

DEEP-PolyU /
Awesome-GraphRAG

Code

Issues

Pull requests

Actions

Projects

Security

Insights

👁

🔗

★

Awesome-GraphRAG: A curated list of resources (surveys, papers, benchmarks, and opensource projects) on graph-based retrieval-augmented generation.

[arxiv.org/abs/2501.13958](#)

MIT license

789 stars 105 forks 46 watching Branches Activity Custom properties Tags

Public repository

🔗 1 Branch 0 Tags

🔍 Go to file


Go to file

+

Add file

Code

...

	chensyCN Add newly released papers	33dc2a0 · 3 days ago
figs	update fig	3 weeks ago
LICENSE	Initial commit	5 months ago
README.md	Add newly released papers	3 days ago

Awesome-GraphRAG (GraphRAG Survey)

👁 awesome

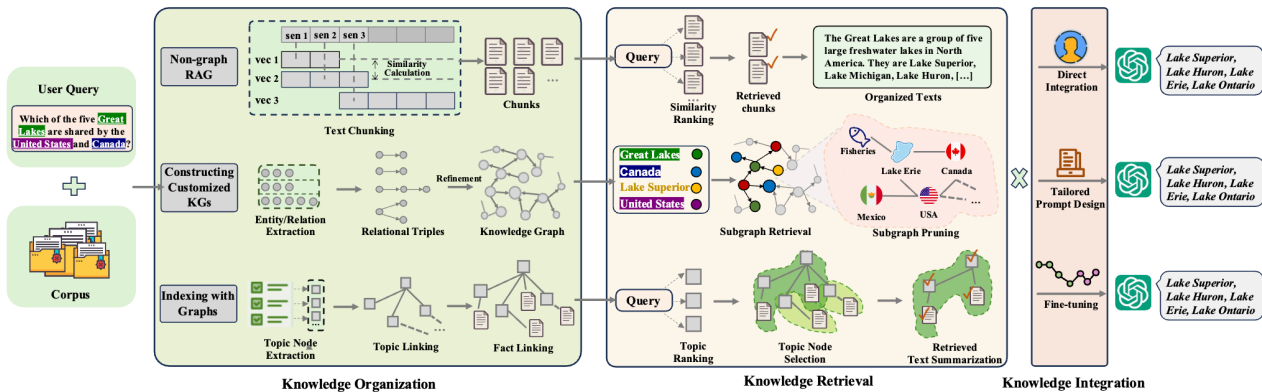
PRs welcome

Stars 789

Forks 105

last commit last monday

This repository contains a curated list of resources on graph-based retrieval-augmented generation (GraphRAG), which are classified according to "[A Survey of Graph Retrieval-Augmented Generation for Customized Large Language Models](#)". Continuously updating, stay tuned!



