

# Gelecek Yeniden Şekillenirken Ülkemiz, Tıp Sanatı ve Biz

Prof. Dr. Hakkı M. Karakaş, MBA



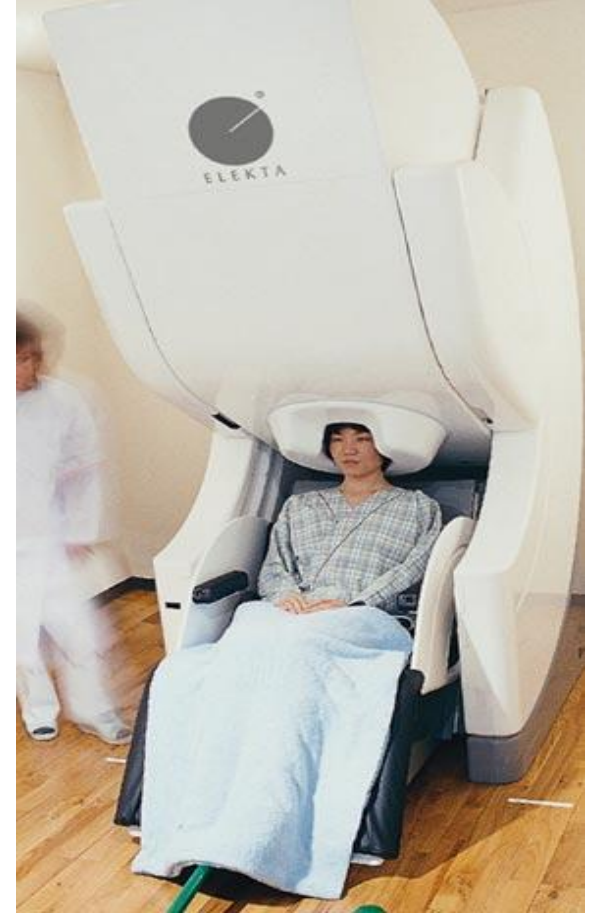
- **Yapay Zeka Uygulamaları**
  - Daha etkili, daha hızlı, daha erken, daha hassas
- **Gelişmiş Görüntüleme Teknikleri**
  - Daha yüksek çözünürlük, kontrast ve hassasiyet
- **Uzaktan Görüntüleme ve Teletıp**
  - Uzak bölgelerdeki hastalara erişim....
- **Kişiselleştirilmiş Tıp**
  - Genetik bilgi ve özel durumlara dayalı teşhis süreçleri ve tedavi planları
- **Eğitim ve Uzmanlık Gelişimi**
  - Uzmanlık alanlarında çeşitlenme

