

A radiológus szerepe a mesterséges intelligencia orvosi alkalmazásaiban

Mesterséges intelligencia az orvostudományban

Forbes Jul 27, 2018, 12:41am

How Is AI Used In Healthcare - 5 Powerful Real-World Examples That Show The Latest Advances

[Bernard Marr](#) Contributor



1. Robot sebészet – Da Vinci, Heartlander
2. Virtuális nővér szolgáltatás -monitorozás, gyors válaszadás
3. Munkarend, adminisztráció
4. Döntés és diagnosztikai segítség
5. Képelemzés

HEALTHCARE MARKETING ANALYTICS

By [Kevin Troyanos](#), Contributor, CIO | AUG 20, 2018

3 ways artificial intelligence is changing the healthcare industry



1. Diagnózis felállításának segítése
2. Marketing
3. A gyógyszerelés be nem tartásának csökkentése

Artificial intelligence in healthcare

From Wikipedia, the free encyclopedia

This page was last edited on 8 October 2018

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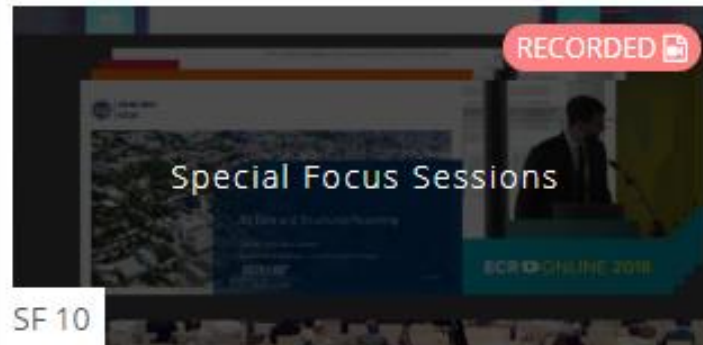
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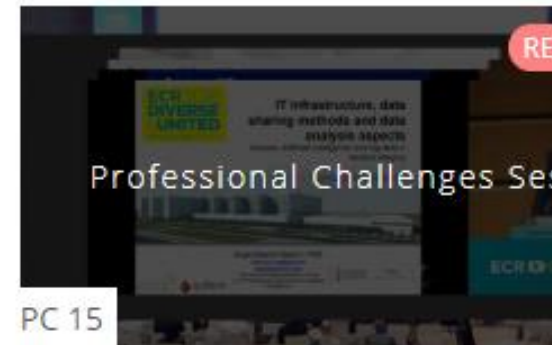
 ai

335 sessions found (1913 presentations, 704 posters) - Page 1/11



SF 10

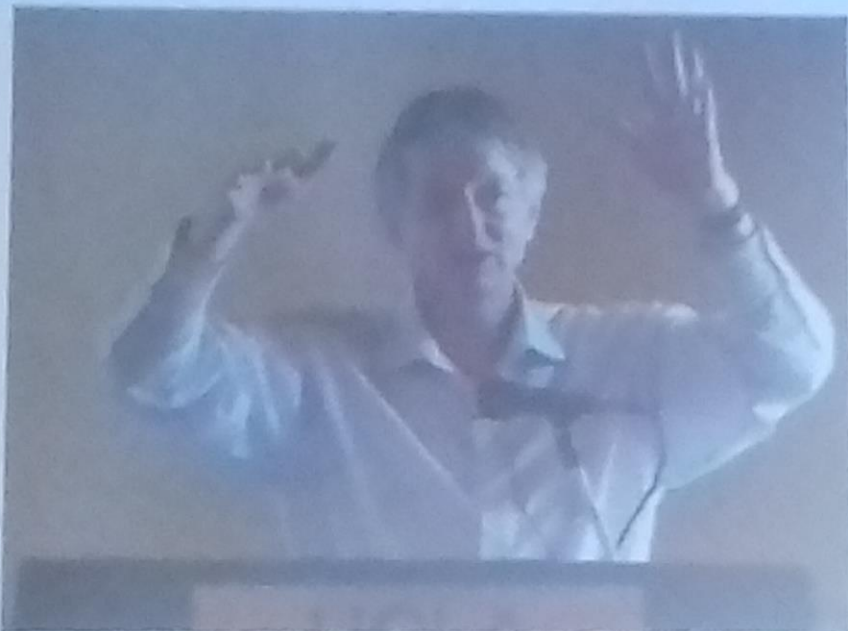
Artificial intelligence (AI) applications



PC 15

Artificial intelligence and big data in imaging

AI – No more Radiologists?



Geoff Hinton – father of AI predicted the demise of the radiologist!!

2016 - A Google AI 'godfather' says machines could match human abilities in 'more than 5 years'

My response - I don't think he understands the role of a radiologist!

A nagy kérdés:

Edition: **ENGLISH** DEUTSCH ESPAÑOL FRANÇAIS

Perspective > Medscape Radiology

COMMENTARY

Will Computer

Saurabh Jha, MBBS, MRCS

DISCLOSURES | May 12, 2016

10 Read Comments



I recently told a radiologist, "I beat the machine." He beat the machine, not me.

CT could scarcely detect the glut of thin slice abdominal radiographs. Algorithms extracted the information, then humbled, as if from clicking the mouse.

The role of computer-aided diagnosis (CAD) is being made. Lusted e photo fluorogram chest films. The e radiologists."

AI Is Not Just a S

NEWS MAGAZINE TOPICS IMAGING

If you think AI will never replace radiologists

May 14, 2018 | Michael Walter | Artificial Intelligence



It's one of the most frequently discussed topics in radiology: the impact of artificial intelligence (AI) have on radiologists?

Robert Schier, MD, a radiologist for Radiology of the American College of Radiology, says the industry.

"The advent of computers that can accurately detect things is happening. There are vastly differing opinions on whether this will replace radiologists or not."

VALUE-BASED CARE

Home > Artificial Intelligence

ARTIFICIAL INTELLIGENCE

Will Computers Replace Radiologists?

Jul 29, 2018

SHARE Facebook

By SAURABH JHA

There is hope, however, that AI will change how radiologists work. Borstelmann, a radiologist at the University of Michigan, says that AI will not replace radiologists, but it will change how they work.

Listen to our discussion with the Journal of the American College of Radiology's Dr. Robert Schier.

About the author

Saurabh Jha is a radiologist at the Radiology of the American College of Radiology.

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SUMMARY AND COMMENT | EMERGENCY MEDICINE, HOSPITAL MEDICINE

ON THE HORIZON

October 22, 2018

Will Robots Replace Radiologists?

Daniel J. Pallin, MD, MPH reviewing Chilamkurthy S et al. Lancet 2018 Oct 11

For some types of imaging, the question is not whether, but when.