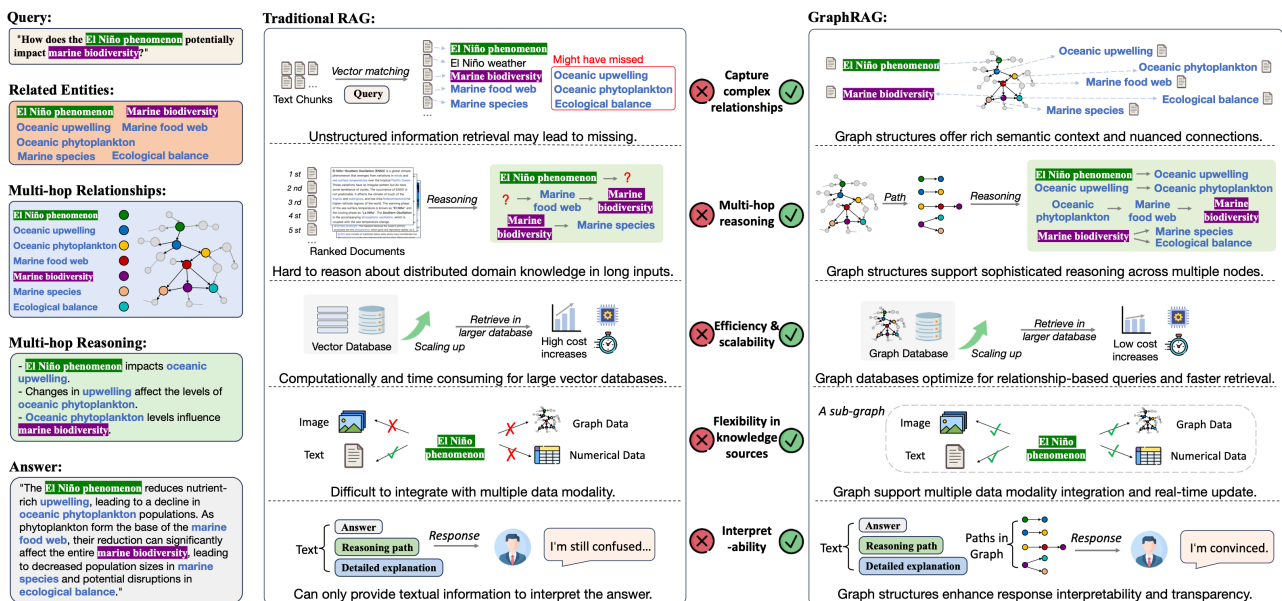
Overview of traditional RAG and two typical GraphRAG workflows.

- Non-graph RAG organizes the corpus into chunks, ranks them by similarity, and retrieves the most relevant text for generating responses.

- **Knowledge-based GraphRAG** extracts detailed knowledge graphs from the corpus using entity recognition and relation extraction, offering fine-grained, domain-specific information.
- **Index-based GraphRAG** summarizes the corpus into high-level topic nodes, which are linked to form an index graph, while the fact linking maps topics to text.

RAG vs. GraphRAG

GraphRAG is a new paradigm of RAG that revolutionizes domain-specific LLM applications, by addressing traditional RAG limitations through three key innovations: (i) **graph-structured knowledge representation** that explicitly captures entity relationships and domain hierarchies, (ii) **graph-aware retrieval mechanisms** that enable multi-hop reasoning and context-preserving knowledge acquisition, and (iii) **structure-guided knowledge search algorithms** that ensure efficient retrieval across large-scale corpora.








Comparison between traditional RAG and GraphRAG.

Contact Us

We welcome researchers to share related work to enrich this list or provide insightful comments on our survey. Feel free to reach out to the corresponding co-first authors: [Qinggang Zhang](#), [Shengyuan Chen](#).

