

Project Title

Leveraging Endeavour AI to Eliminate Redundant CT Studies Performed

Project Lead and Members

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Organisation(s) Involved

National University Hospital

Healthcare Family Group(s) Involved in this Project

Allied Health

Applicable Specialty or Discipline

Diagnostic Radiography

Aims

1. To develop a code-based solution using the Endeavor AI (EAI) platform which can identify potential redundant CT requests on large volume data of incoming out patient CT requests.
2. To evaluate the accuracy and time saved using the code-based solution vs the existing process of vetting by radiographers & radiologists within the department.

Background

Redundant CT studies are a significant issue due to the fragmented specialized care patients receive, often leading to overlapping imaging studies by multiple specialists. The existing vetting process for CT scans is time-consuming, requiring manual checks by radiographers and radiologists.

Methods

1. Development of a rule-based code solution using the Endeavor AI platform (EAI) and TIBCO Spotfire software for real-time data analytics.
2. Integration of patient data from electronic health records (EHR) into the platform to create a dashboard solution that highlights redundant CT examinations.
3. Rule-based criteria for identifying redundancy tailored to different types of CT scans (e.g., CT Brain, CT Liver).
4. Automated identification of potential duplicate studies and visual assessment for clarification and prevention.

Results

1. Sensitivity and specificity improvements in the solution:
 - Version 1: Sensitivity 0.78, Specificity 0.98
 - Version 2: Sensitivity 0.91, Specificity 0.95
2. Positive Predictive Value (PPV) and Negative Predictive Value (NPV) outcomes:
 - Version 1: PPV 0.42, NPV 0.99
 - Version 2: PPV 0.18, NPV 0.99
3. Average of 87 CT request forms checked daily, with 8 highlighted for clarification.
4. 90% reduction in effort and time spent on vetting processes.
5. Implementation of the solution has led to reduced redundant CT scans, saving machine utilization time, scan slots, and staff manpower.

Lesson Learnt

Key lessons include the importance of interdisciplinary collaboration, the need for flexibility in solution development, and the value of ongoing stakeholder engagement. Challenges in data integration and code development highlighted the need for adaptable strategies and the potential for broader applications beyond radiology.

1. Customizable criteria for redundancy detection to meet department needs.
2. Scalability of the solution to include cross-modality redundancy (e.g., MRI, ultrasound).
3. Integration of additional EHR data for comprehensive scan vetting (e.g., renal function, pacemaker, metallic implants).

Additional Information

National Healthcare Innovation & Productivity (NHIP) 2024 – Best Practice (Automation, IT and Robotics category)

Conclusion

The Endeavour AI-based solution for eliminating redundant CT studies has demonstrated significant improvements in efficiency and accuracy. It provides a scalable and customizable approach to managing imaging requests, with potential applications across other imaging modalities. The implementation has led to substantial time and cost savings, improving the overall quality of care.

Project Category

Technology

Digital Health, Data Analytics, Artificial Intelligence

Keywords

Endeavour AI, Redundant CT Studies, Diagnostic Imaging, Healthcare Technology,
Radiology, Efficiency

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