**Ancak, bu öngörüler  
inovasyonlara ve toplumsal  
gereksinimlere  
bağlı olarak değişebilir.**

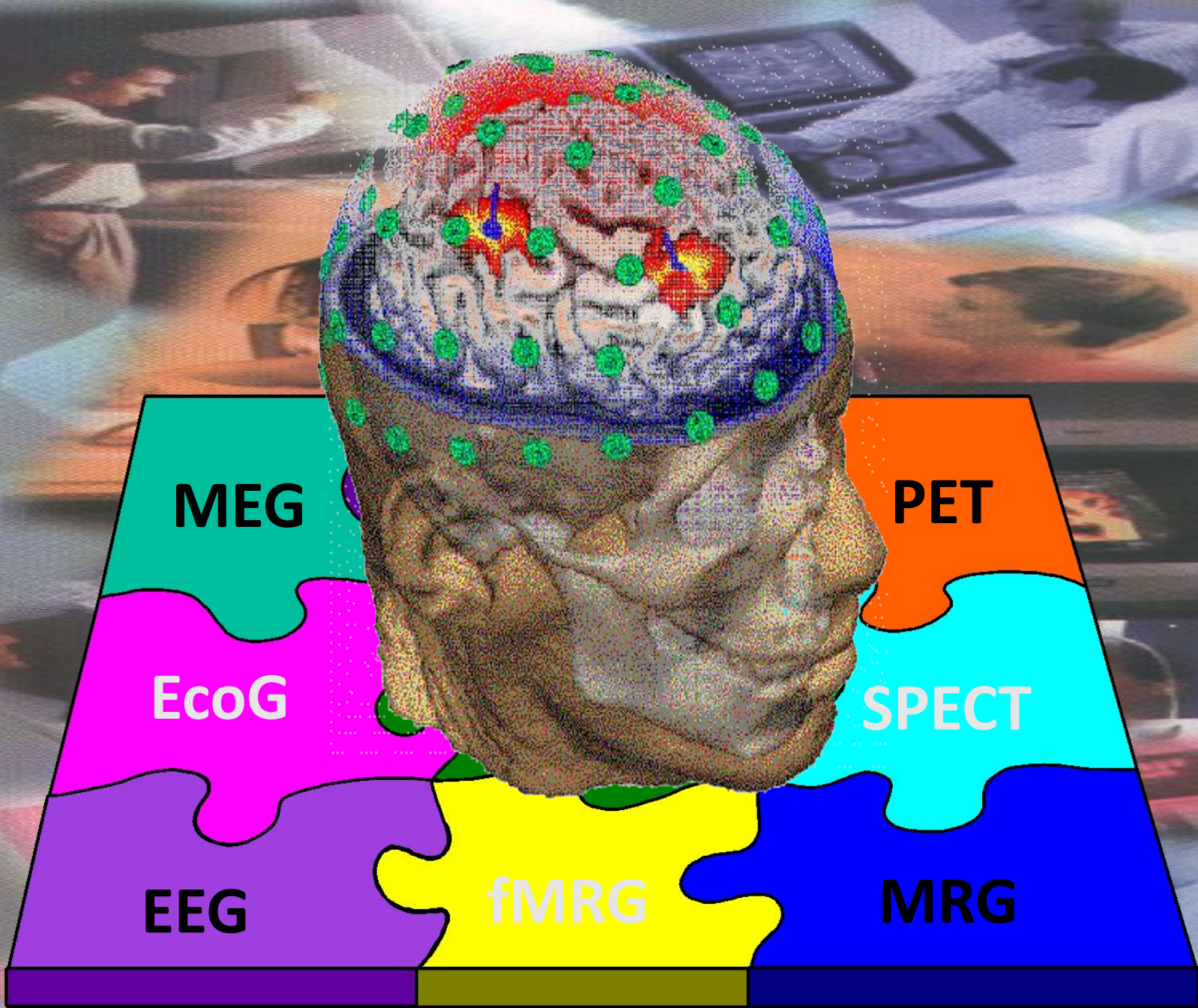


# Görüntüleme teknolojilerinin evrimi

- Tıbbi görüntülemenin evrimi, temel bilimin tıpta devrimsel uygulamaları şeklinde olmuştur.
- BT ve MRG görüntülemenin ana çerçevesidir
  - **Peki ya ESI, MSI, EIM, CIT, APT, MWCT, PCXRI?**