Modern computers can detect patterns in clouds of data. We are all familiar with this, now that smartphones use facial recognition. Investigators in India used machine-learning techniques to develop algorithms that would analyze data from head computed tomography (CT) scans and determine whether intracranial hemorrhage, skull fracture, or mass effect were present.

Starting with roughly 300,000 CT scans, the investigators set aside 22,000 for validation of the algorithms. Using the balance of the scans, they used machine learning to derive diagnostic classification algorithms. Then they tested the accuracy of the algorithms in the set-aside scans and in two external datasets. To summarize the results, diagnostic accuracy was very good, with areas under the receiver operating characteristic curves in the low 90 percents across datasets and diagnoses. Sensitivities were also in the low 90 percents.

COMMENT

Soon, computer programs will be used to cross-check radiologists' diagnoses, and eventually, radiologists may be replaced entirely by computers for some diagnostic applications.

EDITOR DISCLOSURES AT TIME OF PUBLICATION

Disclosures for Daniel J. Pallin, MD, MPH at time of publication

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Leadership Positions in Professional Societies	Society for Academic Emergency Medicine (Chair, Program Committee, 2017–2018)

CITATION(S):

Chilamkurthy S et al. Deep learning algorithms for detection of critical findings in head CT scans: A retrospective study. Lancet 2018 Oct 11; [e-pub]. ([https://doi.org/10.1016/S0140-6736\(18\)31645-3](https://doi.org/10.1016/S0140-6736(18)31645-3))

Daniel J. Pallin, MD, MPH

Editor-in-Chief

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WILL RADIOLOGISTS BE REPLACED BY COMPUTERS? DEBUNKING THE HYPE OF AI

November 1, 2016 / Digital Radiography, expert insights, Radiology, RSNA16 / 0 Comments / C

5 reasons why the future of radiologists is secure

Dr. Eliot Siegel, Professor and Vice Chair Research Informatics, University of Maryland

There has been quite a bit of "trash talk" about radiologists being replaced by computers in the medical journals lately. Experts in artificial intelligence and machine learning at Stanford have suggested that radiologists might be easier to replace than the

A well-funded startup's CEO recently suggested that he would love to replace the "wasted protoplasm" that represents the radiology profession with a machine learning system.

Ezekiel Emanuel, principal "architect" of the Affordable Care Act, has gone so far as to suggest that radiologists might be replaced by computers in the next four to five years. He made his comments about artificial intelligence in healthcare in his keynote address at the ACR this spring. He repeated the comments in recent articles in the New England Journal of Medicine "Predicting the Future – Big Data, Machine Learning, and Clinical Medicine", and in the Journal of the American College of Radiology "The End of Radiology? Three Threats to the Future Practice of Radiology".

As a result of all the unfounded hype, I've been getting letters from trainees and colleagues. They are concerned about the potential threat of 'automation' whether they should drop out of radiology or avoid it as a career.



I, For One, Do Not Expect Our New Computer Colleagues to Arrive Anytime Soon

This prediction about radiologists being replaced by computers any time soon or in the future is premature. In fact, it's nonsense. My conclusion is based on my perspective as a resident in the past 25 years and my involvement with major commercial "Artificial Intelligence" (AI)

Here are my top 5 reasons why the future of radiologists is secure:

1. Machine learning/convolutional neural networks have been successful with very simple images. But they have not been applied to the far more complex images on a radiologic volumetric CT or MRI study. No one is anywhere close to having general success applying AI to medical images. In order to create a system to make radiology observations, one would need to combine

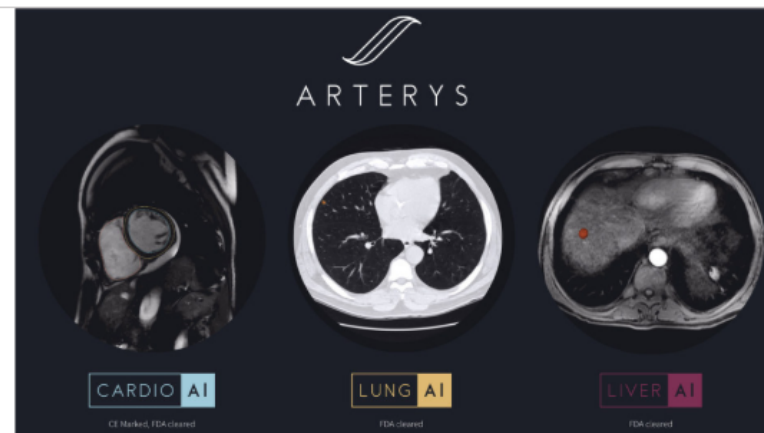
67,709 views | Jan 20, 2017, 02:11am

Arterys Receives First FDA Clearance for Broad Oncology Imaging Suite with Deep Learning

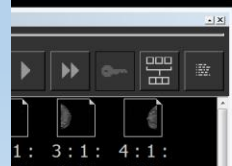
FDA clearance covers all solid tumors. Initial launch will include Liver AI and Lung AI oncology software to empower clinicians to quickly measure and track lesions and nodules in MRI and CT scans

