# LayLLM: Adapting Large Language Models for Lay Summarization of Biomedical Literature and Clinical Reports

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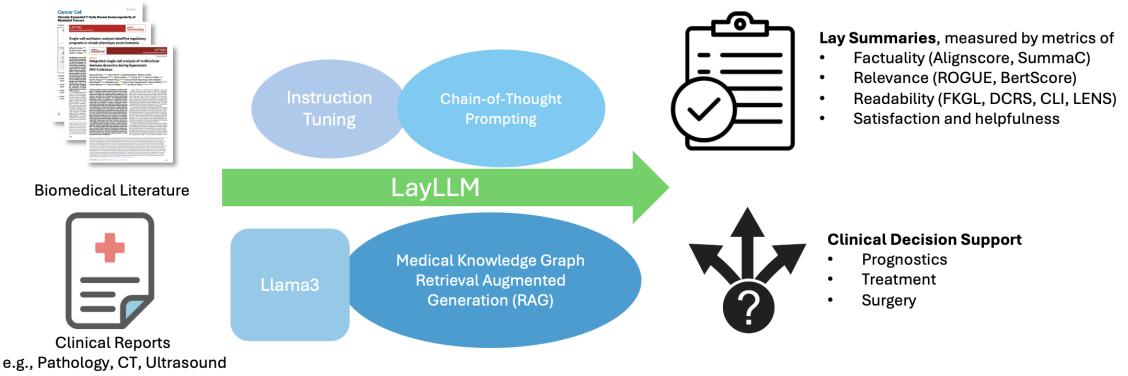


**Main workflow of LayLLM.**

In recent years, biomedical literature and clinical reports have surged due to advancements in biomedical instruments, global pandemics, and an aging population. Both scientific papers and clinical reports share several similarities: they follow a structured narrative flow, contain complex abbreviations, and present intricate results prone to misinterpretation. These factors make them challenging to comprehend. Recent advancements in Large Language Models (LLMs) offer new possibilities for summarizing scientific papers and clinical reports. While these tools generate readable explanations, our systematic evaluation revealed they often lack factual accuracy and relevance, particularly in scientific paper summaries, clinical report interpretations, and clinical decision support. To address these issues, we introduce LayLLM, a system designed to produce high-quality biomedical lay summaries. Combining biomedical chain-of-thought prompting, knowledge-graph retrieval augmented generation, and instruction fine-tuning, LayLLM significantly enhances the factuality and relevance of summaries generated from both open-source (LLama-3) and closed-source (GPT-4) models, without compromising readability. Our extensive evaluations, using three specially curated datasets of 30K biomedical papers and hundreds of medical report interpretations and clinical decision support cases, demonstrate that LayLLM outperforms existing general large language models and specialized models. This work not only showcases LayLLM's enhanced performance but also paves the way for future explorations into LLMs' capabilities for high-quality biomedical lay summarization.

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