Automated Notification System That Facilitates AI Triage on a Legacy PACS System

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Background/Problem Being Solved

AI triage applications are designed to alert radiologists by setting a flag on the PACS worklist in order to ensure that the flagged study is read ahead of other exams. Many legacy PACS and RIS systems do not accept or cannot process an AI result which would prioritize specific exams with potential acute findings. We implemented a custom notification system that creates an alert on a legacy PACS to provide a means for the busy radiologist to address acute findings in a timely fashion.

Intervention(s)

The notification system consists of four components: (1) AI result processing engine, (2) results database, (3) radiologist/workstation database and (4) notification poller. Integral is a real-time database called "presence management" which keeps a dynamic record of all working radiologists and active workstations currently logged into the Philips Intellispace PACS system. All radiologists/workstations are categorized by role and location. Contemporaneous AI results for acute intracranial hemorrhage are sent by HL7 to a MIRTH receiver which parses the message and stores the accession number, the location where the exam originated and the AI result. An active poller interrogates the AI results database for new positive results and matches the exam to active radiologists/workstations in that location. Shift variation is accommodated. A custom modal window and a bell sound on the specific workstation(s) to deliver the alert to the most appropriate radiologist(s) to avoid alert fatigue for others. The radiologist can launch the exam from the modal window or dismiss the window.

Barriers/Challenges

Challenges were primarily developing rules that would simultaneously accommodate a large academic core and multiple community practices to minimize alert fatigue. The capability of sending alerts to the right individual at the right time is inexorably tied to having an up-to-date inventory of active radiologists matched to workstation locations; this can be difficult to maintain in large, heterogeneous multi-specialty practices.

Outcome

Since its inception nine months ago, there have been 347 ICH alerts sent and acknowledged by specific radiologists throughout this practice covering eighteen hospitals in two states. There has been rapid adoption and acceptance of this relatively minimalistic alert mechanism which is tightly integrated into the core PACS viewer that delivers the alert to the most appropriate person augmenting care delivery and minimizing interruptions.

Conclusion/Statement of Impact/Lessons Learned

An alert system based on roles and locations for AI triage applications on a legacy PACS can minimize delays in care by quickly notifying the most appropriate radiologist.

Figure(s)
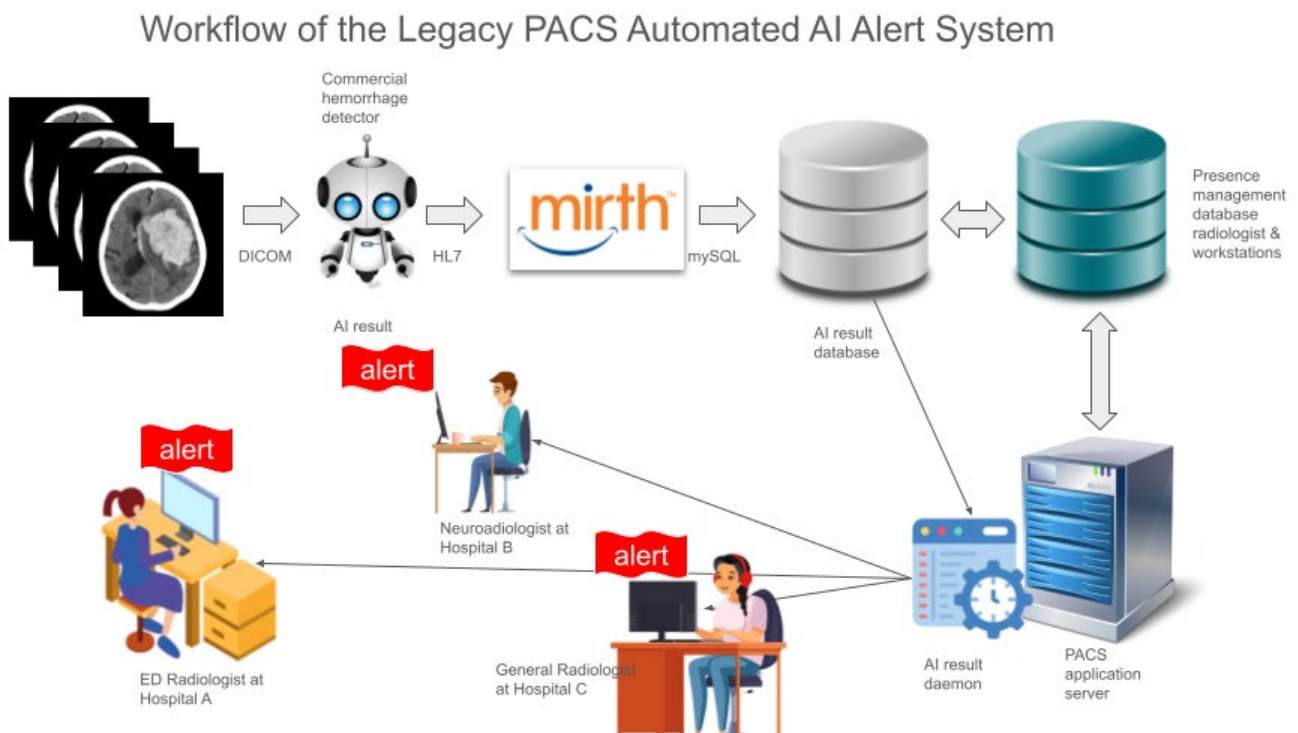
Figure 1. Simplified workflow of the Alert system on legacy PACS. The commercial AI system sends an HL7 message to a MIRTH receiver which parses the message by accession number and origin of study and stores results in a database. A daemon running on the Intellispace application server periodically queries the database for new positive results. The application searches for an active workstation/radiologist at the most appropriate location in the presence management (workstation/radiologist) database and then triggers an alert at one or more workstations (depending upon custom rules (e.g. practice setting, workstation role, radiologist role, day/time).

Keywords

Administration & Operations; Applications