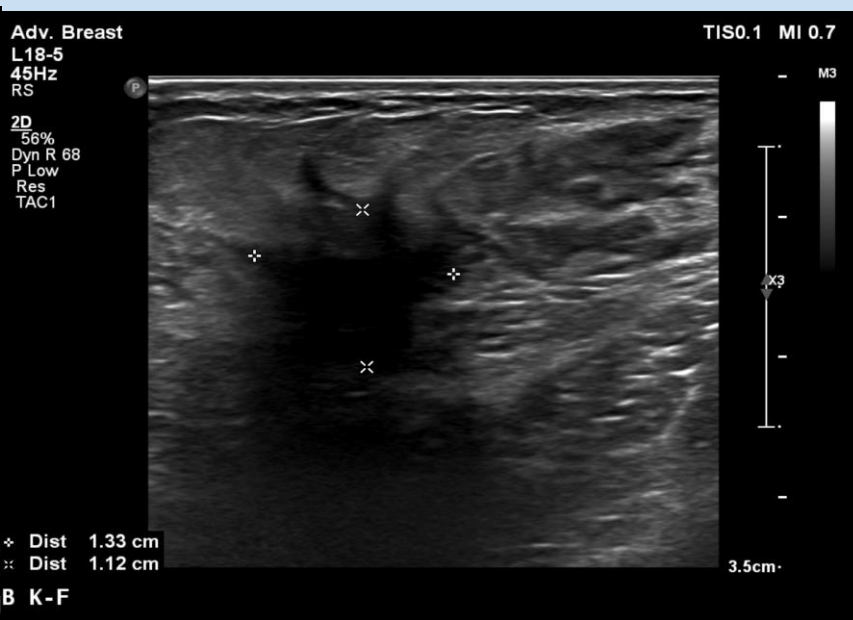
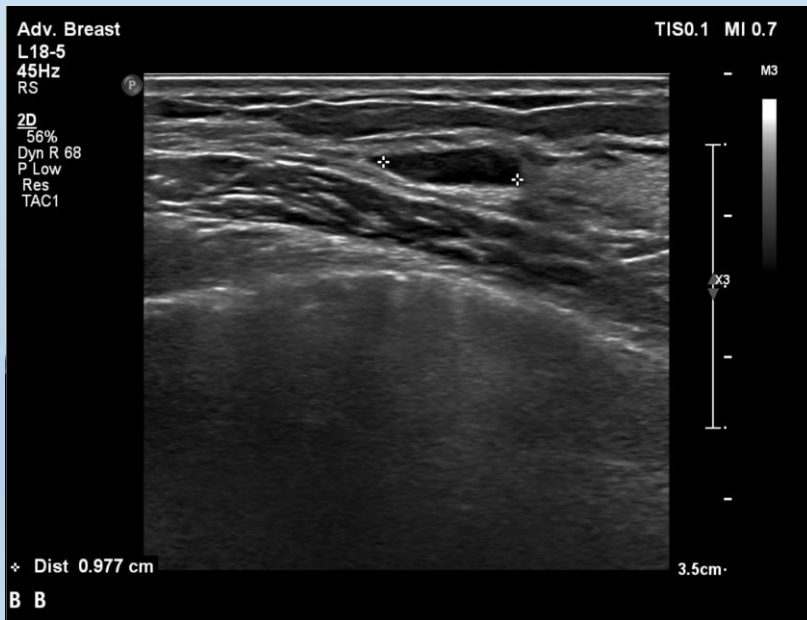
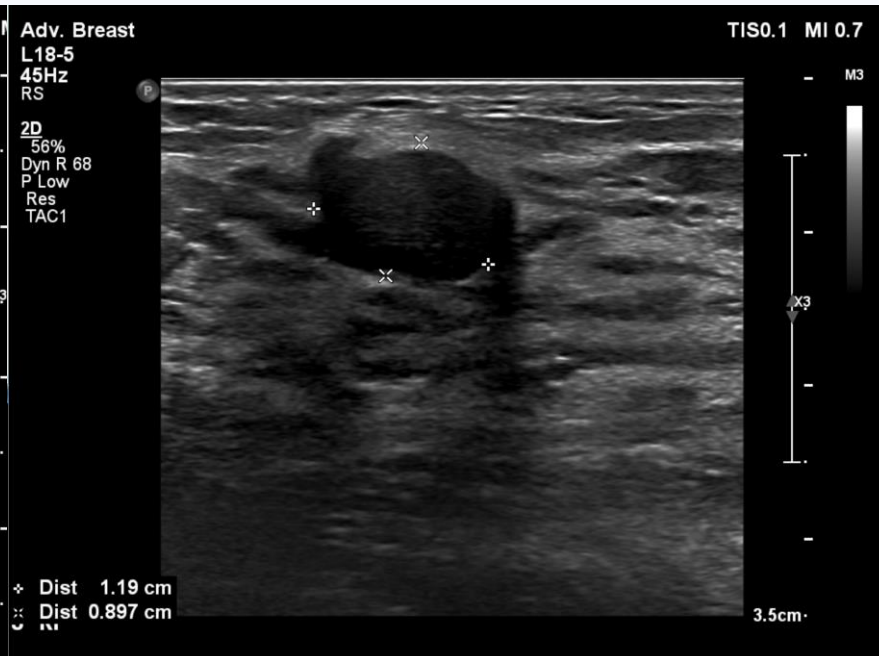
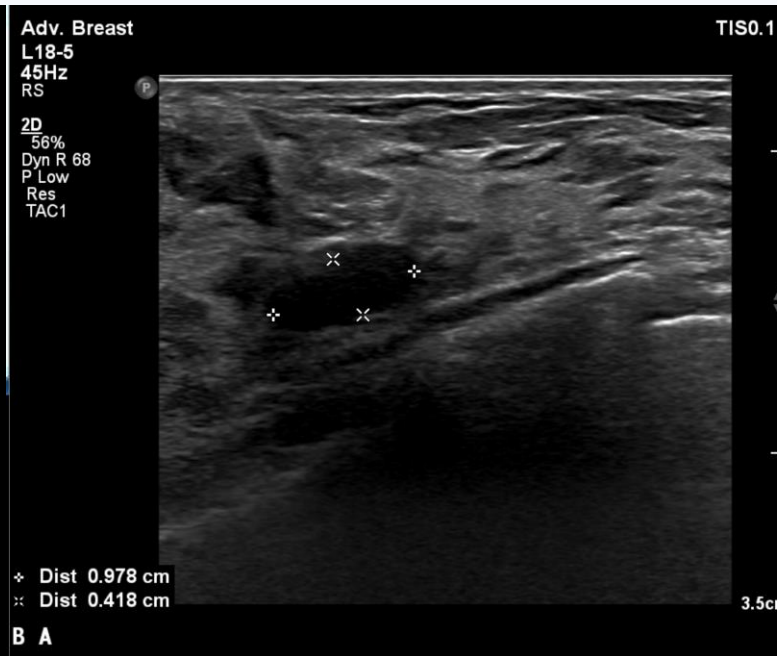
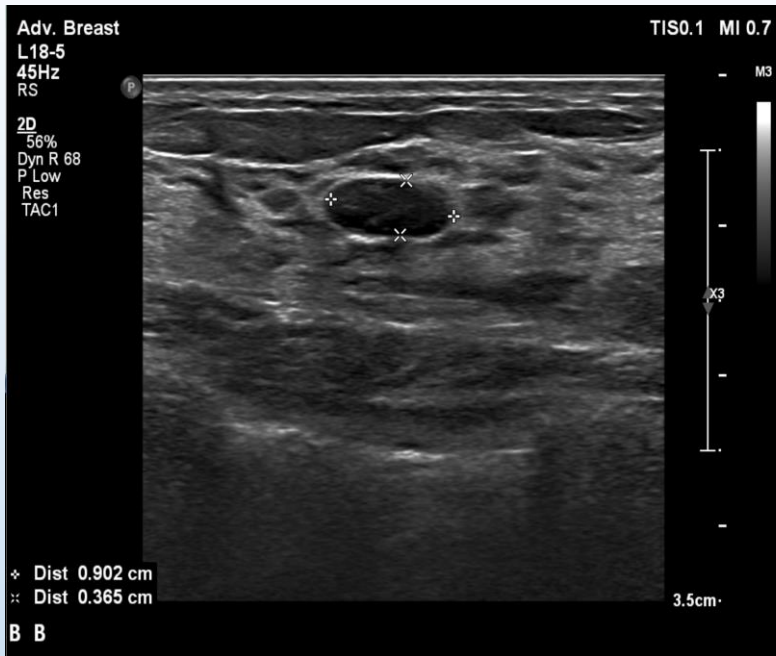


