AI in Radiology: European perspective
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The American College of Radiology Data Science Institute™ is collaborating with a variety of stakeholders within the radiology field to facilitate the development and implementation of artificial intelligence applications that will help radiology professionals provide improved medical care.
European Artificial Intelligence Industries

- Data Analytics: 56
- Sales & Marketing: 38
- Health & Medicine: 32
- Process Automation: 28
- Image Recognition: 27
- Text Analytics: 23
- Software Development: 23
- Conversational AI: 22
- Customer Service: 20
- Personal Assistant: 20
- Robotics: 19
- Internet of Things: 18
- Security: 16
- Fintech: 15
- Core Algorithms: 9
- Creative Industries: 9
- Recruitment: 8
- Education: 6
- Legal & Insurance: 6
- Logistics: 5
- Travel: 5
- Biotechnology: 4

Source: own research, Crunchbase
What can be done with AI in Radiologie

Computer Aided diagnosis
Bottleneck – High quality annotated datasets

Supervised learning → need for high quality annotated datasets
Few available datasets
Ethics and GDPR
Emergence of federated data centers and federated learning
What can be done with AI in Radiologie

Almost infinite possibilities
ESR AI activities

Educational activities

ESOR Premium events

• Barcelona in 2019
• Foundation course on AI in Radiology 1/2020 in Rome
• AI in Oncologic Imaging in Vienna in May 2020

AI Blog

Many Sessions during ECR
AIX Theater during ECR
ESR AI activities

AI Blog

Latest posts

Radiogenomics of lower-grade gliomas: machine learning–based MRI texture analysis for predicting 1p/19q codeletion status
In this work, we aimed to evaluate the potential value of the machine learning (ML)-based MRI...
Burak Kocak
4 days ago

Fully interlinked for Rapid Data Exchange in Mammography
In the region of southern Denmark, a broad network of hospitals provides medical services for the...
ESR
7 days ago

Reasons to do AI with Friends: The one with the sixpack
This week's brand new episode, "The one with the sixpack", was the first episode broadcast live...
ESR
ESR AI activities

During ECR 2020

Artificial Intelligence Exhibition Theatre (AIXT)
- The hype of AI: risks of rapidly implementing radiological AI
- How to train radiologists and related professionals in AI
- Multi-society vision on ethics in AI
- AI beyond radiology image analysis
- Human-computer interaction and AI
- AI and liability in radiology practice
- Data sharing with industry for AI: legal and ethical issues

Coffee & Talk (open forum)
- Imaging biobanks: from concept to implementation
- AI and the future of imaging: European funding prospects

E³ - Advanced Courses: Artificial Intelligence
- Artificial intelligence in radiology: the basics you need to know
- Artificial intelligence for image reconstruction: towards deep imaging?
- Artificial intelligence and translations to clinical practice
- Radiomics: principles and applications
- Artificial intelligence and clinical decision support
- Challenges and solutions for introducing artificial intelligence (AI) in daily clinical workflow
- Making visible the invisible: pushing the boundaries in multimodality radiomic quantification

E³ - Advanced Courses: Hot Topics in Emergency Radiology
- Dual energy and subtraction CT in emergency radiology

E³ - ECR Master Class
- Artificial intelligence in breast imaging: potential perspectives and (unjustified) fears
- Quantitative imaging in oncology

ESR meets Canada
- Tales from the Canadian Frontier

ESR meets Israel
- Radiology in Israel: technology and professionalism

ESR Patient Advisory Group (ESR-PAG)
- Artificial Intelligence (AI) in radiology: meeting expectations and benefitting outcomes

ESTI Session: Lung Cancer Screening certification
- Lung nodule management and lung cancer screening workshop

EuroSafe Imaging Session
- Artificial intelligence for dose optimisation

ISRRT meets Canada
- Radiography profession performance and future challenges in Canada

ISRRT meets Japan
- Radiography profession performance and future challenges in Japan

Joint Session of the EFRS and ISRRT
- Artificial intelligence and the radiographer profession
ESR AI activities
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ESR AI activities

Statements and White Papers

**What the radiologist should know about artificial intelligence – an ESR white paper**

*European Society of Radiology (ESR)*

**Abstract**

This paper aims to provide a review of the basis for application of AI in radiology, to discuss the immediate ethical and professional impact in radiology, and to consider possible future evolution. Even if AI does add significant value to image interpretation, there are implications outside the traditional radiology activities of lesion detection and characterisation. In radiomics, AI can foster the analysis of the features and help in the correlation with other omics data. Imaging biobanks would become a necessary infrastructure to organise and share the image data from which AI models can be trained. AI can be used as an optimising tool to assist the technologist and radiologist in choosing a personalised patient’s protocol, tracking the patient’s dose parameters, providing an estimate of the radiation risks. AI can also aid the reporting workflow and help the linking between words, images, and quantitative data. Finally, AI coupled with CDSS can improve the decision process and thereby optimise clinical and radiological workflow.