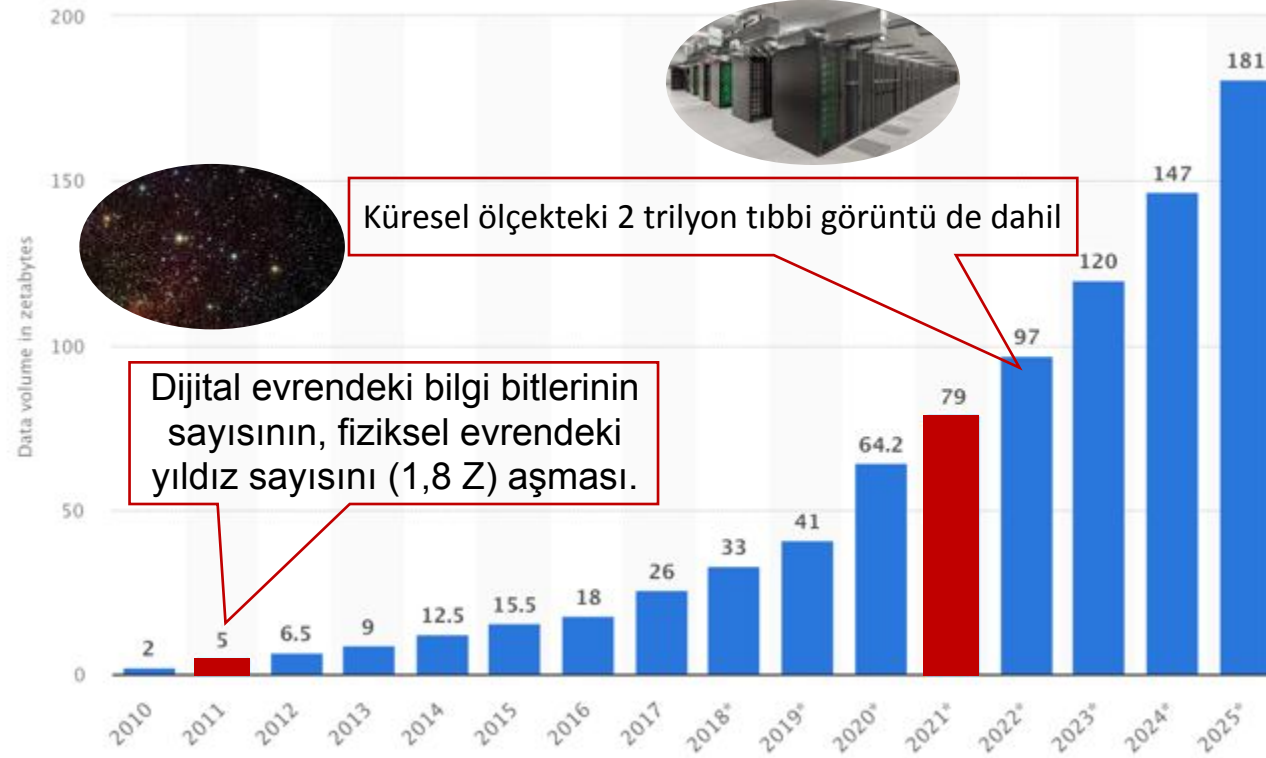
# Bilgi bombardımanı



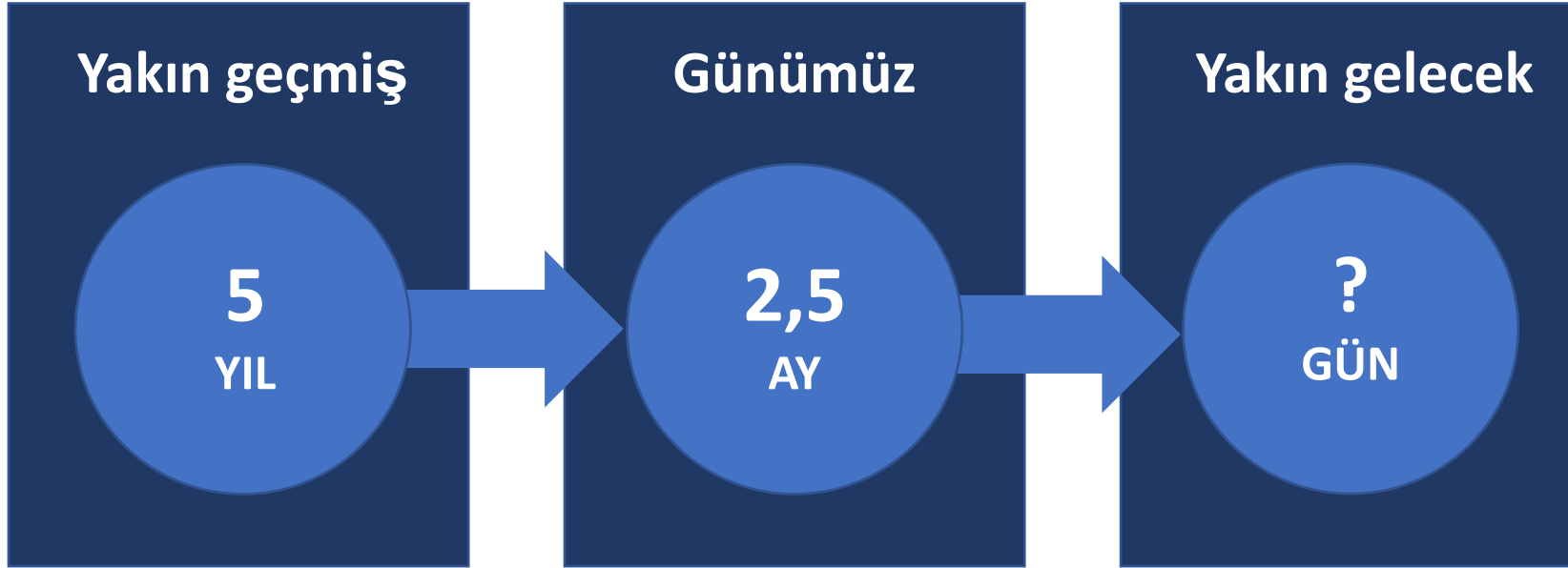


