



Untapped Value at the Viewbox: Generating AI-Driven Insights from Radiology Readouts

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Background/Problem Being Solved

Radiology readouts are a fixture of academic radiology practice and radiology education due to their information-rich nature; they enable attendings to convey didactic and experiential knowledge to trainees, covering case approach and impression synthesis, imaging protocoling and appropriateness criteria, and follow-up recommendations for various findings. However, analysis and utilization of radiology readout content remains underexplored in literature despite the wealth of information contained in each interaction.

Intervention(s)

To capture information conveyed in radiology readouts, we developed an artificial intelligence (AI) system that extracts transcripts, case breakdowns, and teaching points from audio-recordings of readouts in real-time. Our fully automated pipeline uses an on-premises automatic speech recognition (ASR) model and cloud-based HIPAA-compliant large language models (LLM). A front-end application records audio and displays structured readout summaries to guide resident report generation and supplement learning.

Barriers/Challenges

Transcription accuracy of ASR models relies on audio recording quality, which varies with ambient conditions (e.g. ringing phones, other conversations). Accents and biomedical terminology may reduce ASR accuracy. Additionally, variability in attending teaching style may affect the quality of extracted insights.

Outcome

Our AI system extracts transcripts, case breakdowns, and teaching points from audio-recordings of readouts in real-time. Providing these automated outputs to residents improves engagement during readout, reducing typing time and increasing shared case-viewing time. Case breakdowns guide resident report generation, potentially minimizing attending revisions and improving workflows. Aggregated structured readout summaries can serve as curricular supplements to residents, present alternative teaching styles to educators, and reveal common knowledge gaps amongst trainees, highlighting areas for curricular improvement.

Conclusion/Statement of Impact/Lessons Learned

Our AI system leverages the underexplored content of radiology readouts to generate structured, case-based insights that enhance trainee engagement and learning, while providing educators opportunities to refine teaching style and curriculum. Importantly, this work explores a new class of AI tools for academic radiology practices, impacting both clinical workflows and educational missions.

Figure(s)



Figure 1. Data flow. A front-end application records readout audio, which is transcribed into text by a local instance of the whisper-v3-turbo ASR model. The transcript is sent to a HIPAA-compliant instance of gpt-40 mini; a zero-shot prompting strategy leveraging structured outputs is used to generate a case summary highlighting findings, impression, resident questions, and teaching points. Output from the LLM populates a separate page of the front-end application, allowing for real-time use in resident report generation with continued access to allow revisitation of cases and teaching points.

	Transcript
	we're looking at the colon, did you have any observations about the colon on your initial survey? That sigmoid colon segment looks like it has some stranding around it, probably some diverticultis there. Yeah, exactly. So we see thickening of the sigmoid colon in this region of diverticulosis. We see that there's a faint amount of adjacent fat stranding thickening of the peritoneum so this looks like sigmoid diverticultis and is a potential unifying diagnosis with deliberate findings for septic thrombophlebitis from diverticulitis. Now if we think about the
Record Readout View Transcripts	Case Summaries ⇔
	Case 1 Breakdown
	Reason for Exam:
🙆 Radiology Readout Assistant	abdominal pain
	sepsis
	Key Findings:
	mild bibasilar atelectasis
	trace bilateral pleural effusions
	 focal low density along the portohepatic region
	 linear low density focus in segment six
	portal vein thrombosis
Start Recording	 non-obstructing stone in the lower pole of the right kidney
otar recording	 thickening of the sigmoid colon with adjacent fat stranding
	Key Impression:
	 acute sigmoid diverticulitis complicated by septic thrombophlebitis of the right posterior portal vein
	Teaching Points:
	 Use a liver window for better visualization of low density lesions.
	Consider portal vein thrombosis when observing differences in liver density.
	Evaluate the inferior mesenteric vein for potential thrombus in cases of diverticulitis.
	 Look for complications of diverticulitis such as abscess or perforation.

Figure 2. Frontend Application. This application is hosted within the institutional network. The left panel records audio and requires a single-click to launch automated audio processing, transcription, and structured readout summary generation. The outputs are displayed on a separate page, shown on the right panel. The example in the right panel is the real-time output after an 8-minute readout of a Radiopedia case (rID: 60829). With current optimizations, the full pipeline—from audio to structured summary—can process audio at an estimated 2-3 seconds per minute recorded.

Keywords

Administration & Operations; Artificial Intelligence/Machine Learning; Clinical Workflow & Productivity; Educational Systems; Emerging Technologies; Quality Improvement & Quality Assurance