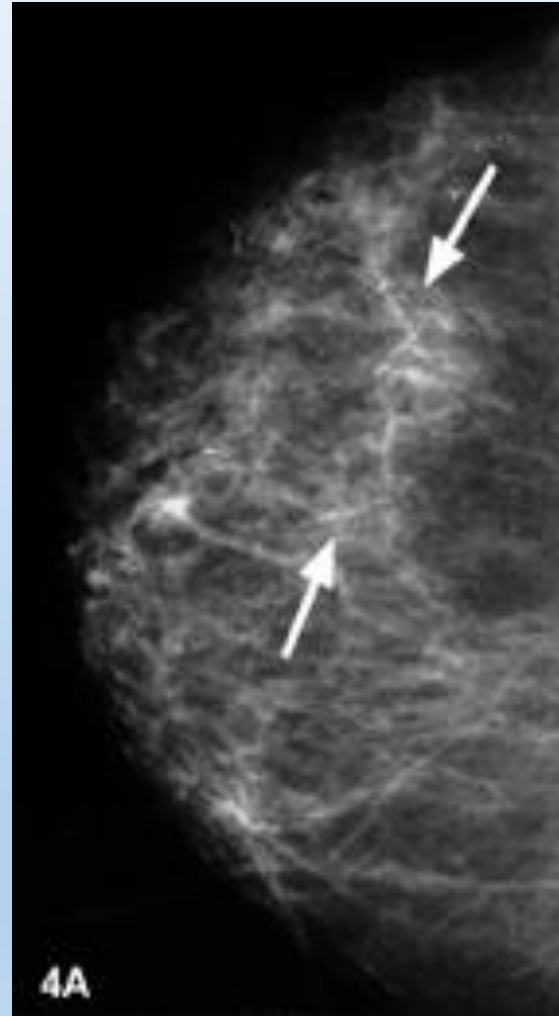
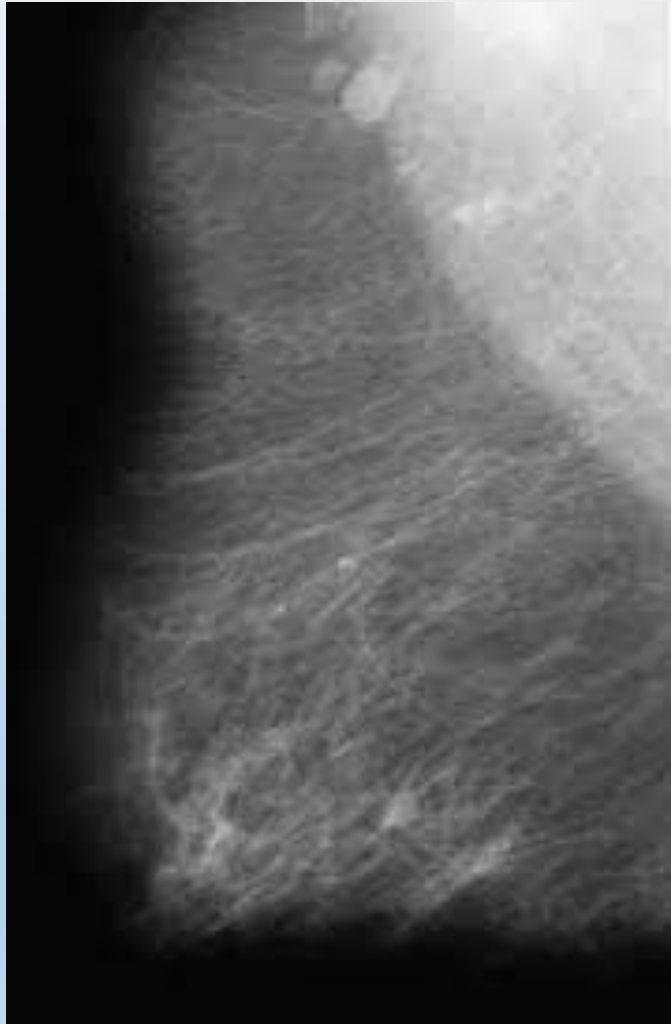
SAN FRANCISCO, Feb. 15, 2018 /PRNewswire/ -- Arterys Inc., the leader in intelligent, cloud-based medical imaging software solutions, today announced its fifth 510(k) clearance from the U.S. Food and Drug Administration (FDA). The clearance is for the Arterys Oncology AI suite, and is a milestone indicative of the company's momentum in applying AI to advance medical imaging accuracy and consistency.