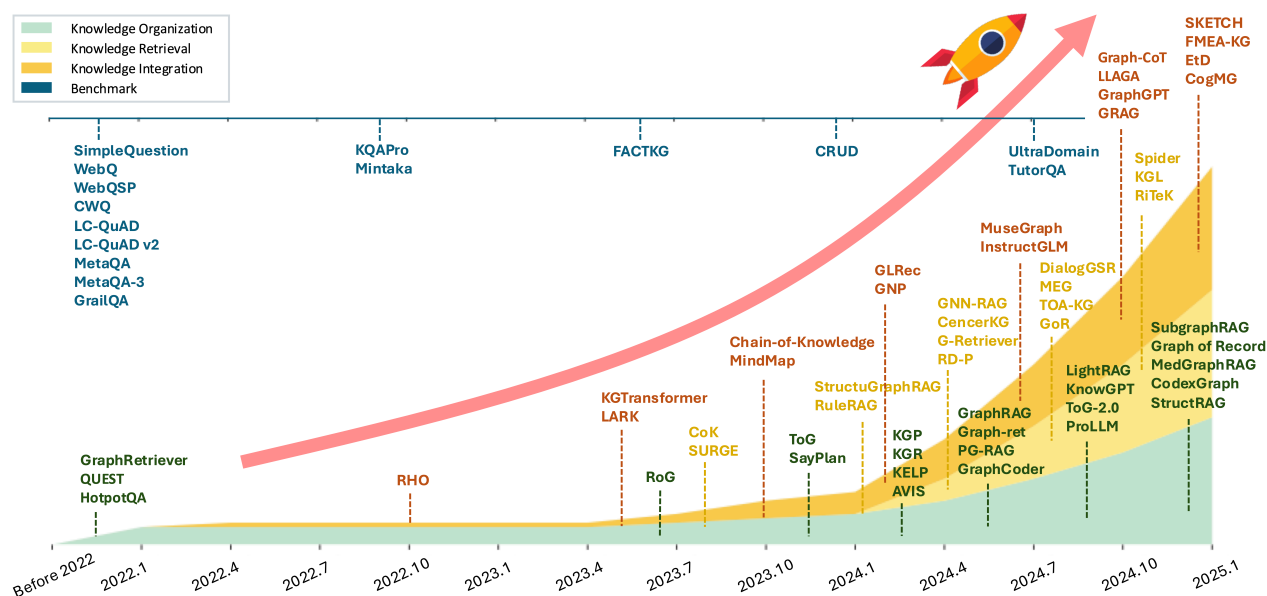
Table of Content

- [Contact Us](#)
- [Trend of GraphRAG Research](#)
- [Research Papers](#)
 - [Knowledge Organization](#)
 - [Graph for Knowledge Indexing](#)
 - [Graph as Knowledge Carrier](#)
 - [Knowledge Graph Construction from Corpus](#)
 - [GraphRAG with Existing KGs](#)
 - [Hybrid GraphRAG](#)
 - [Knowledge Retrieval](#)

- [Semantics Similarity-based Retriever](#)
- [Logical Reasoning-based Retriever](#)
- [LLM-based Retriever](#)
- [GNN-based Retriever](#)
- [Multi-round Retriever](#)
- [Post-retrieval](#)
- [Hybrid Retriever](#)
- [Knowledge Integration](#)
 - [Fine-tuning](#)
 - [Fine-tuning with Node-level Knowledge](#)
 - [Fine-tuning with Path-level Knowledge](#)
 - [Fine-tuning with Subgraph-level Knowledge](#)
 - [In-context Learning](#)
 - [Graph-enhanced Chain-of-Thought](#)
 - [Collaborative Knowledge Graph Refinement](#)
-  [Related Survey Papers](#)
-  [Benchmarks](#)
-  [Open-source Projects](#)
-  [Citation](#)
-  [Star History](#)



Trend of GraphRAG Research



The development trends in the field of GraphRAG with representative works.



Research Papers

Knowledge Organization

Graphs for Knowledge Indexing

- (arXiv 2025) DIGIMON: A unified and modular graph-based RAG framework [\[Paper\]](#)
- (arXiv 2025) ArchRAG: Attributed Community-based Hierarchical Retrieval-Augmented Generation [\[Paper\]](#)
- (arXiv 2025) KET-RAG: A Cost-Efficient Multi-Granular Indexing Framework for Graph-RAG [\[Paper\]](#)
- (arXiv 2025) PIKE-RAG: sPecialized KnowledgE and Rationale Augmented Generation [\[Paper\]](#)
- (arXiv 2024) Graph Neural Network Enhanced Retrieval for Question Answering of LLMs [\[Paper\]](#)
- (arXiv 2024) KAG: Boosting LLMs in Professional Domains via Knowledge Augmented Generation [\[Paper\]](#)
- (arXiv 2024) OG-RAG: Ontology-Grounded Retrieval-Augmented Generation For Large Language Models [\[Paper\]](#)
- (arXiv 2024) GRAG: Graph Retrieval-Augmented Generation [\[Paper\]](#)
- (arXiv 2024) Empowering Large Language Models to Set up a Knowledge Retrieval Indexer via Self-Learning [\[Paper\]](#)
- (ICLR 2024) RAPTOR: Recursive Abstractive Processing for Tree-Organized Retrieval [Paper](#)
- (AAAI 2024) Knowledge graph prompting for multi-document question answering [\[Paper\]](#)
- (arXiv 2024) GraphCoder: Enhancing Repository-Level Code Completion via Code Context Graph-based Retrieval and Language Model [\[Paper\]](#)
- (NeurIPS 2023) Avis: Autonomous visual information seeking with large language model agent [\[Paper\]](#)
- (CoRL 2023) Sayplan: Grounding large language models using 3d scene graphs for scalable robot task planning [\[Paper\]](#)
- (arXiv 2020) Answering complex open-domain questions with multi-hop dense retrieval [\[Paper\]](#)