# Hacim

## Küresel veri hacmi (zettabayt cinsinden)

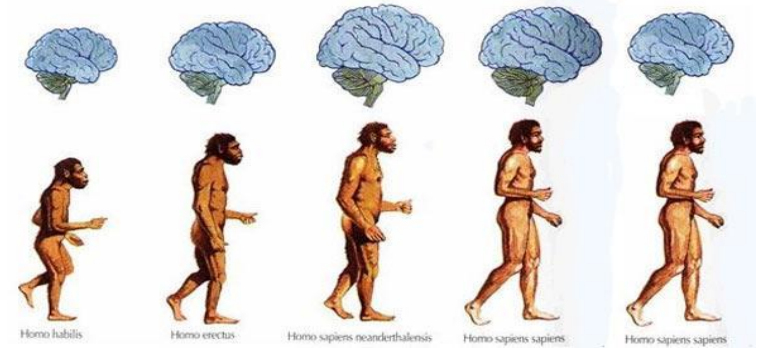
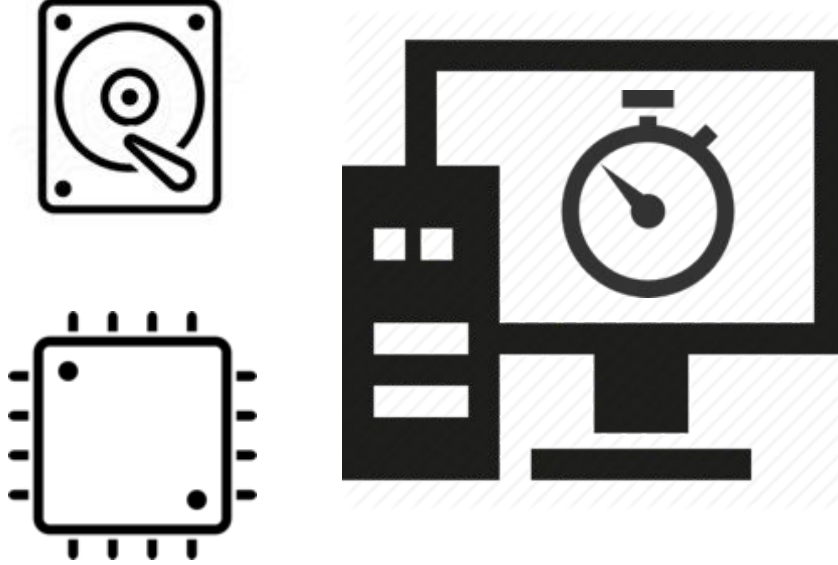


