ARTIFICIAL INTELLIGENCE IN RADIOLOGY LITERATURE: TRENDS IN PUBLICATION FROM 2008-2017

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DISCLOSURES

Andrew Smith MD PhD

• CEO of eMASS with patent pending and received on AI-assisted tumor response
• Patent pending on various AI-based technologies
• Associate Editor for Radiology
• Ad hoc reviewer for Radiology Artificial Intelligence

• Jordan Perchik, Charles Xie, Adrian Murray, Andrew Gunn: None
*What is artificial intelligence?*

- Non-human systems able to accomplish tasks require human intelligence or reasoning

*Artificial intelligence is increasing in interest, utility, and scope*

- Increasing public awareness
- Increasing competition
  - IBM, Siemens
  - Google, Apple, Amazon, Facebook
INTRODUCTION

- Significant opportunities for AI in medical field
  - Large potential role in Radiology

- Assess trends in AI publication on Radiology literature from 2008-2017
METHODS

- Identify top 10 Radiology journals
  - Impact factor, SciMagJor.com rankings, and SCOPUS 2017 Cite-Score
  - Journals without 2008-2017 article information available on SCOPUS were excluded
- Article information and citation statistics were collected from SCOPUS
  - Articles with titles, MeSH terms, or keywords including “Artificial intelligence”, “Machine learning”, “Deep learning”, or “Neural network” were selected for analysis
- Compare citation analysis of the selected Radiology journals vs. AI articles
  - Compare within journal and overall
RESULTS

• 34,529 articles were published in the selected journals from 2008-2017
  • 172 AI articles (0.5% of total)

• AI articles received more citations on average, but this difference was not significant (p=0.49)
  • AI articles: 19.3
  • Total journal average: 17.6

• Radiology and AJNR published the most AI related articles
  • Radiology had the 4th highest proportion of publications dedicated to AI (0.52%)
## RESULTS

<table>
<thead>
<tr>
<th>Journal</th>
<th>Total AI articles</th>
<th>AI as percent of publications</th>
<th>Average citation - AI articles</th>
<th>Overall average article citation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Radiology</strong></td>
<td>28</td>
<td>0.52%</td>
<td>39.29</td>
<td>30.12</td>
</tr>
<tr>
<td>Am J of Neuroradiol</td>
<td>28</td>
<td>0.63%</td>
<td>27.39</td>
<td>18.45</td>
</tr>
<tr>
<td>Am J Roentgenol</td>
<td>25</td>
<td>0.38%</td>
<td>17.68</td>
<td>17.1</td>
</tr>
<tr>
<td>J Am Coll Radiol</td>
<td>24</td>
<td>0.75%</td>
<td>3.125</td>
<td>5.18</td>
</tr>
<tr>
<td>Eur J Radiol</td>
<td>19</td>
<td>0.49%</td>
<td>10.42</td>
<td>12.65</td>
</tr>
<tr>
<td>Eur Radiol</td>
<td>19</td>
<td>0.48%</td>
<td>25</td>
<td>19.1</td>
</tr>
<tr>
<td>Invest Radiol</td>
<td>15</td>
<td>1.4%</td>
<td>22.67</td>
<td>22.24</td>
</tr>
<tr>
<td>Eur J Nucl Med Mol Imaging Radiographics</td>
<td>10</td>
<td>0.33%</td>
<td>19.67</td>
<td>25.85</td>
</tr>
<tr>
<td>Radiographics</td>
<td>4</td>
<td>0.23%</td>
<td>28</td>
<td>19.57</td>
</tr>
<tr>
<td>J Vasc Interv Radiol</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>5.32</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>17.2</td>
<td>0.52%</td>
<td>19.3</td>
<td>17.6</td>
</tr>
</tbody>
</table>
AI articles per year


Radiology
European Radiology
Am J Roentgenol
Am J Neuroradiol
Eur J Radiol
J Am Coll Radiol
J Vasc Interv Radiol
Investigative Radiology
Radiographics
Linear (Average)

TRENDLINE
AVERAGE
DISCUSSION

• Artificial intelligence has a role across clinical spectrum

• Conversation around AI shifting from uncertainty to opportunity
  • Still some concern among Radiologists about role of AI and the future of Radiology
    • Increase value or replace?
      • Increasingly seen as a tool to supplement Radiologist, allow to increase precision and efficiency
DISCUSSION

• New and existing resources
  • Courses through RSNA
  • Dedicated journals for AI and Radiology
    • Society for Imaging Informatics in Medicine, Radiology: Artificial Intelligence

• Opportunities for the future
  • Incorporating AI development and use into residency training
CONCLUSION

• The evolution of AI will continue in the years ahead and will have a significant impact on the practice of medicine

• Radiology is a field of significant opportunity in the development of AI

• AI research has remained underrepresented in top Radiology journals and did not increased from 2008-2017
  • 2018 publication statistics show promising growth in AI research

• We must continue to encourage research and publication in AI
ACKNOWLEDGMENTS

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REFERENCES