 README  MIT license



Graphs as Knowledge Carrier

Knowledge Graph Construction from Corpus

- (arXiv 2025) MedRAG: Enhancing Retrieval-augmented Generation with Knowledge Graph-Elicited Reasoning for Healthcare Copilot [\[Paper\]](#)
- (arXiv 2025) PathRAG: Pruning Graph-based Retrieval Augmented Generation with Relational Paths [\[Paper\]](#)
- (arXiv 2024) From local to global: A graph rag approach to query-focused summarization [\[Paper\]](#)
- (EMNLP 2024) Structure Guided Prompt: Instructing Large Language Model in Multi-Step Reasoning by Exploring Graph Structure of the Text [\[Paper\]](#)
- (EMNLP 2024 Findings) GraphReader: Building Graph-based Agent to Enhance Long-Context Abilities of Large Language Models [\[Paper\]](#)
- (SIGIR 2024) Retrieval-augmented generation with knowledge graphs for customer service question answering [\[Paper\]](#)
- (arXiv 2024) DynaGRAG | Exploring the Topology of Information for Advancing Language Understanding and Generation in Graph Retrieval-Augmented Generation [\[Paper\]](#)
- (arXiv 2024) FastRAG: Retrieval Augmented Generation for Semi-structured Data [\[Paper\]](#)
- (TechRxiv 2024) LuminiRAG: Vision-Enhanced Graph RAG for Complex Multi-Modal Document Understanding [\[Paper\]](#)
- (BigData 2023) AutoKG: Efficient automated knowledge graph generation for language models [\[Paper\]](#)
- (ACL 2019) Using Local Knowledge Graph Construction to Scale Seq2Seq Models to Multi-Documnet Inputs [\[Paper\]](#)
- (SIGIR 2019) Answering complex questions by joining multi-document evidence with quasi knowledge graphs [\[Paper\]](#)

GraphRAG with Existing KGs

- (ICLR 2025) Simple is Effective: The Roles of Graphs and Large Language Models in Knowledge-Graph-Based Retrieval-Augmented Generation [\[Paper\]](#)
- (arXiv 2024) StructRAG: Boosting Knowledge Intensive Reasoning of LLMs via Inference-time Hybrid Information Structurization [\[Paper\]](#)
- (ICLR 2024) Reasoning on Graphs: Faithful and Interpretable Large Language Model Reasoning [\[Paper\]](#)
- (AAAI 2024) Mitigating large language model hallucinations via autonomous knowledge graph-based retrofitting [\[Paper\]](#)
- (ICLR 2024) Think-on-Graph: Deep and Responsible Reasoning of Large Language Model on Knowledge Graph [\[Paper\]](#)
- (Bioinformatics 2024) Biomedical knowledge graph-enhanced prompt generation for large language models [\[Paper\]](#)
- (NeurIPS 2024) KnowGPT: Knowledge Graph based Prompting for Large Language Models [\[Paper\]](#)
- (ACL 2024 Findings) Knowledge Graph-Enhanced Large Language Models via Path Selection [\[Paper\]](#)
- (IEEE VIS 2024) KNOWNET: Guided Health Information Seeking from LLMs via Knowledge Graph Integration [\[Paper\]](#)
- (CoLM 2024) ProLLM: Protein Chain-of-Thoughts Enhanced LLM for Protein-Protein Interaction Prediction [\[Paper\]](#)
- (arXiv 2024) LEGO-GraphRAG: Modularizing Graph-based Retrieval-Augmented Generation for Design Space Exploration [\[Paper\]](#)
- (arXiv 2024) Think-on-Graph 2.0: Deep and Faithful Large Language Model Reasoning with Knowledge-guided Retrieval Augmented Generation [\[Paper\]](#)

