Retrospective Wrong-Patient Error Analysis using Point-of-Care Visible Light Imaging

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Building Intelligent Connections

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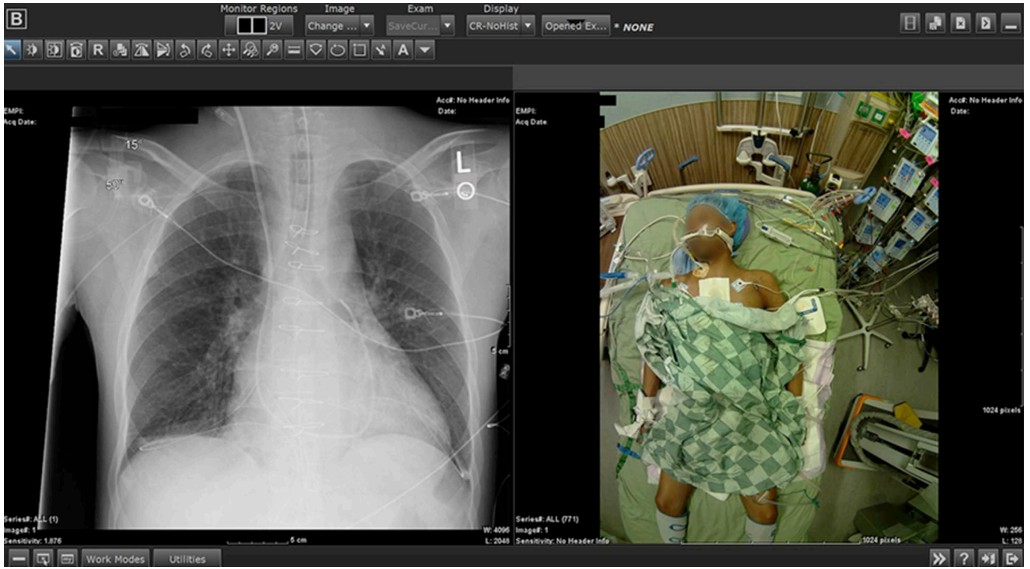
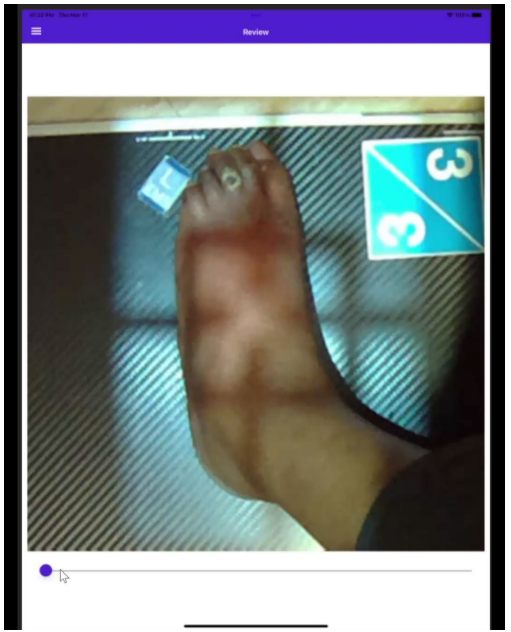


Disclosures

- Carson A. Wick and Srini Tridandapani have ownership interest in the underlying technology in this presentation.

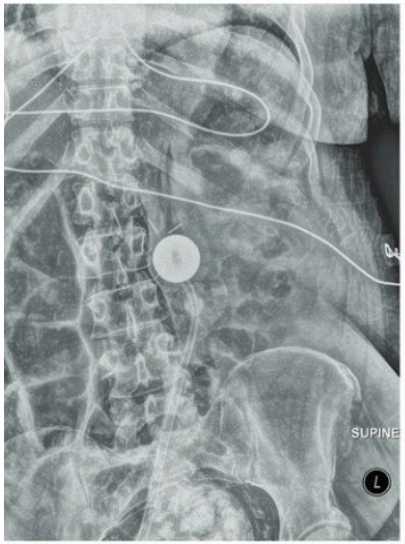
Motivation – Why visible light imaging?

- Detect and reduce radiography errors
  - Misidentification
  - Laterality
  - VL imaging can be used to rapidly detect and reconcile radiology errors
- Point-of-care (POC) patient visible-light (VL) imaging
  - Adds visual context to radiology studies
  - Reconnects radiologist and patient