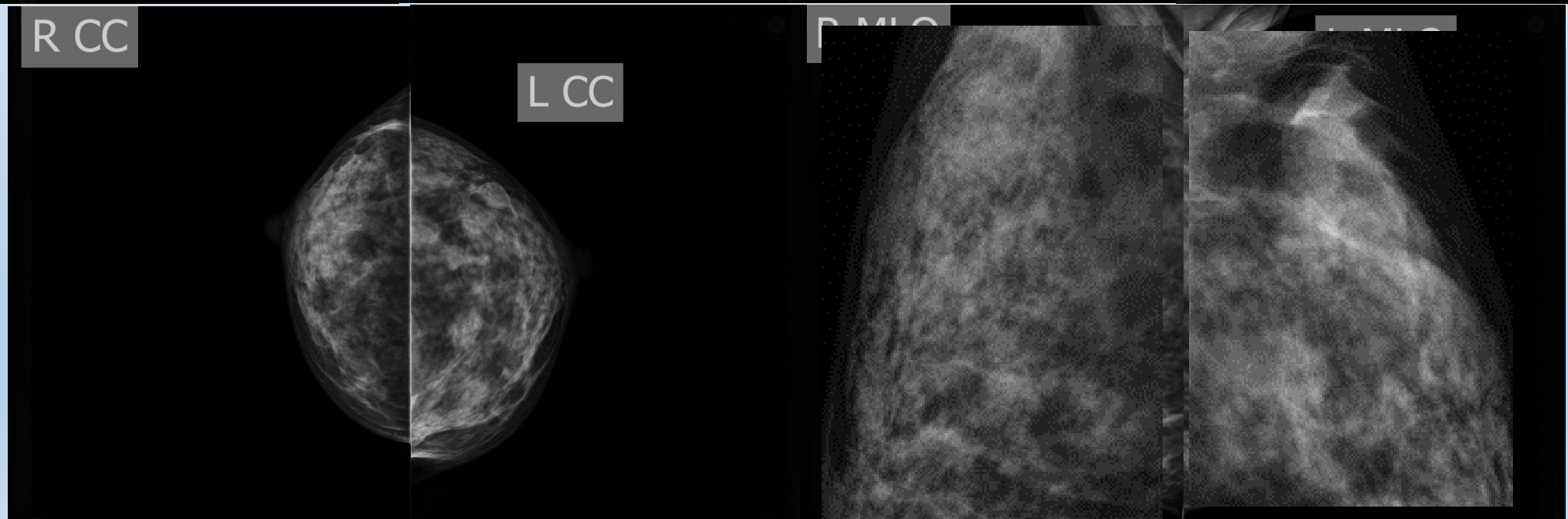
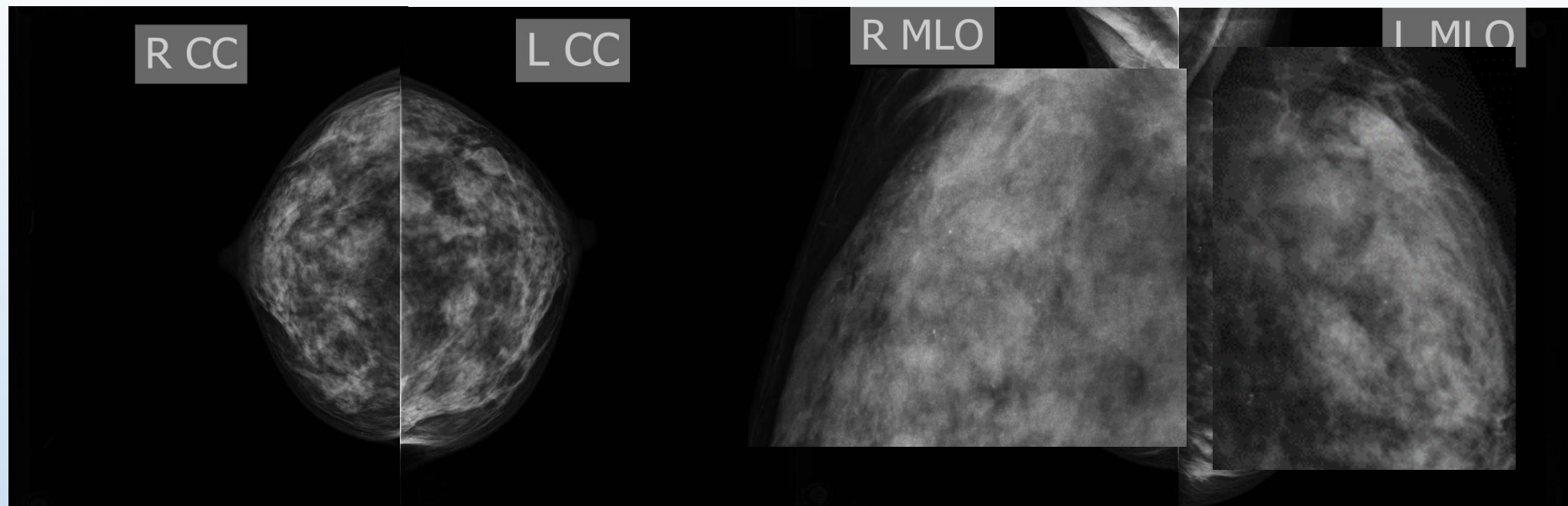


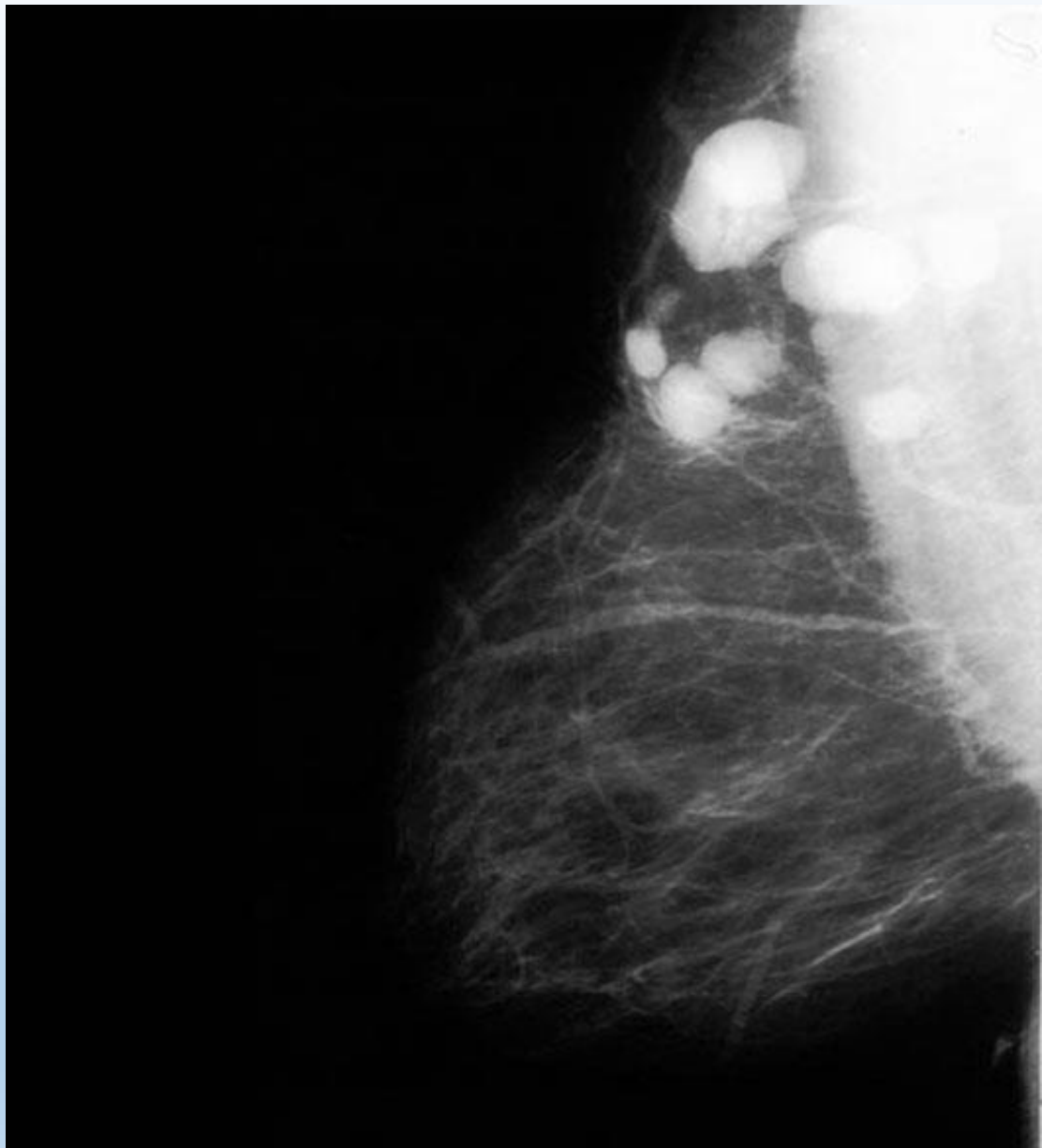
Arterys expands its clinical offerings with two new AI-powered workflows for medical imaging interpretation