Hybrid GraphRAG

- (NAACL 2025) Knowledge Graph-Guided Retrieval Augmented Generation [\[Paper\]](#)
- (ACL 2024 Findings) HybGRAG: Hybrid Retrieval-Augmented Generation on Textual and Relational Knowledge Bases [\[Paper\]](#)
- (arXiv 2024) Graph of Records: Boosting Retrieval Augmented Generation for Long-context Summarization with Graphs [\[Paper\]](#)
- (arXiv 2024) Medical graph rag: Towards safe medical large language model via graph retrieval-augmented generation [\[Paper\]](#)
- (arXiv 2024) Codexgraph: Bridging large language models and code repositories via code graph databases [\[Paper\]](#)

Knowledge Retrieval

Semantics Similarity-based Retriever

- (AAAI 2024) StructuGraphRAG: Structured Document-Informed Knowledge Graphs for Retrieval-Augmented Generation [\[Paper\]](#)
- (arXiv 2024) G-Retriever: Retrieval-Augmented Generation for Textual Graph Understanding and Question Answering [\[Paper\]](#)
- (arXiv 2024) CancerKG.ORG A Web-scale, Interactive, Verifiable Knowledge Graph-LLM Hybrid for Assisting with Optimal Cancer Treatment and Care [\[Paper\]](#)
- (arXiv 2024) Empowering Large Language Models to Set up a Knowledge Retrieval Indexer via Self-Learning [\[Paper\]](#)
- (arXiv 2024) GraphCoder: Enhancing Repository-Level Code Completion via Code Context Graph-based Retrieval and Language Model [\[Paper\]](#)

- (arXiv 2024) Medical Graph RAG: Towards Safe Medical Large Language Model via Graph Retrieval-Augmented Generation [\[Paper\]](#)
- (arXiv 2024) How to Make LLMs Strong Node Classifiers? [\[Paper\]](#)

Logical Reasoning-based Retriever

- (NeurIPS 2024) KnowGPT: Knowledge Graph based Prompting for Large Language Models [\[Paper\]](#)
- (ACL 2024 Findings) Knowledge Graph-Enhanced Large Language Models via Path Selection [\[Paper\]](#)
- (ICLR 2024) Think-on-Graph: Deep and Responsible Reasoning of Large Language Model on Knowledge Graph [\[Paper\]](#)
- (CIKM 2024) RD-P: A Trustworthy Retrieval-Augmented Prompter with Knowledge Graphs for LLMs [\[Paper\]](#)
- (arXiv 2024) RuleRAG: Rule-Guided Retrieval-Augmented Generation with Language Models for Question Answering [\[Paper\]](#)
- (LHB 2024) Intelligent question answering for water conservancy project inspection driven by knowledge graph and large language model collaboration [\[Paper\]](#)
- (arXiv 2024) RiTeK: A Dataset for Large Language Models Complex Reasoning over Textual Knowledge Graphs [\[Paper\]](#)

LLM-based Retriever

- (AAAI 2024) Knowledge graph prompting for multi-document question answering [\[Paper\]](#)
- (EMNLP 2024) Structure Guided Prompt: Instructing Large Language Model in Multi-Step Reasoning by Exploring Graph Structure of the Text [\[Paper\]](#)
- (ACML) Enhancing Textbook Question Answering with Knowledge Graph-Augmented Large Language Models [\[Paper\]](#)
- (ICLR 2024) Think-on-Graph: Deep and Responsible Reasoning of Large Language Model on Knowledge Graph [\[Paper\]](#)
- (arXiv 2024) LightRAG: Simple and Fast Retrieval-Augmented Generation [\[Paper\]](#)
- (arXiv 2024) MEG: Medical Knowledge-Augmented Large Language Models for Question Answering [\[Paper\]](#)
- (arXiv 2024) From local to global: A graph rag approach to query-focused summarization [\[Paper\]](#)