# *Tıbbi verilerin hacminin iki katına çıkma süresi*



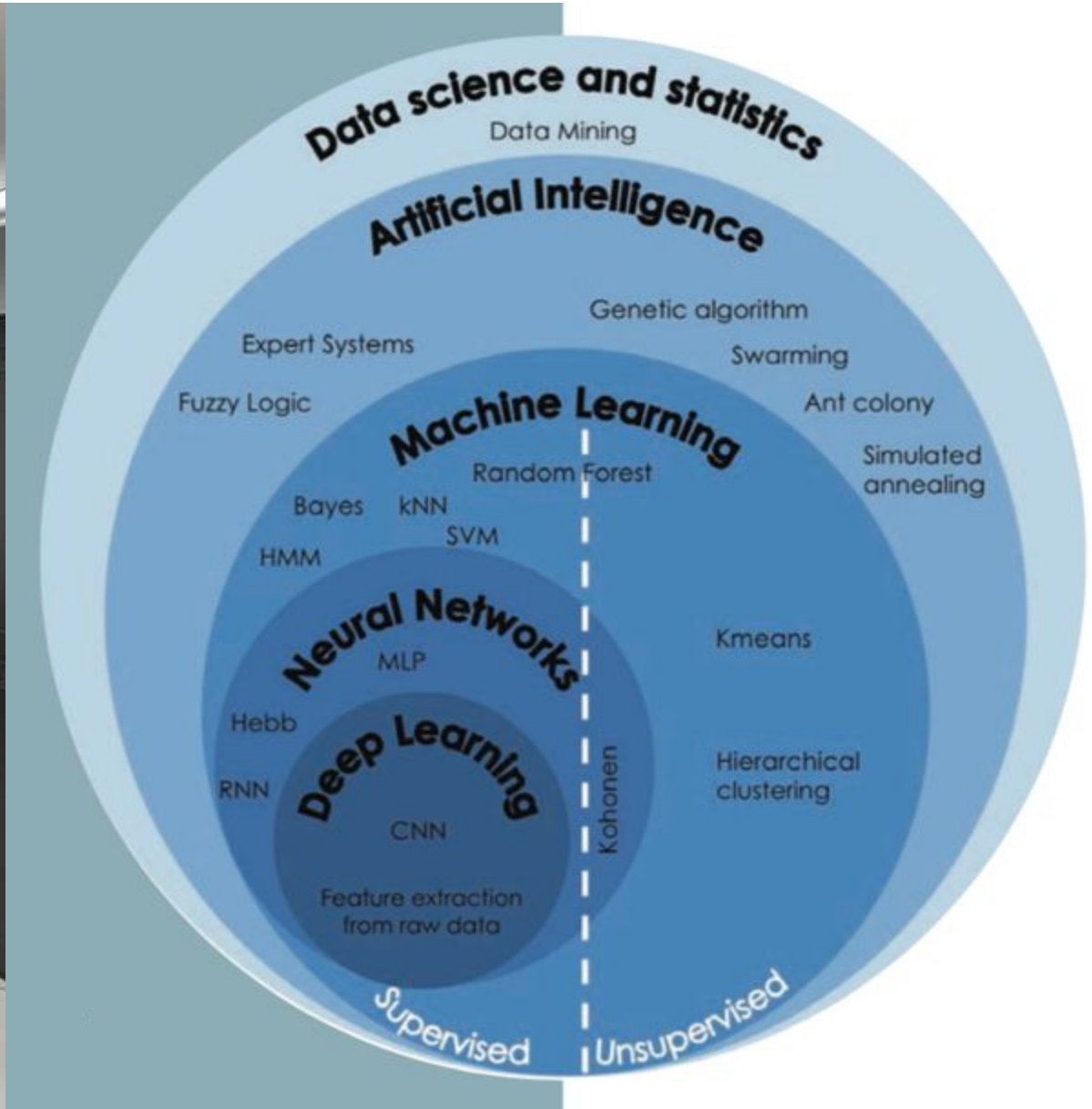
# Büyük veri

Verilerin temel boyutlarının, doğru ve zamanında karar vermek için bir sistemin **depolama ve/veya hesaplama kapasitesini aşması**



***Büyük hacimli/çeşitli/hızlı veriler, belirli bir zaman diliminde geleneksel bir yaklaşımla saklanamaz ve işlenemez.***





