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Shaping Healthcare Possibilities

Transforming Radiology Reporting with AI and Cloud Integration

A Unified Platform Approach for Enhanced Efficiency and Patient Care

CASE STUDY

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Case Study Short Description

The Client is a national radiology practice transforming diagnostic experience for radiologists, radiology practices, hospitals, health systems, patients and families founded in 2012 serving 4000+ radiologists, 3400+ sites, 131 imaging centres across 50 states in the United States.

Client's legacy platforms and systems were isolated as well as spread across different technology stacks including different cloud providers. Daily routine included radiologists having to login to multiple systems and navigate information from one system to another which was tedious and lesser efficient. Client aims to develop a single platform to improve radiologist productivity and patient care while seamlessly deploying suite of AI tools and analytics across any of their platforms for higher quality and technology enabled delivery. There was a need identified to have all the systems under one platform with common cloud provider as well as AI tools. This case study describes the work that is being done to design, configure and manage the end-to-end Radiology Workflows on an AI driven one-stop shop platform using AWS infrastructure.

Problem Statement

1. **Limited usage of advanced technology and AI with existing systems and infrastructure**
2. **Limitations with integrating systems operated by various cloud providers**
3. **Integrating and implementing medical imaging AI models, validating and deploying AI tools to accelerate their adoption by hospitals, clinics**
4. **Overall operational as well technology cost for driving existing systems**

Solution Description and Architecture

Client's newly developed platform which so far have incorporated Reporting model, Drafting feature uses Amazon Web Services (AWS) as part of a broader strategic initiative to transition the organization's cloud infrastructure. Few other systems that are being developed and enhanced outside of this platform but ultimately have a roadmap to get integrated with this new platform are also built on Amazon Web Services (AWS) using various services including EKS, EC2 for compute and deployments and S3 for storage to enhance the scalability, availability and edge device management of the platform. The new platform uses Amazon SageMaker for its LLM based AI model in its current use cases of Reporting as well as Drafting to address and overcome various manual drafting and legacy system dictation challenges. For the monitoring and logging use cases Amazon CloudWatch is used to ensure optimal system uptime. The resulting solution, built entirely on AWS-native components, delivers a robust, scalable, and highly available platform. Using variety of services and tools offered by AWS, the plan is to migrate all the practices, sites and radiologists to new platform for enhancing patient care by making AI based decision more efficient.

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Outcomes

Data Accuracy: With the implementation of the LLM-based reporting system, findings that may have been overlooked in manual reports are now automatically identified and included, reducing the risk of omission. Additionally, measurement data from images is pre-populated directly into the report, minimizing manual entry errors and ensuring greater consistency and precision in clinical documentation.

Improved clinician experience: The new reporting AI model significantly enhances the physician experience by enabling natural language dictation, allowing them to speak freely without needing punctuation or structured formatting. Physicians can dictate only positive findings, skip normal findings and standard phrases like 'next field' or 'new paragraph', and speak in any order. The model also supports intuitive voice editing of drafted reports and automatically filters out non-clinical speech—eliminating the need to constantly mute or manually edit out irrelevant content.

Faster Processing: The integration of AI and LLM-based reporting enables rapid generation of draft reports based on input data. Impressions are not only more accurate but also quicker to populate. As a result, the overall review and case signing process is significantly accelerated, enhancing reporting efficiency.

Improved Patient Care: The AI-powered dictation and reporting model allows radiologists to focus more on image analysis rather than being distracted by traditional documentation challenges. By reducing cognitive load and streamlining the reporting process, the system enables more thorough and accurate study interpretation—ultimately leading to better-informed diagnoses and improved patient outcomes.

Cost Optimization: Client will save licensing cost by replacing third party viewer and dictation provider with the platform's inbuilt capabilities

- Around **80%** reports are either equivalent or better with new reporting system (used with AI model) compared to existing radiology reports
- For Beta users, almost **67%** times they prefer using new reporting over radiology reports
- **60%** reports were signed without change while 88% reports were signed with only 0-1 changes

Lessons Learnt

This engagement highlighted the importance of consolidating fragmented legacy systems into a unified platform to enhance operational efficiency and user experience. We learned that leveraging a common cloud provider and integrating AI-driven solutions, such as LLM-based reporting and drafting models, can significantly improve accuracy, speed, and clinician satisfaction. The adoption of AWS-native services like SageMaker, EKS, EC2, and S3 proved critical for scalability, reliability, and seamless deployment of AI tools. Additionally, early identification of integration challenges across multiple technology stacks and proactive planning for migration were key factors in ensuring successful implementation. These insights will guide future projects in optimizing technology adoption and delivering measurable improvements in patient care.

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