GNN-based Retriever

- (arXiv 2025) CG-RAG: Research Question Answering by Citation Graph Retrieval-Augmented LLMs [\[Paper\]](#)
- (arXiv 2024) Advanced RAG Models with Graph Structures: Optimizing Complex Knowledge Reasoning and Text Generation [\[Paper\]](#)
- (arXiv 2024) Language Models are Graph Learners [\[Paper\]](#)
- (arXiv 2024) Graph Neural Network Enhanced Retrieval for Question Answering of LLMs [\[Paper\]](#)
- (arXiv 2024) Knowledge Graph-Augmented Language Models for Knowledge-Grounded Dialogue Generation [\[Paper\]](#)

Multi-round Retriever

- (arXiv 2024) Graph Chain-of-Thought: Augmenting Large Language Models by Reasoning on Graphs [\[Paper\]](#)
- (arXiv 2024) Generative Subgraph Retrieval for Knowledge Graph-Grounded Dialog Generation [\[Paper\]](#)

- (arXiv 2024) **Graph of Records: Boosting Retrieval Augmented Generation for Long-context Summarization with Graphs** [\[Paper\]](#)

Post-retrieval

- (ACL 2024) **Boosting Language Models Reasoning with Chain-of-Knowledge Prompting** [\[Paper\]](#)
- (ACL Findings 2024) **Call Me When Necessary: LLMs can Efficiently and Faithfully Reason over Structured Environments** [\[Paper\]](#)
- (arXiv 2024) **Graph-constrained Reasoning: Faithful Reasoning on Knowledge Graphs with Large Language Models** [\[Paper\]](#)
- (arXiv 2024) **Mitigating Large Language Model Hallucinations via Autonomous Knowledge Graph-based Retrofitting** [\[Paper\]](#)

Hybrid Retriever

- (arXiv 2024) **Think-on-Graph 2.0: Deep and Faithful Large Language Model Reasoning with Knowledge-guided Retrieval Augmented Generation** [\[Paper\]](#)
- (arXiv 2024) **StructRAG: Boosting Knowledge Intensive Reasoning of LLMs via Inference-time Hybrid Information Structurization** [\[Paper\]](#)

Knowledge Integration

Fine-tuning

Fine-tuning with Node-level Knowledge

- (arXiv 2025) **Large Language Models based Graph Convolution for Text-Attributed Networks?** [\[Paper\]](#)
- (SIGIR 2024) **Graphgpt: Graph instruction tuning for large language models** [\[Paper\]](#)

Fine-tuning with Path-level Knowledge

- (AAAI 2024) **Exploring large language model for graph data understanding in online job recommendations** [\[Paper\]](#)
- (arXiv 2024) **MuseGraph: Graph-oriented Instruction Tuning of Large Language Models for Generic Graph Mining** [\[Paper\]](#)
- (WWW 2023) **Structure pretraining and prompt tuning for knowledge graph transfer** [\[Paper\]](#)
- (ICLR 2023) **Reasoning on graphs: Faithful and interpretable large language model reasoning** [\[Paper\]](#)

Fine-tuning with Subgraph-level Knowledge

- (ICML 2024) **Llaga: Large language and graph assistant** [\[Paper\]](#)
- (KDD 2024) **Graphwiz: An instruction-following language model for graph problems** [\[Paper\]](#)
- (AAAI 2024) **Graph neural prompting with large language models** [\[Paper\]](#)
- (ACL 2024 Findings) **Rho: Reducing hallucination in open-domain dialogues with knowledge grounding** [\[Paper\]](#)
- (EACL 2024 Findings) **Language is All a Graph Needs** [\[Paper\]](#)

