AI-Powered Triage for Acute MSK MRI Requests: Improving Workflow Efficiency and Clinical Decision-Making

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Purpose:

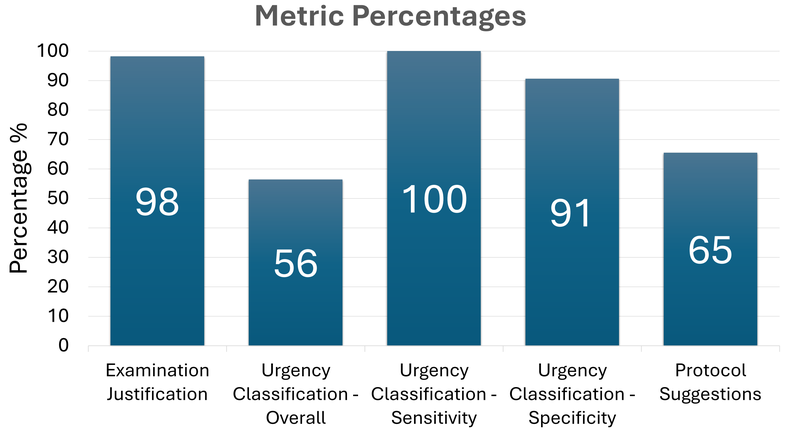
- This study investigates the utility of artificial intelligence (AI) in triaging acute musculoskeletal (MSK) MRI requests, focusing on justification assessment, urgency classification, and protocol suggestion.
- The aim was to evaluate AI's ability to enhance radiology workflow efficiency by improving clinical decision-making and prioritization.

Methods and Materials:

- MRI request forms for acute indications were collected from a local hospital and reviewed by radiologists, who assessed each case for:
  I. Justification (Yes/No)
  II. Urgency classification (Immediate scan: within 6 hours, urgent scan: within 24 hours, Non-Urgent Inpatient scan: within 72 hours)
  III. Protocol suggestion (e.g., MRI knee, MRI spine).
- A large language model (LLM) analysed the same data, providing triage classifications and protocol suggestions.
- The AI's performance was evaluated against the radiologists' decisions using accuracy, sensitivity, and specificity metrics.

Results:

- The AI demonstrated high performance in determining examination justification, achieving an accuracy of 98.18%, closely aligning with radiologists.
- For urgency classification, the overall accuracy was 56.36%, with a sensitivity of 100% for identifying cases requiring immediate scans and specificity of 90.57% for distinguishing non-immediate cases.
- The AI effectively identified all cases needing immediate scans but showed variability in distinguishing between urgent and non-urgent inpatient categories.
- Protocol suggestions showed moderate alignment, with an accuracy of 65.45%, highlighting the AI's ability to support radiologists in suggesting clinically appropriate imaging protocols.



Conclusion:

- AI demonstrates significant promise in automating aspects of MSK MRI triage, particularly in justification checks and identifying cases needing immediate scans.
- These findings highlight AI's potential to enhance radiology workflows, prioritize critical cases effectively, and reduce radiologists' workload by automating repetitive tasks while maintaining high clinical accuracy.

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