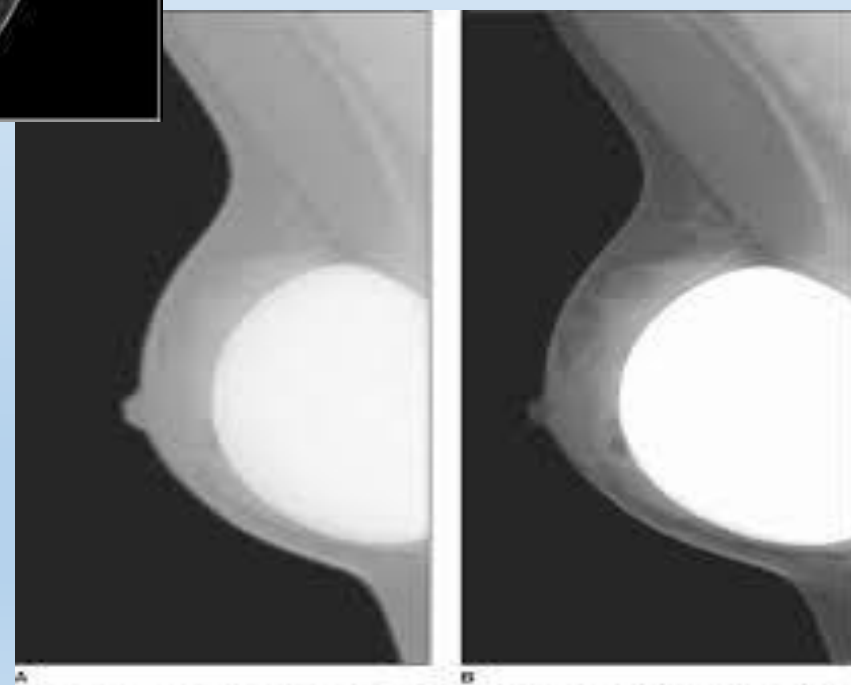
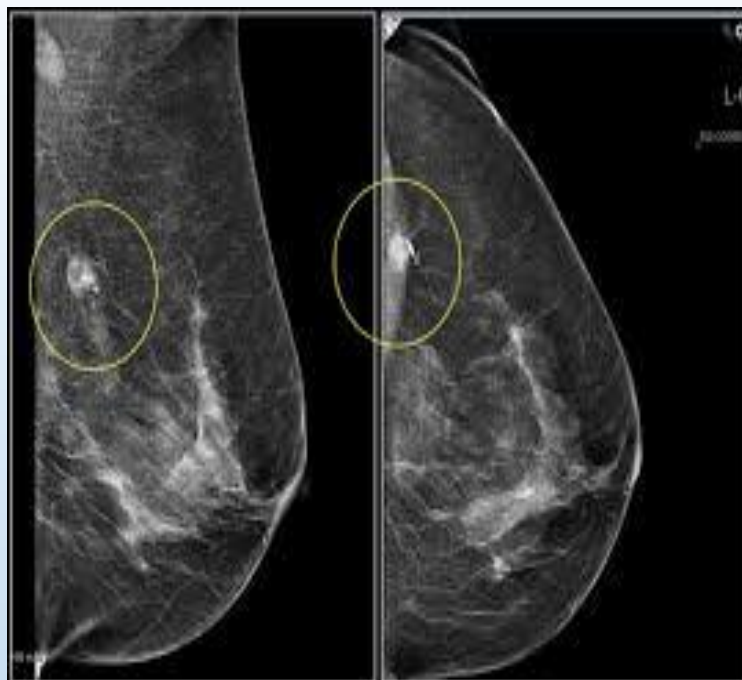
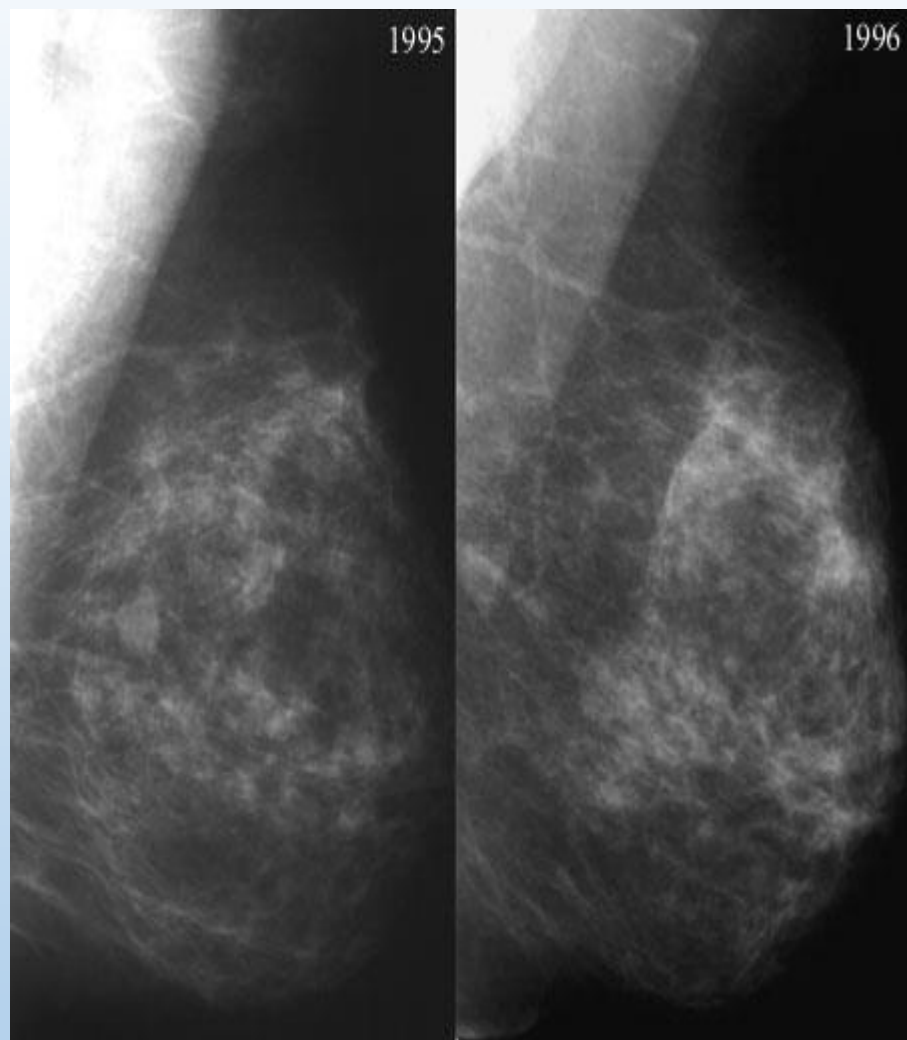


Figure 5. The capability to vary image display parameters, combined with higher dynamic contrast range of the digital detector, allows a same image to be obtained for expressing both the breast implant (A) and the adjacent breast tissue (B).