In-context Learning

Graph-enhanced Chain-of-Thought

- (KBS 2025) Different paths to the same destination: Diversifying LLMs generation for multi-hop open-domain question answering [\[Paper\]](#)
- (ICLR 2024) Reasoning on Graphs: Faithful and Interpretable Large Language Model Reasoning [\[Paper\]](#)
- (ICLR 2024) Think-on-Graph: Deep and Responsible Reasoning of Large Language Model on Knowledge Graph [\[Paper\]](#)
- (arXiv 2024) Think-on-Graph 2.0: Deep and Faithful Large Language Model Reasoning with Knowledge-guided Retrieval Augmented Generation [\[Paper\]](#)
- (arXiv 2024) Graph Chain-of-Thought: Augmenting Large Language Models by Reasoning on Graphs [\[Paper\]](#)
- (ICLR 2024) Chain-of-Knowledge: Grounding Large Language Models via Dynamic Knowledge Adapting over Heterogeneous Sources [\[Paper\]](#)
- (ACL Finding 2024) Visual In-Context Learning for Large Vision-Language Models [\[Paper\]](#)
- (NeurIPS 2023) What makes good examples for visual in-context learning? [\[Paper\]](#)
- (ACL 2023) Plan-and-Solve Prompting: Improving Zero-Shot Chain-of-Thought Reasoning by Large Language Models [\[Paper\]](#)
- (AAAI 2024) When Do Program-of-Thought Works for Reasoning? [\[Paper\]](#)
- (ICLR 2022) An Explanation of In-context Learning as Implicit Bayesian Inference [\[Paper\]](#)
- (EMNLP 2023) KnowledGPT: Enhancing Large Language Models with Retrieval and Storage Access on Knowledge Bases [\[Paper\]](#)

Collaborative Knowledge Graph Refinement

- (AAAI 2024) Mitigating large language model hallucinations via autonomous knowledge graph-based retrofitting [\[Paper\]](#)
- (ACL 2024 Findings) Knowledge Graph-Enhanced Large Language Models via Path Selection [\[Paper\]](#)
- (arXiv 2024) Plan-on-Graph: Self-Correcting Adaptive Planning of Large Language Model on Knowledge Graphs [\[Paper\]](#)
- (arXiv 2024) Explore then Determine: A GNN-LLM Synergy Framework for Reasoning over Knowledge Graph [\[Paper\]](#)
- (ACL 2024) CogMG: Collaborative Augmentation Between Large Language Model and Knowledge Graph [\[Paper\]](#)



Related Survey Papers

- (arXiv 2025) Retrieval-Augmented Generation with Graphs (GraphRAG) [\[Paper\]](#)
- (arXiv 2024) Graph Retrieval-Augmented Generation: A Survey [\[Paper\]](#)
- (AlxSET 2024) Graph Retrieval-Augmented Generation for Large Language Models: A Survey [\[Paper\]](#)

To explore the applications of LLMs on graph tasks, we recommend the following repositories:

- [Awesome-LLMs-in-Graph-tasks](#) by [Yuhan Li](#) from HKUST(GZ).
- [Awesome-Graph-LLM](#) by [Xiaoxin He](#) from NUS.
- [Awesome-Graph-Prompt](#), created by [Xixi Wu](#) from CUHK.










Benchmarks

Dataset	Task	Paper	Repo
DIGIMON	Large-scale graphRAG	[arXiv 2025]	[Github]

Dataset	Task	Paper	Repo
SimpleQuestion	Simple Question Answering	[arXiv 2015]	[Github]
WebQ	Simple Question Answering	[EMNLP 2013]	[CodaLab]
Multihop-RAG	Multi-hop Reasoning	[COLING 2024]	[Github]
CWQ	Multi-hop Reasoning	[NAACL 2018]	[TAU-NLP]
MetaQA	Multi-hop Reasoning	[AAAI 2018]	[Github]
MetaQA-3	Multi-hop Reasoning	[AAAI 2018]	[Github]
CURD	Large-scale Complex QA	[arXiv 2024]	[Github]
KQAPro	Large-scale Complex QA	[ACL 2022]	[Github]
LC-QuAD v2	Large-scale Complex QA	[ISWC 2019]	[figshare]
LC-QuAD	Large-scale Complex QA	[ISWC 2017]	[Github]
UltraDomain	Domain-specific QA	[arXiv 2024]	[Github]
TutorQA	Domain-specific QA	[arXiv 2024]	[Github]
FACTKG	Domain-specific QA	[ACL 2023]	[Github]
Mintaka	Domain-specific QA	[ACL 2022]	[Github]
GrailQA	Domain-specific QA	[WWW 2021]	[Github]
WebQSP	Domain-specific QA	[ACL 2016]	[Microsoft]



