

Development of Specialized Large Language Models for Radiology Report Processing

Xiang "Shaun" Li

Massachusetts General Hospital, Boston, MA

In this study, we developed a specialized Large Language Model (LLM) tailored for the field of radiology. The LLM, named RadiologyGPT, has been specifically adjusted to understand and process radiological text via fine-tuning on an extensive dataset. In addition, we employed the Retrieval-Augmented Generation (RAG) technique, which generates dynamic contexts for the LLM by incorporating previous radiology reports as exemplars into the prompts. The performance of the RadiologyGPT, which is the quality of the generated Impression section, was evaluated by both quantitative metrics like ROGUE scores and human reader study. Key points of the generated impressions are analyzed, such as the number of findings reported, the significance of the missing findings (if any), stylistic acceptability, and the model's ability to generate diagnosis/differential diagnosis. RadiologyGPT represents an important step forward in clinical Natural Language Processing, as it pioneers a domain-specific LLM integrating the current techniques for LLM customization. Although still in its preliminary stage, the capabilities and future possibilities of generative modeling in healthcare are both exciting and merit further investigation.