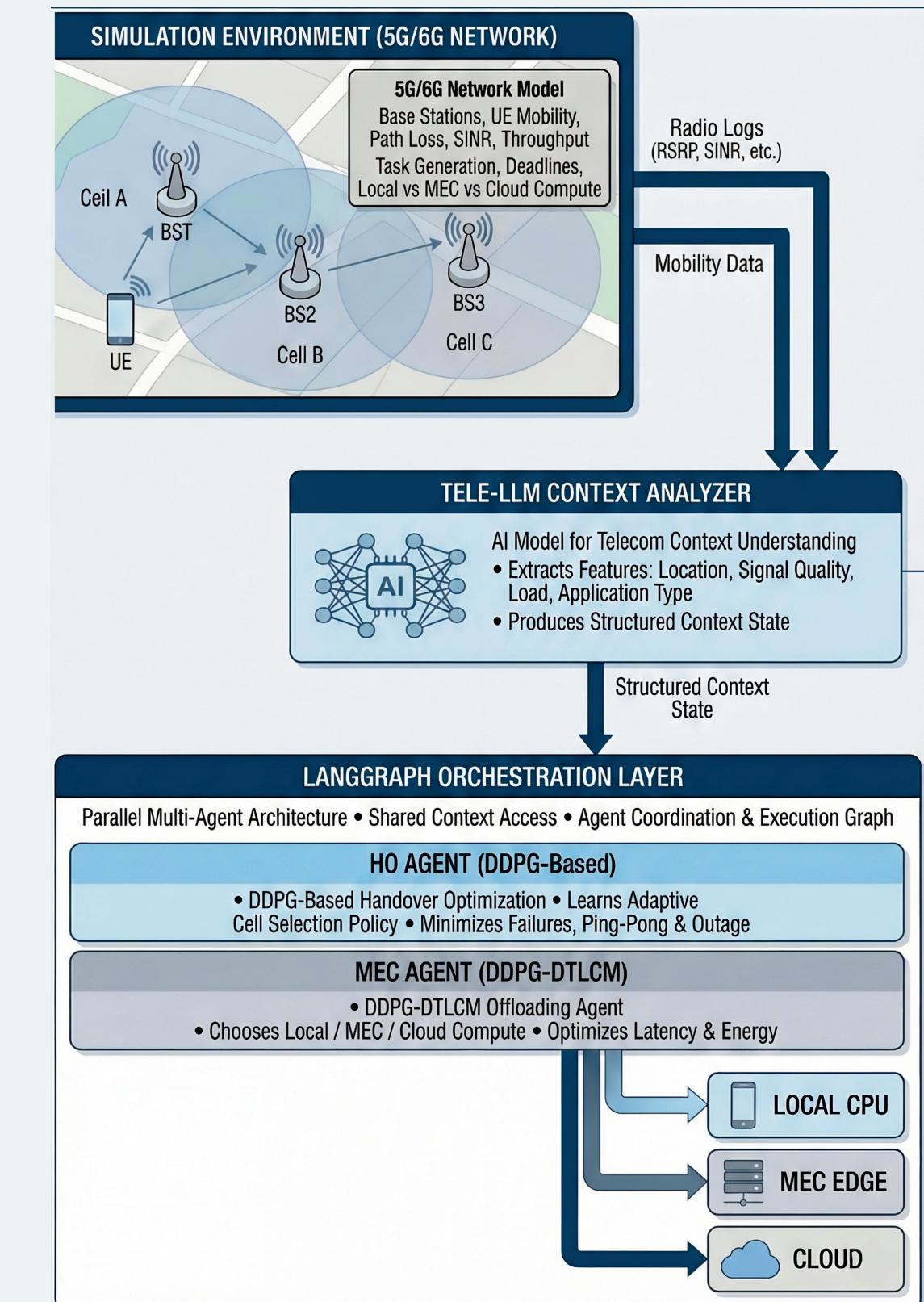
## Methodology



## Literature Survey

- AHO (DRL for HO):** Improves handover only — no MEC, no multi-agent design. [1]
- UAV MEC DRL:** Offloading for UAVs — not cellular HO, no HO agent. [2]
- Vehicular MADRL:** Multi-agent offloading — no separate HO/MEC roles. [4]
- Joint HO–offloading DRL methods:** use one monolithic agent with no separation or coordination between radio and MEC decisions. [5]

## Tech stack



## References

- [1] T. S. Kumar et al., "Advanced Handover Optimization (AHO) using deep reinforcement learning in 5G Networks," *J. King Saud Univ. Comput. Inf. Sci.* vol. 37, no. 115, 2025.
- [2] S. A. Zakaria et al., "Task offloading for multi-UAV asset edge computing with deep reinforcement learning," *Cluster Computing* vol. 28, no. 462, 2025.
- [3] A. Maatouk et al., "Tele-LLMs: A series of specialized large language models for telecommunications," *arXiv preprint arXiv:2409.05314*, 2024.
- [4] H. Zhao et al., "Federated Multi-Agent DRL for Task Offloading in Vehicular Edge Computing," *Electronics*, vol. 14, no. 17, 3501, 2025.
- [5] M. Chen, Y. Hao, L. Hu, M. S. Hossain, and A. Ghoneim, "Deep Q-learning for joint server selection, task offloading, and handover in multi-access edge computing," *IEEE Transactions on Mobile Computing*, vol. 19, no. 11, 2020.