**Keywords:** Artificial intelligence, Imaging informatics, Radiomics, Ethical issues, Computer applications

**Impact of artificial intelligence on radiology: a EuroAIM survey among members of the European Society of Radiology**

*European Society of Radiology (ESR)*

**Abstract**

We report the results of a survey conducted among ESR members in November and December 2018, asking for expectations about artificial intelligence (AI) in 5–10 years. Of 24,000 ESR members contacted, 675 (2.8%) completed the survey. 454 males (67.8%) and 555 (32.2%) working at academic/public hospitals. AI impact was mostly expected (30% of respondents) on breast, oncologic, thoracic, and neuro imaging, mainly involving mammography, computed tomography, and magnetic resonance. Respondents foresee AI impact on job opportunities (375/675, 55.9%), 216/675 (32) expecting increase, 157/675 (23.2%) reduction; reporting workload 504/675 (74.7%), 256/675 (37.7%) expecting reduction; 248/675 (36.9%) increase; radiologist’s profile, becoming more clinical (364/675, 54.0%) and more sub-specialised (283/675, 42%). For 374/675 respondents (55.9%) AI-only reports would not be accepted by patients, for 79/675 (12%) accepted, for 222/675 (33%) it is too early to answer. For 375/675 respondents (41%) AI will make the radiologist-patient relationship more interactive; for 140/675 (21%) more impersonal, for 259/675 (38%) unchanged. If AI allows time saving, radiologists should interact more with clinicians (437/675, 65%) and/or patients (322/675, 48%). For all respondents, involvement in AI-projects is welcome, different roles: supervision (434/675, 64%), task definition (353/675, 52%), image labelling (197/675, 29%). Of 675 respondents, 321 (48%) do not currently use AI. 138 (20%) use AI, 205 (30%) are planning to do it. According to 277/675 respondents (41%), radiologists will take responsibility for AI outcome, while 277/675 (41%) suggest shared responsibility with other professionals. To summarise, respondents showed a general favourable attitude towards AI.

**Keywords:** Artificial Intelligence, Machine Learning, Radiologists, Radiology, Surveys and Questionnaires
Ethics of artificial intelligence in radiology: summary of the joint European and North American multisociety statement

## ESR AI activities

**ESR Training Curriculum in Imaging Informatics**

<table>
<thead>
<tr>
<th>Level I</th>
<th>Level II</th>
<th>Level III</th>
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<tbody>
<tr>
<td>To understand the functioning and application of Artificial Intelligence (AI) tools (based upon Machine Learning and Deep Learning)</td>
<td>To have knowledge on the different technical options to implement AI and deep learning applications in the radiology workflow</td>
<td>To know about emerging technologies such as Artificial Intelligence classifiers for the provision of detection, diagnosis and other radiological purposes. To know how to assess the performance of such tools and critically appraise their applicability.</td>
</tr>
<tr>
<td></td>
<td>To have knowledge about ethics of AI</td>
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EuSoMII Annual Meeting
Valencia 23-24 October 2020
What is the ESR planing for?

ESR AI Task Force

A task force „AI in Radiology“ will be created and meet for the first time during ECR 2020.

1. Definition and Prioritization of AI use cases
2. Specific use case: application of AI to monitor image quality of examinations. Adding a dimension to dose monitoring
3. AI and Ethics: standards to respect when collecting data and using AI algorithms
What is the ESR planing for?

ESR Tast Force

4. Consider the role of AI for patient safety
5. Develop a training program for AI in Radiology
6. Work with European Regulatory bodies for the validation and certification of AI algorithms in Radiology
7. Run data challenges on a European level
What can be done with AI in Radiologie

Almost infinite possibilities
ECR ‘19 HYPE CYCLE on a napkin
I'm being sued for a missed diagnosis! What do I do now??

Sorry, buddy, comes with the job.

When handing radiology over to artificial intelligence sounds appealing.
Slide retirée à la demande de l’orateur
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