Fogalom magyarázat

- AI (artificial intelligence)
- CAD (computer-aided diagnosis)
- ML (machine learning)
- Black box
- Imaging biomarkers
- Radiomics
- Labeled data
- Imaging biobanks

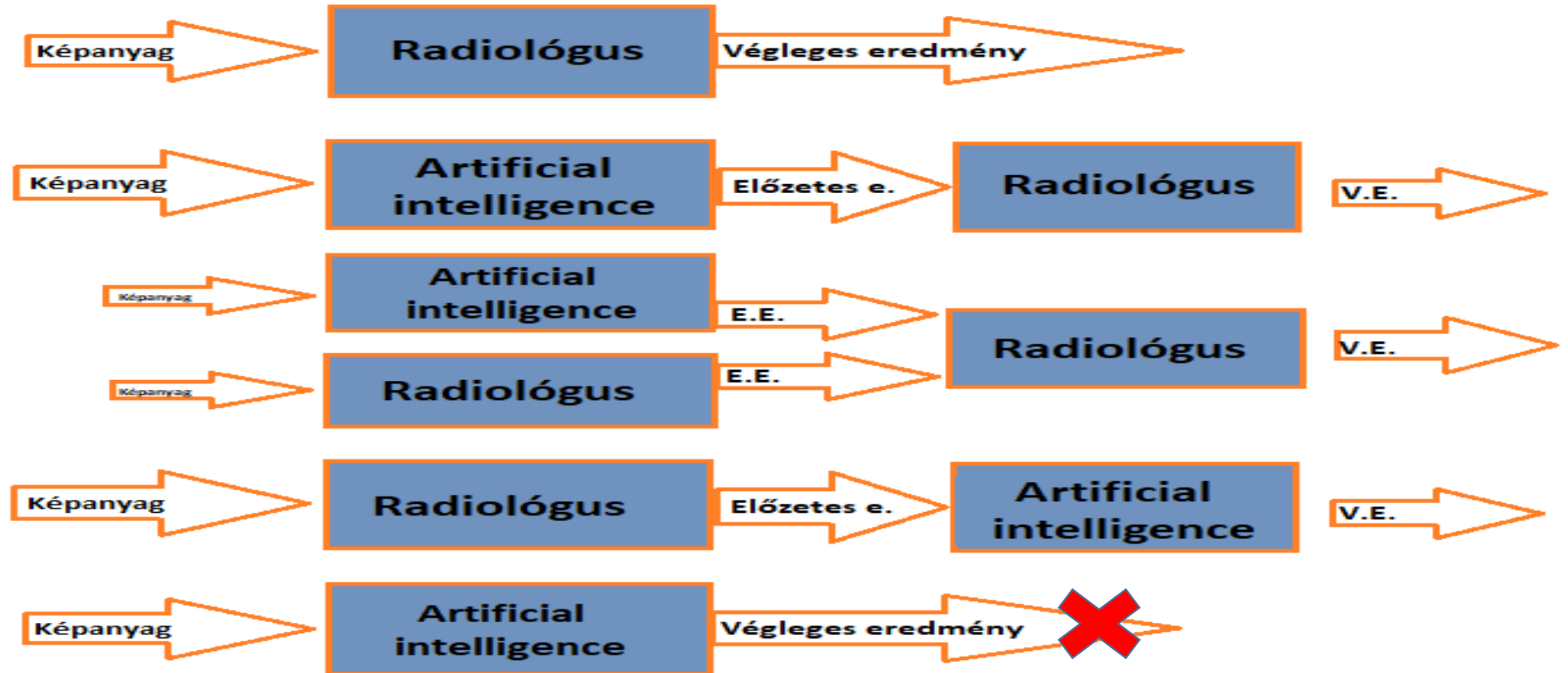
Radiológus szerepe:

- Fejlesztés, irányvonal
- Pl. mammográfia: 6 + 5 + 3 év - program 10000 nagyságrendű képanyag
- Felelősségvállalás
- **Algoritmusok/tesztek validálása**
- Algoritmusok által adott eredmény értelmezése, közlése
- Címkézett adatok létrehozása, ellenőrzése
- Orvosi képanyag-bankok létrehozása, ellenőrzése

1. Új diagnosztikai módszer bevezetésének feltételei

- Legyen bizonyíthatóan
 - pontosabb és/vagy
 - gyorsabb és/vagy
 - olcsóbb és/vagy
 - hozzáférhetőbb és/vagy
 - kevésbé invazív
- Essentialism vs. consequentialism

AI helye a diagnosztikában



Radiológus szerepe:

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2. Radiológiai eredmény értelmezése, közzlése



Health Risks (122) ?

↑ ELEVATED RISKS	YOUR RISK	AVERAGE RISK
Coronary Heart Disease	33.1%	24.4%
Psoriasis	15.0%	10.1%
Restless Legs Syndrome	5.2%	4.2%
Exfoliation Glaucoma	2.9%	1.0%
Lupus (Systemic Lupus Erythematosus) ♀	1.1%	0.2%
See all 122 risk reports...		

Traits (62) ?

REPORT	RESULT
Alcohol Flush Reaction	Does Not Flush
Bitter Taste Perception	Can Taste
Blond Hair	28% Chance
Earwax Type	Wet
Eye Color	Likely Blue
See all 62 traits...	

Inherited Conditions (53) ?