Articles

Logical Analysis in Roentgen Diagnosis **MEMORIAL FUND LECTURE**<sup>1</sup>

Author List

Additional Information

DOI: <http://dx.doi.org/10.1148/74.2.178>

Abstract Cited by PDF

Logical Analysis in Roentgen Diagnosis

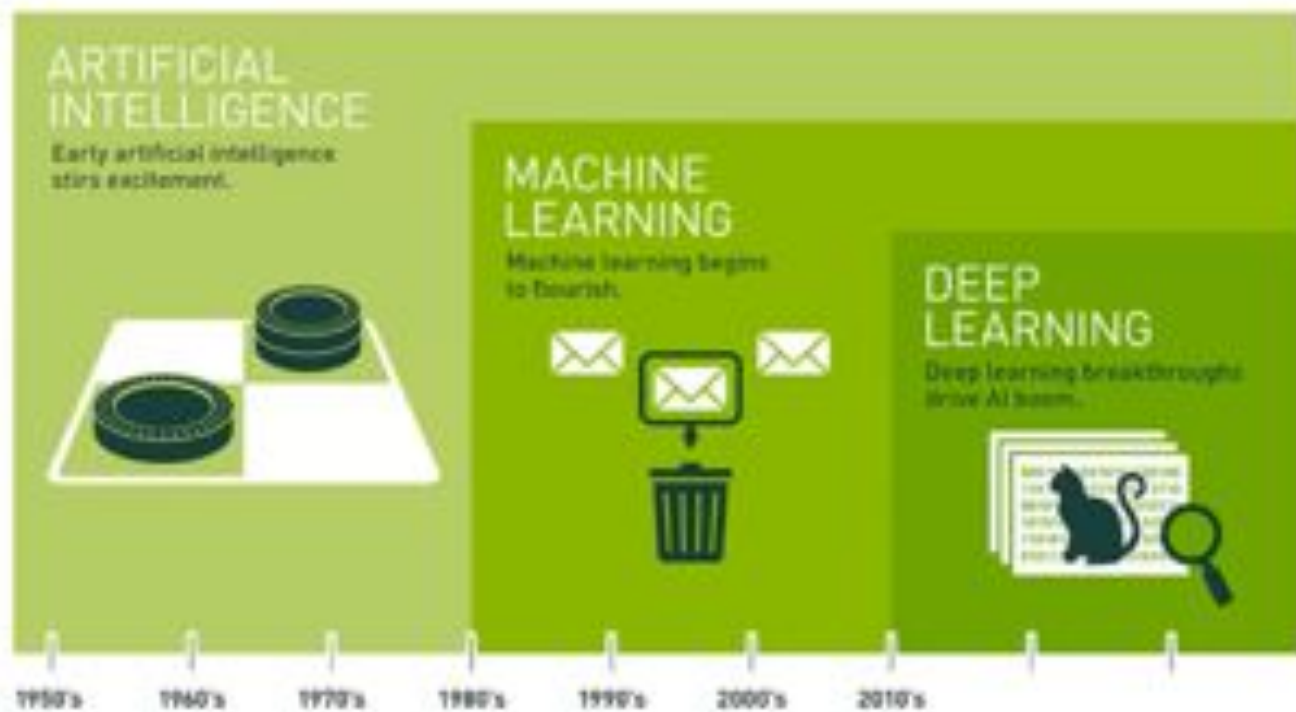
Memorial Fund Lecture<sup>1</sup>

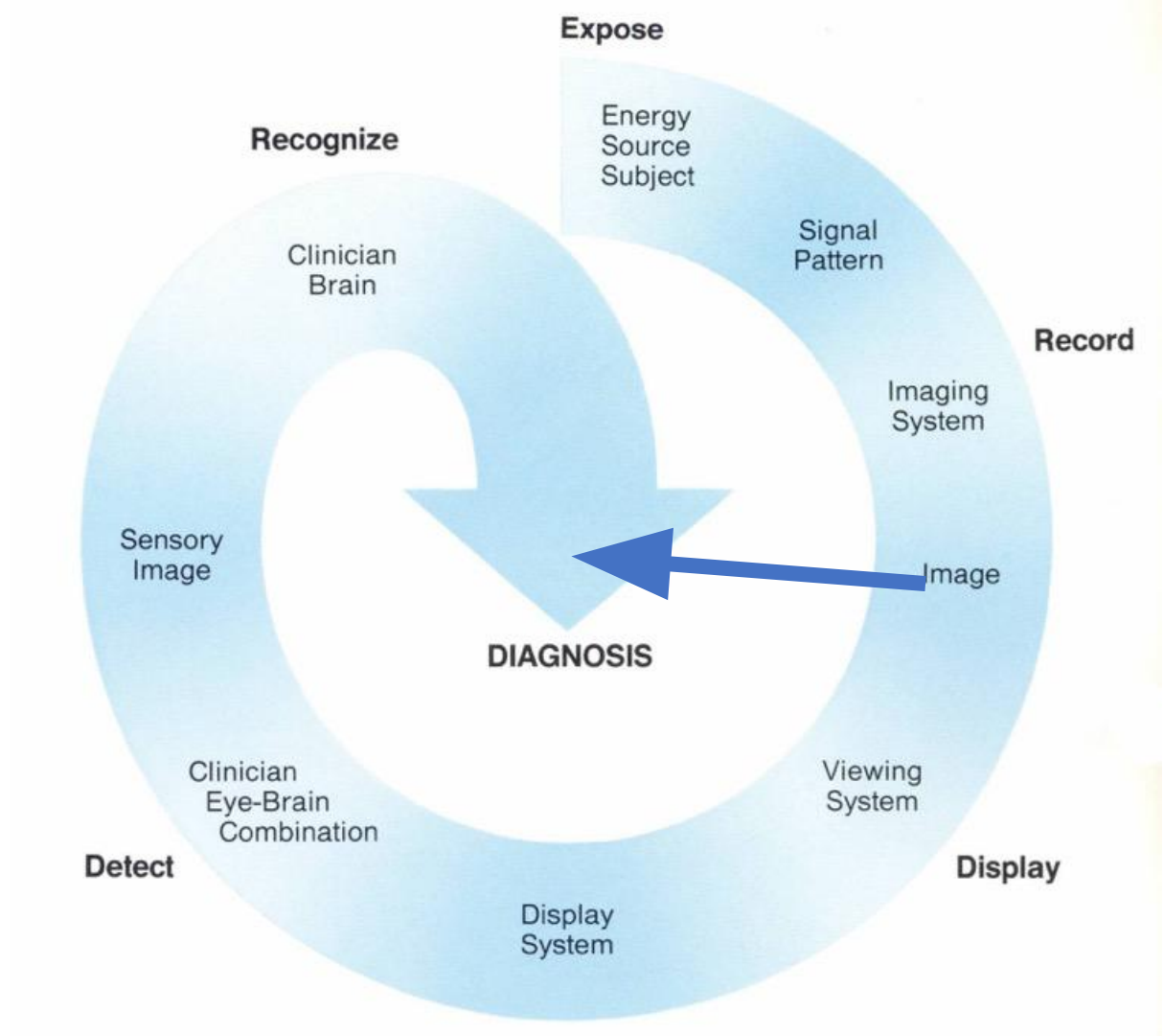
LEE B. LUSTED, M.D.

**D**URING THE FIRST year of my residency training I had occasion to ask my chief, Dr. Robert Stone, how I could be sure of the accuracy of my roentgen diagnosis. In the course of our discussion he told me about his former chief, Dr. Howard Ruggles, an excellent diagnostician who was able to make a high percentage of correct diagnoses after a brief examination

stance, the protean manifestations of pulmonary tuberculosis.

