Leveraging AI to Optimize Radiology Workflow: A ChatGPT-Based Organizational Assistant

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Background/Problem Being Solved

Radiology departments are complex institutions with numerous protocols, policies, and procedures that are essential for appropriate patient care and diagnostic accuracy. However, troubleshooting protocols and accessing and understanding documentation can often be time-consuming for radiologists. These interruptions can lead to errors, decrease productivity, and delay patient care.

Intervention(s)

To optimize the radiologist's workflow, a ChatGPT (GPT-4o) chatbot was trained on a dataset of up-to-date departmental policies, protocols, procedures, standardized clinical support tools (LI-RADS criteria, etc.), contact information, and important links. The chatbot was instructed to operate within the bounds of its trained dataset and alert users if the information provided was not within its dataset.

Barriers/Challenges

Several barriers and challenges were encountered during the development and implementation of this chatbot. These included the need to accurately represent the complex and nuanced nature of departmental policies and procedures in a machine-readable format, ensuring the chatbot's ability to understand and respond to a vast array of queries, and maintain the chatbot's accuracy and relevance over time.

Outcome

The chatbot was successfully implemented and demonstrated significant benefits to the radiology department. The AI has been used extensively by the department's body and chest divisions and radiology residents, actively being utilized by 150+ users with thousands of chatbot inquiries. Over time, interdepartmental interest has grown with other divisions and technicians seeking to integrate the chatbot into their workflow.

Conclusion/Statement of Impact/Lessons Learned

The development and implementation of a ChatGPT chatbot for radiology departments represents a significant advancement in the field of applied informatics. By leveraging the power of artificial intelligence, we can improve the efficiency and accuracy of clinical workflows (standardization), leading to improved patient care. However, it is crucial to

carefully consider the challenges associated with developing and maintaining such a chatbot, including data quality and accuracy.

Figure(s)