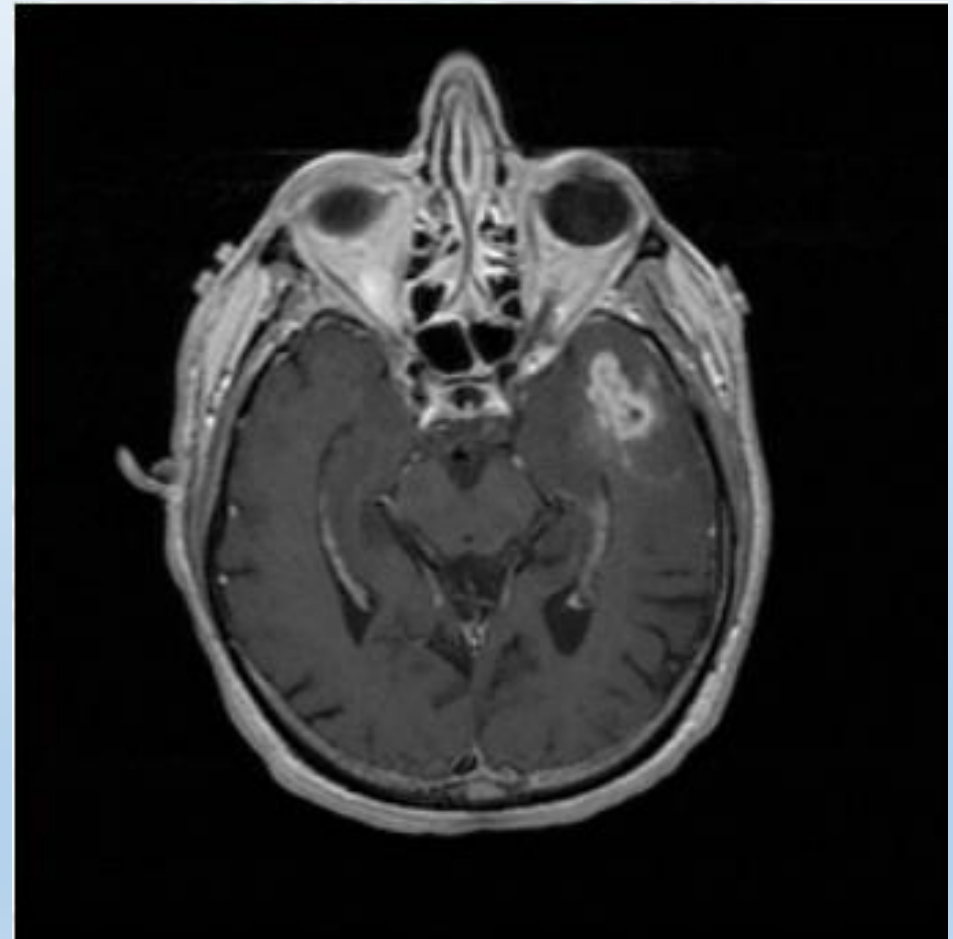
REPORT	RESULT
Hemochromatosis (HFE-related)	Variant Present
ARSACS	Variant Absent
Agnesis of the Corpus Callosum with Peripheral Neuropathy (ACCPN)	Variant Absent
Alpha-1 Antitrypsin Deficiency	Variant Absent
Autosomal Recessive Polycystic Kidney Disease	Variant Absent
See all 53 carrier status...	

Drug Response (25) ?

REPORT	RESULT
Clopidogrel (Plavix®) Efficacy (CYP2C19-related) update	Reduced
Abacavir Hypersensitivity	Typical
Acetaldehyde Toxicity	Typical
Fluorouracil Toxicity	Typical
Hepatitis C Treatment Response	Typical
See all 25 drug response...	

Radiológiai eredmény értelmezése, közlése

- Viable Tumor Volume=16,23cc
- Necrotic tissue volume=44,8cc
- Molecular markers:
 - IDH-mut R132
 - 1p19q Code1
 - MGMT Methylation 4,85
- Recommended harvesting target=
 - 44,8,32,7,18,8



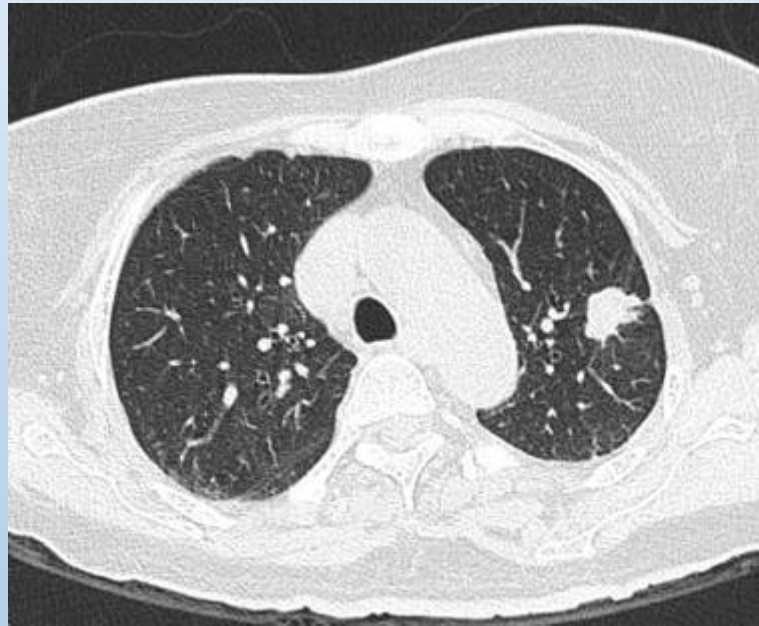
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3. Labeled data



Veserák metastasisa



Tüdő adenocarcinoma



Kissejtes tüdőrák

A labeled data nehézségei a radiológiában

- Hasonló betegségek nézhetnek ki különbözően
- Hasonlóan nézhetnek ki különböző betegségek
- Szövettani típus: benignus v.s. malignus
- Valódi negatív ? (true negative?)
- Klinikai adatok relevanciája

Buktatók

- Rossz training = rossz eredmény
- Állandó, kontrollálatlan training – frozen code
- Klinikai aspektus figyelmen kívül hagyása
- Black box

Buktatók kiküszöbölése, szűkítése

- Orvosi felügyelet
- Az eredmény orvosi értelmezése
- Labeled data training
- ROI ellenőrzés, black box uncover
- Big data, imaging biobanks

European Imaging biobanks

PERSPECTIVE

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Imaging biobanks in oncology: European perspective

Emanuele Neri^{*1} & Daniele Regge²

Future
ONCOLOGY



Kang B, et al (2013)
Current status,
challenges, policies,
and bioethics of
biobanks

Biobankok

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Svédo. – 12

Francia – 9

Holland – 8

Olasz - 8

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COMMENTARY

Will Computers Replace Radiologists?

Saurabh Jha, MBBS, MRCS

Recommendations

 14 Cancer Centers, IBM Install Supercomputer in Clinic



will computers replace

- will computers replace **teachers**
- will computers replace **accountants**
- will computers replace **pilots**
- will computers replace **humans**
- will computers replace **translators**
- will computers replace **actuaries**
- will computers replace **pathologists**
- will computers replace **pharmacists**
- will computers replace **lawyers**
- will computers replace **umpires**

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