2.1.5 Survey of Tools and Technologies Used

In the domain of multi-agent systems powered by Large Language Models (LLMs), several tools and technologies have emerged to facilitate collaborative reasoning, task orchestration, and code generation. This section explores the key frameworks, libraries, and technologies that have been surveyed across recent literature and relevant implementations.

1. Large Language Models (LLMs)

LLMs such as GPT-4, PaLM 2, Claude, and LLaMA are foundational to all surveyed works. These models provide the core natural language understanding and code generation capabilities required to interpret user intent and perform intelligent reasoning.

2. Multi-Agent Frameworks

Several research papers have proposed frameworks such as:

- **Chain-of-Agents** [1]: Enables sequential collaboration among agents.
- **ReConcile** [6]: Uses round-table style consensus building.
- **Corex** [2] and **HALO** [3]: Focus on parallel reasoning and hierarchical control among LLMs.

These systems employ role-based agents (e.g., planner, coder, critic, tester), enabling distributed decision-making for more accurate and reliable outputs.

3. Task Decomposition Models

Tools such as **Tree-of-Thought (ToT)** and **TDAG** [12] allow dynamic task decomposition using tree or DAG-based structures. These approaches promote modular and recursive task breakdown, enabling scalable multi-agent planning and execution.

4. Reasoning Aggregators and Consensus Engines

The following technologies empower agents to engage in collaborative or competitive reasoning, while combining their outputs through weighted voting or strategic modeling:

- **Mixture-of-Agents** [4]
- **Bayesian Nash Equilibrium-based Debate Systems** [5]