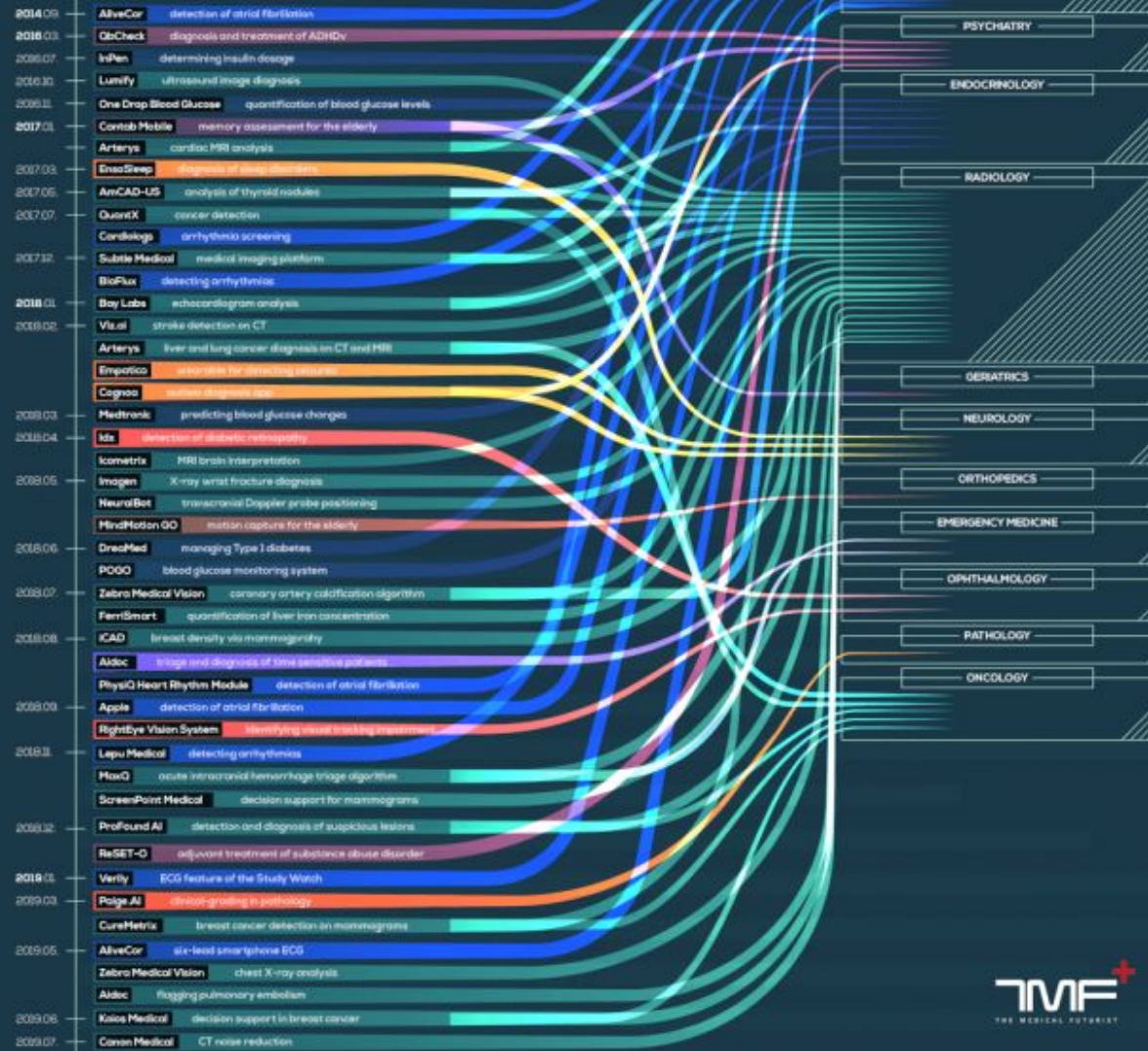
But what about the traps set for the unwary radiologist who uses this "looks like it" method too freely? Figure 1 shows the lung manifestations of four different diseases. The roentgen findings are similar and few radiologists would make all four diagnoses correctly on the basis of the





