



Streamlining Radiology Workflow with an LLM-Powered Prior Report Summarization Tool

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Background/Problem Being Solved

Comprehensive review of prior radiology reports during image interpretation can be a time-consuming process, especially in patients with complex medical histories and numerous prior studies. Prior reports provide critical context for accurate diagnosis. This challenge underscores the need for innovative solutions that streamline workflows and reduce cognitive load while improving diagnostic accuracy.

Intervention(s)

With our PACS vendor, we developed a large language model (LLM) tool that can be integrated within our PACS and uses an institutional-compliant GPT-4 model to generate concise, comprehensive summaries of prior radiology report impressions. These summaries highlight relevant findings to assist in the interpretation of current exams. The prompt was iteratively refined to enhance the relevance, usability, and accuracy of the output.

Barriers/Challenges

LLMs may generate inaccurate information, with potential additions or omissions, which can undermine trust and applicability. Investigating the frequency and impact of such occurrences is necessary to ensure high standards are met for use in clinical care.

Outcome

The prompt was iteratively refined to generate an output that is clear, concise and comprehensive. We have received IRB approval to perform a retrospective analysis that will evaluate the performance of the LLM, and we will present data on:

Overall accuracy

Presence of significant omissions and additions

Potential clinical impact of errors

Perceived clinical utility Workflow efficiency impact

Conclusion/Statement of Impact/Lessons Learned

We propose a novel tool that has the potential to improve radiologist efficiency and reporting accuracy. Ongoing refinement and user feedback will improve clinical utility, paving the way for integration into routine practice and for improving patient care.

Figure(s)

AI-generated Summary:

Summary of Relevant Findings (Newest to Oldest):

- * No abdominopelvic metastases.
- * No thoracoabdominal metastases since September 25, 2023.
- * No abdominopelvic metastasis.
- * No abdominopelvic metastasis.
- * No abdominal or pelvic neoplasm.
- * No metastatic disease in the abdomen or pelvis.
- * No metastatic disease in the abdomen or pelvis.
- * Stable retroperitoneal lymph nodes; no new foci of disease.
- * Continued diminution of retroperitoneal lymphadenopathy; no new foci of disease.
- * Increased size of aortocaval lymph node; no new foci of disease.
- ** No new foci of metastasis in the abdomen and pelvis.
- ** No new foci of disease in the abdomen or pelvis.
- ** Unremarkable liver; cholelithiasis without acute cholecystitis.
- ** No new foci of disease in the abdomen or pelvis.
- ** Stable left perinephric nodules; no new foci of disease.
- :** Stable left perinephric nodules; no new foci of disease.
- :** Decreased left posterior perinephric nodule; stable anterior left perinephric nodule; stable L4 vertebral treated metastases.
- ** Concerning left posterior perinephric nodule; stable anterior left perinephric nodule; stable L4 vertebral treated metastasis.
- ** No new abdominopelvic metastases; stable L4 vertebral body treated metastasis.
- * No new abdominopelvic metastases; stable L4 vertebral body treated metastasis.

Figure 1. Example of generated output

** No new foci of disease in the abdomen or pelvis.
** Decreased left posterior perinephric nodule; stable anterior left perinephric nodule; stable L4 vertebral treated metastases.
** Concerning left posterior perinephric nodule; stable anterior left perinephric nodule; stable L4 vertebral treated metastasis.



Figure 2. Example case with subtle finding on current exam, prompted for review by report summary

Keywords

Artificial Intelligence/Machine Learning; Clinical Workflow & Productivity