Multi-Agent Video Recommenders: Evolution, Patterns, and Open Challenges

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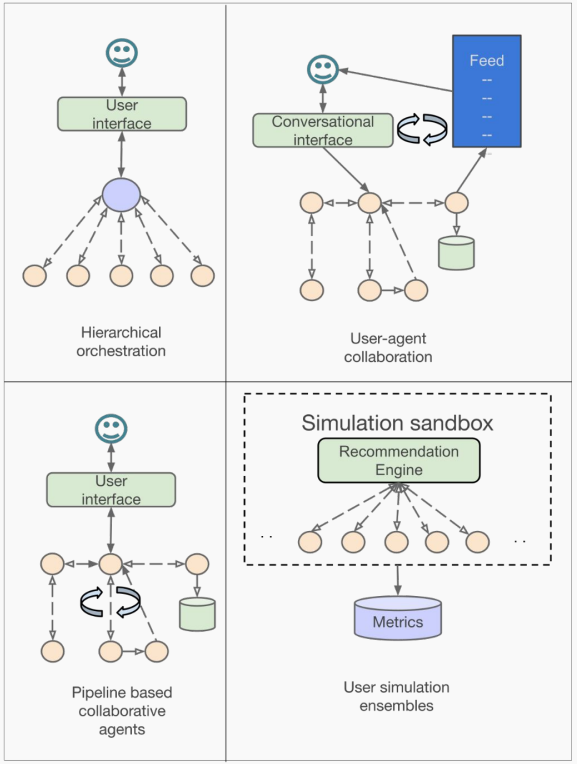
The Paradigm Shift

- Traditional single-model recommenders (Collaborative Filtering, Deep Sequential) optimize static global objectives like CTR or watch time.
- This neglects competing goals (diversity, fairness, explainability) and struggles to adapt to complex, dynamic user feedback loops.
- Decomposing recommendation into specialized, interacting agents (perception, reasoning, feedback) allows for precise and explainable systems.

Open Challenges & Future Directions

- Scalability: High inference costs of LLM agents vs. real-time latency requirements
- Multimodal Grounding: Moving beyond text summaries to deep video/audio understanding
- Incentive Alignment: Designing incentives such that agents with conflicting sub-goals (e.g., "Likes" vs. "WatchTime") cooperate truthfully
- Developing Hybrid RL-LLM architectures (LLM for planning, RL for execution) and Lifelong Personalization systems



Taxonomy of Collaborative Patterns