Motivation – Error detection and reduction

- Misidentification (wrong-patient) errors

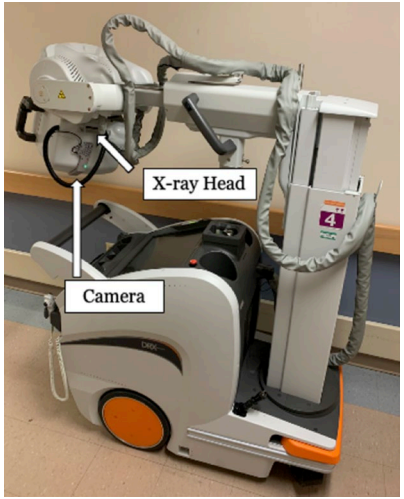


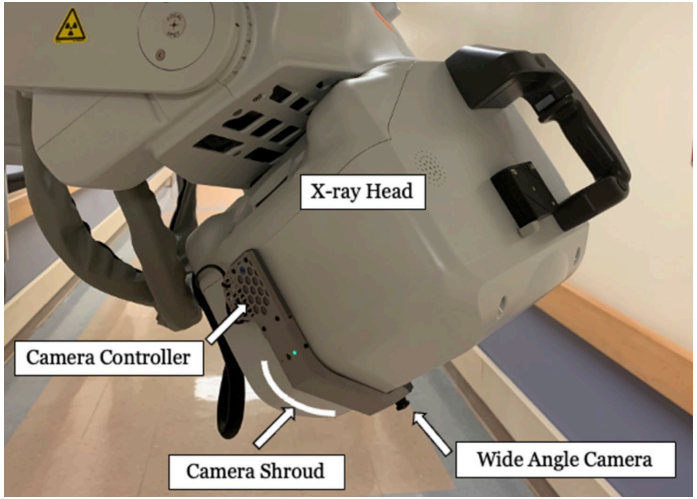


Review

Background – Point-of-care visible-light imaging

- Programmable cameras
  - Acquire point-of-care (POC) visible-light (VL) images simultaneously with radiographs
- VL images sent to corresponding study as new series in PACS from the VL imaging system server



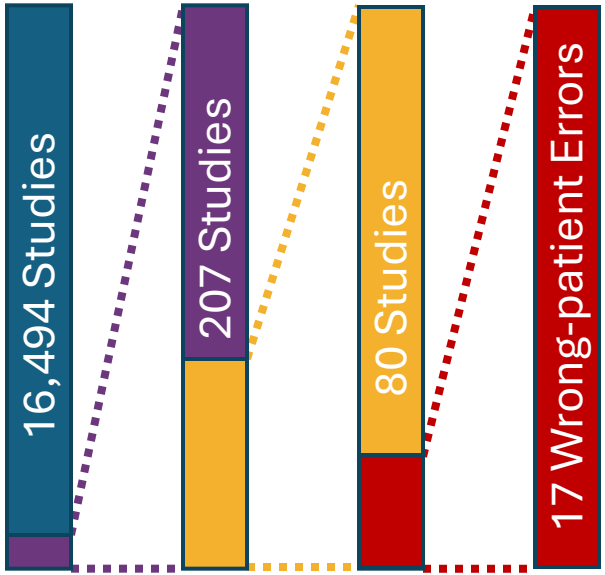


Methods – Error Detection

- VL images acquired automatically
- When errors are detected and corrected, the associated images may be deleted from PACS without a log of these errors
- Follow-up PACS querying was performed for radiography studies with VL images
  - PACS query results compared against VL imaging system logs
  - Studies with radiographs no longer in PACS, suggesting an error, were manually reviewed to evaluate for wrong-patient errors

Results – Overview

- 9-month period
- 16,494 portable radiography studies with POC VL images
- 207 studies (1.3%) had at least one missing radiograph
- 80 studies (0.5%) had all radiographs missing
- 17 wrong-patient errors (1 in 970) were confirmed with manual POC VL image review



Results – Wrong-Patient Error Examples

Eg. 1: Intended Patient

Wrong Patient

Eg. 2: Intended Patient

Wrong Patient

Conclusion

- POC VL images can be used to detect, verify, and reconcile radiology imaging errors
- Wrong-patient errors may be more common, 1 in 970, than previously believed
  - We had previously estimated that 1 in 10,000 studies may contain misidentification errors using addenda anaylsis[1]
- This was a preliminary study looking back at only 9 months; we intend to look at the last 2 years of data

[1] Sadigh G, Loehfelm T, Applegate KE, Tridandapani S. JOURNAL CLUB: Evaluation of Near-Miss Wrong-Patient Events in Radiology Reports. AJR Am J Roentgenol. 2015 Aug;205(2):337-43.

Further Reading

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- Ramamurthy S, Bhatti P, Arepalli CD, Salama M, Provenzale JM, Tridandapani S. Integrating patient digital photographs with medical imaging examinations. J Digit Imaging. 2013 Oct;26(5):875-85.
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- Zygmont ME, Gilyard S, Hanna TN, Johnson JO, Herr KD. Using Point-of-Care Patient Photographs With Musculoskeletal Radiography to Identify Errors of Laterality in Emergency Department Imaging. Curr Probl Diagn Radiol. 2021 Nov-Dec;50(6):787-791.
- Krupinski EA. Impact of Patient Photos on Detection Accuracy, Decision Confidence and Eye-Tracking Parameters in Chest and Abdomen Images with Tubes and Lines. J Digit Imaging. 2019 Oct;32(5):827-831.