Patient Data Reconciliation and Image Import Facilitation Tool

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Background

Recognizing and struggling to meet the growing demands of ingesting outside images into Geisinger’s PACS system led to the creation and development of the Image Import Tool. Current workflow of manual data reconciliation and exam (order) creation, an essential part of image ingestion, created a condition for multiple human errors, such as errors in patient names, exam dates and medical record numbers. By more efficiently leveraging resources already available, a one stop solution to automate the exam creation step was needed to minimize these risks and reduce the time required to perform the import process, thereby freeing up staff to work on other tasks.

Case Presentation

The Image Import Tool is an application developed to streamline importation of medical images from outside facilities and to reduce error. The tool replaces the manual exam creation process with an automated process which reduces the potential for error. It provides increased speed and accuracy while supplying clinicians with essential information faster.

To address the most common sources of external images, the application features three methods of data ingestion: 1) physical discs containing image data, 2) images sent directly to Geisinger’s PACS system via a PACS-to-PACS transfer, and 3) images submitted through, a commercial image ingestion tool (cloud based). Metadata collection difference for all three are distinct.

1. Physical discs: Image discs are scanned by the application to gather exam metadata. Depending on the format of the disc, multiple methods can be used by the application to retrieve data from DICOMDIR files (which catalog all exams on the disc in one location), individual DCM files (which store data on individual exam), or as a last resort the application can scan the file structure of the disc for the individual DICOM image files and build a map of the exams and images contained within. The application analyzes the metadata to compare and display the closest matching patients stored in Geisinger’s RIS system. The user selects the appropriate patient from the list provided, after verifying details such as full name, gender, date of birth and address. Next, the user is required to select the requesting provider from a list of all the active providers contained in the RIS system database. This collection of data is compiled and used to generate an HL7 schedule message which is transmitted to the Geisinger RIS system. The message creates an exam in RIS, transmits the exam to PACS which creates a corresponding location for images on the disc to be attached.

2. Images sent via PACS-to-PACS transfer: the application queries Geisinger’s PACS system database to retrieve exam metadata. Exams which are received via this method would land in a “catch all” location within PACS known as “exceptions.” Due to the catch-all nature of this location, search tools are provided within the application to narrow down results by patient name, medical record number or accession number to just the desired exams to begin the metadata retrieval process. The patient data and requesting provider information is gathered via the same process previously described; and, an HL7 schedule message is sent to create an exam. The images can be resolved to the exam from within Geisinger’s PACS system.
3. For images sent via commercial image ingestion software: the application queries the commercial tool database to retrieve exam and patient data to begin the process described above. Since many exams are likely to be contained within the commercial tool database, filters are provided to allow searching by patient name, medical record number or accession number to limit the number of exams retrieved.

**Figure 1**

![Image Import Tool](image1.png)

**Figure 2**

![PACS Exceptions](image2.png)
**Outcome**

Pilot was launched using the Image Import Tool and proved to be invaluable. It was key in providing developers insight into further improving the tool to the production release version because improvements were based on actual use cases. Close communication between the developers of the application and hospital staff, who are now using the application, resulted in numerous changes to workflow. The application interface is now better tailored to meet the needs of the hospital staff. The pilot implementation showed remarkable improvement and revealed an approximate 33% reduction in time per exam when importing disc images and up to a 66% reduction per exam when using Lifelmage.

**Discussion**

Reliable automation of this process has helped us with time savings and increased accuracy.

**Conclusion**

Image import tool greatly reduces the time required to import each exam and eliminates human error in data entry. Automating this tedious, manual process has precipitated major benefits to the organization by providing increased productivity, positively impacting patient care and making employee’s work lives much less stressful. The initiative is showing significant increases in productivity.

**Keywords**

importing tool, dicom, orders, workflow