Open-source Projects

-  DIGIMON: A unified and modular graph-based RAG framework
-  Microsoft-GraphRAG: A modular graph-based Retrieval-Augmented Generation (RAG) system
-  Nano-GraphRAG: A simple, easy-to-hack GraphRAG implementation
-  Fast GraphRAG: RAG that intelligently adapts to your use case, data, and queries
-  LightRAG: Simple and Fast Retrieval-Augmented Generation
-  HuixiangDou2: A Robustly Optimized GraphRAG Approach
-  GraphRAG-SDK: a specialized toolkit for building GraphRAG systems.



Citation

If you find this survey helpful, please cite our paper:

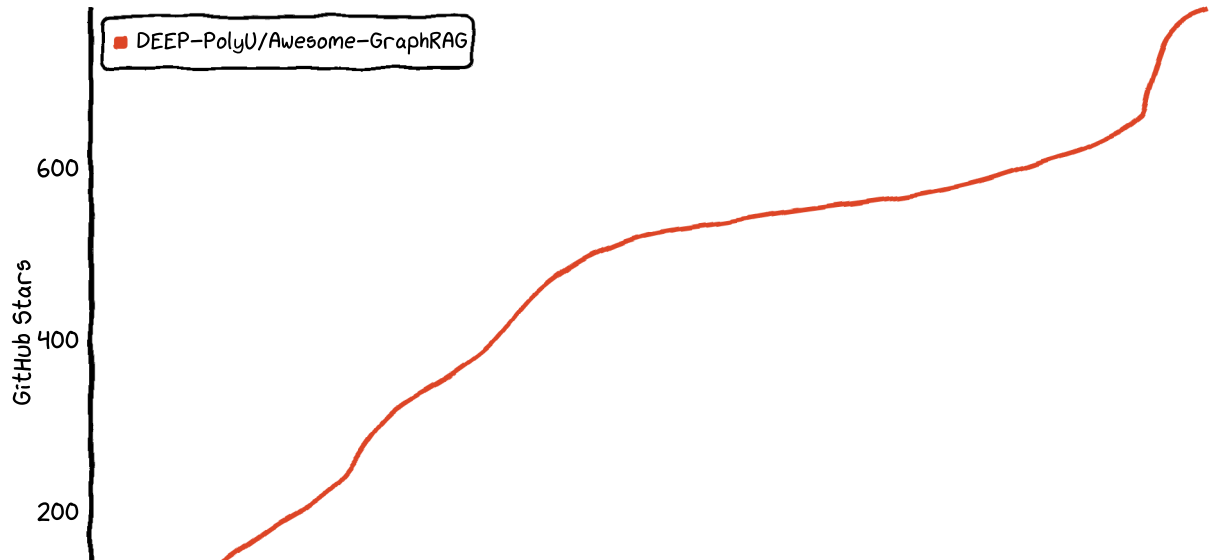
```
@article{zhang2025survey,  
  title={A Survey of Graph Retrieval-Augmented Generation for Customized Large Language Models},  
  author={Zhang, Qinggang and Chen, Shengyuan and Bei, Yuanchen and Yuan, Zheng and Zhou, Huachi and Hong, Zijin and Dong, Junnan and Chen, Hao and Chang, Yi and Huang, Xiao},
```



```
journal={arXiv preprint arXiv:2501.13958},  
year={2025}  
}
```

★ Star History

📊 Star History



Contributors 5