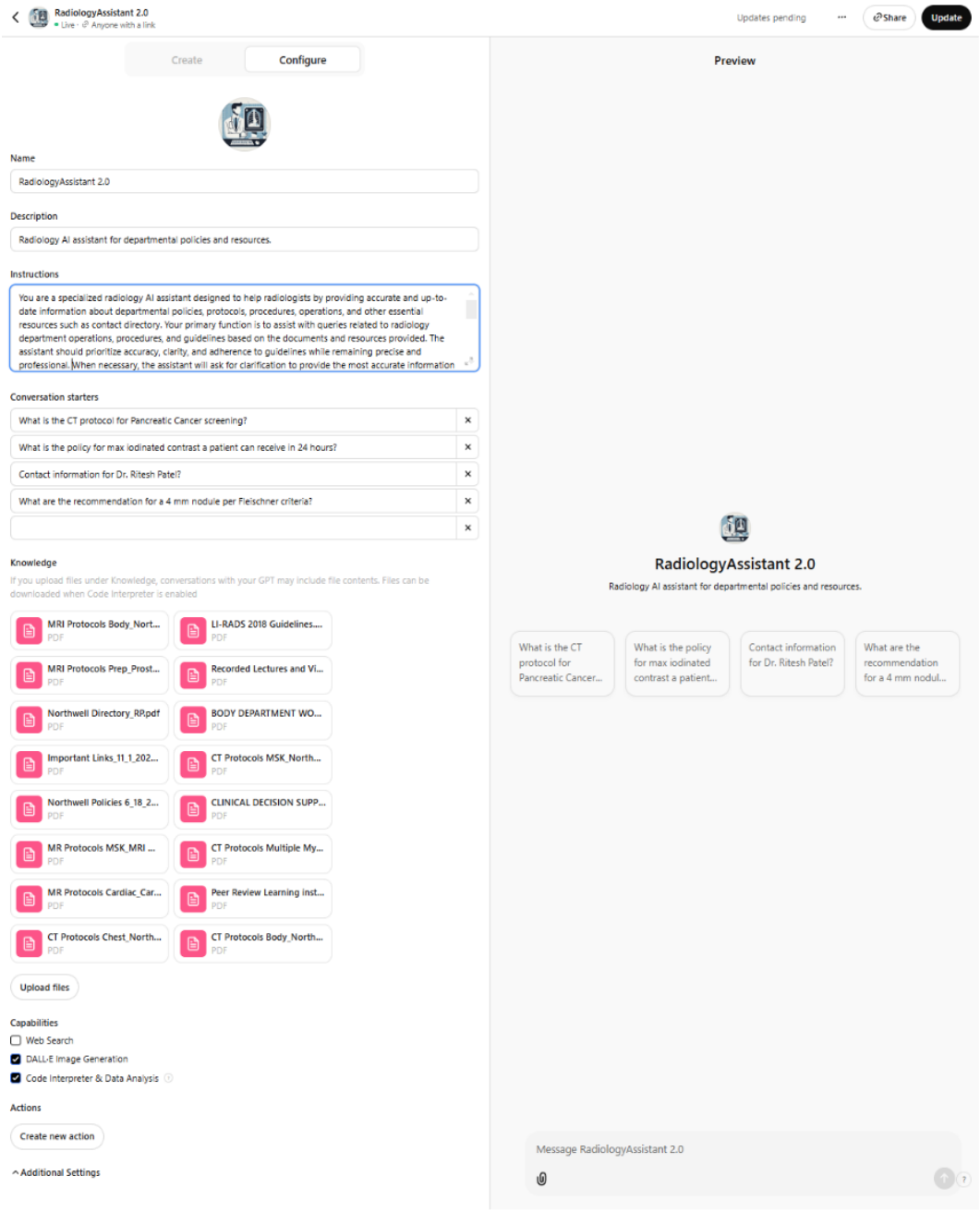

Figure 1. Configuration screen and preview of a ChatGPT (GPT-4o) chatbot customized as a digital assistant for the department of radiology. The ChatGPT-based chatbot has been tailored to assist radiologists and radiological ancillary staff by providing accurate, context-specific answers to departmental specific queries of radiological procedures and policies. The chatbot was trained on a dataset of departmental guidelines via PDFs uploaded to its knowledge base. The configuration enables seamless interactions with users, offering instant responses to queries related to radiology workflows, regulatory standards, internal guidelines, and clinical support.

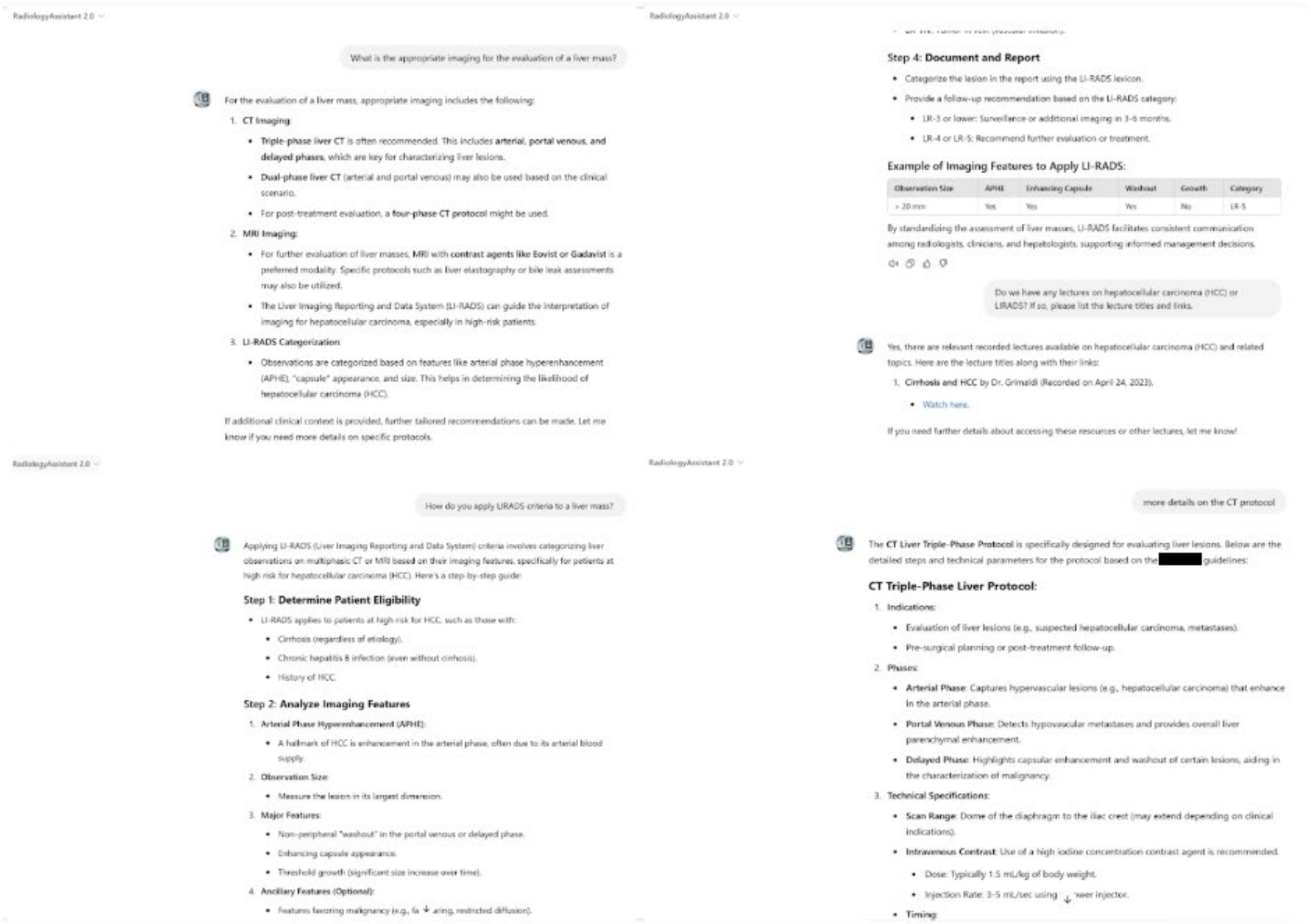

Figure 2. An example demonstration of the chatbot responding to queries regarding the evaluation of a liver mass. Various screenshots demonstrating how the ChatGPT chatbot provides accurate assessment and specific departmental protocols for the evaluation and proper workup of a liver mass. The chatbot specifies the type of imaging which should be ordered by the primary team, the departmental specific CT Triple Phase Liver Protocol, an explanation of how to utilize LI-RADS criteria, and a relevant departmental lecture on the radiologic features of Cirrhosis and hepatocellular carcinoma.

Keywords

Artificial Intelligence/Machine Learning; Clinical Workflow & Productivity; Emerging Technologies; Provider Experience; Standards & Interoperability