IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 3, January 2026
Impact Factor: 7.67

A Survey on Multi-Agent LLM Frameworks for Data-Driven Dashboard Automation and Insight Generation

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Abstract: *The growth of enterprise analytics has increased the need for automated systems that turn raw, diverse data into clear insights and dashboards for decision-making. Traditional business intelligence workflows depend on manual interpretation, modeling, and visualization. This leads to slow and inconsistent analysis that relies heavily on expert knowledge. Recent developments in Large Language Models (LLMs) have improved the understanding of structured data and narrative explanations; however, using a single model is still not enough for complex analysis and understanding specific domains. Multi-agent LLM frameworks solve this issue by sharing analytical tasks among specialized agents. These agents focus on data profiling, domain knowledge, reasoning for insights, reflective improvement, and planning for visualization. This survey gives a detailed overview of multi-agent LLM designs for automated data-to-dashboard processes. We create a classification of system components, review key frameworks, assess performance trade-offs, and highlight emerging challenges like controlling inaccuracies, ensuring evaluation reliability, providing clear explanations, and addressing governance issues. Finally, we suggest open research opportunities for developing strong, scalable, and professional-grade autonomous analytics systems*

Keywords: Survey, Multi-Agent LLMs, Enterprise Analytics, Insight Generation, Dashboard Automation, Tree-of-Thought, Reflexive Reasoning, G-Evaluation, Data Interpretation

DOI: 10.48175/IJARSCT-30945