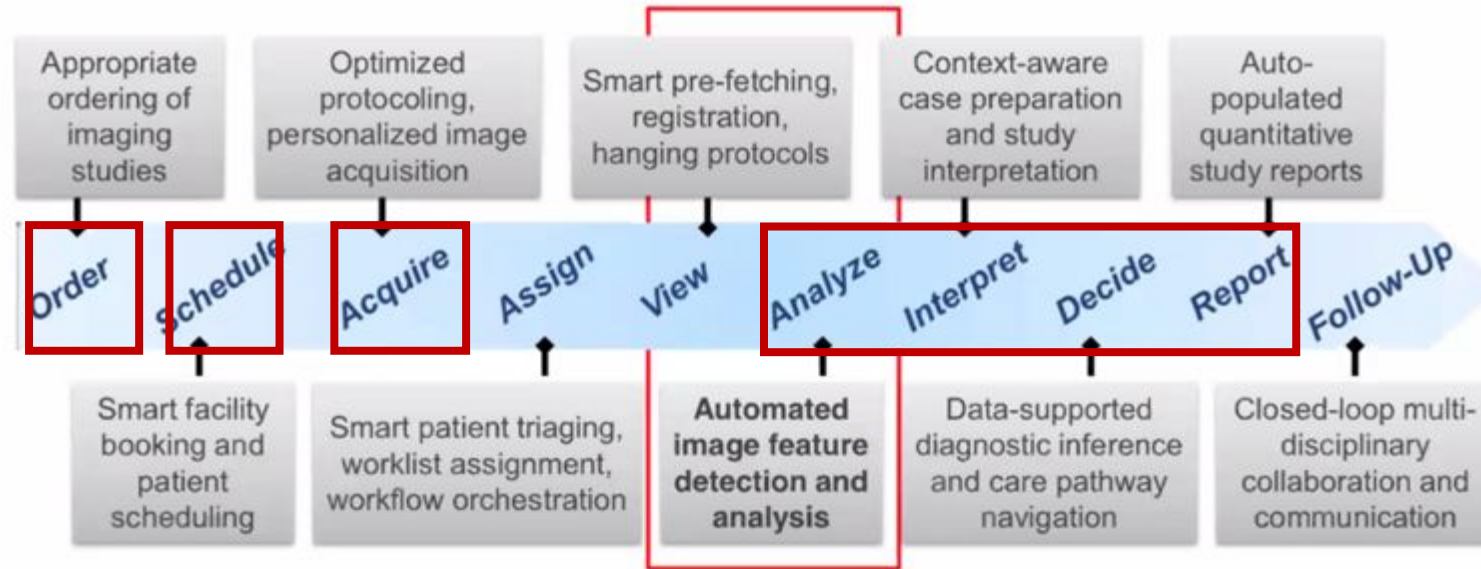


# FDA APPROVALS FOR ARTIFICIAL INTELLIGENCE-BASED ALGORITHMS IN MEDICINE

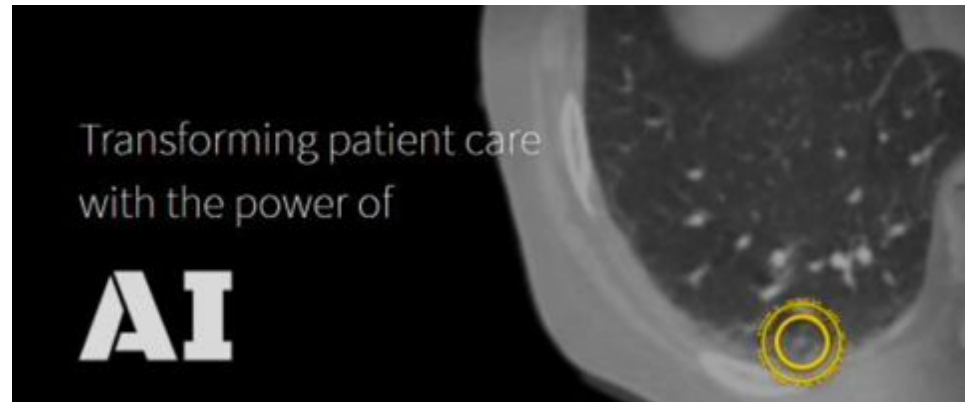
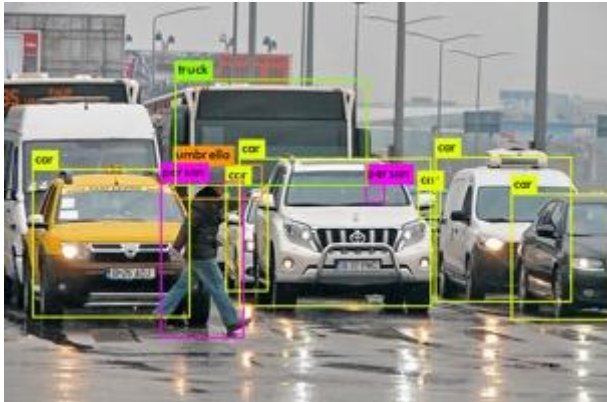




# Radyoloji iş akışında yapay zeka



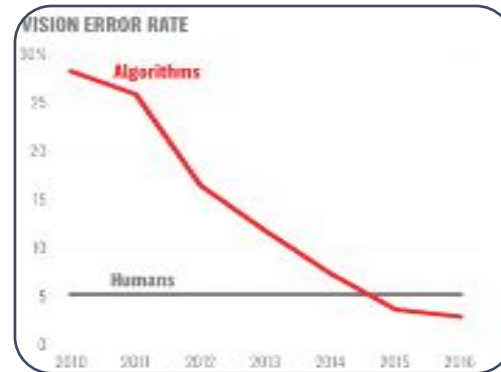
Frost & Sullivan 2018







# YZ'nin vaatleri



# Sağlıkta yapay zeka

## Bireysel düzey



## Bölüm düzeyi



AI Result	PatientID	Name	Surname	Description	Date
POSITIVE	400-608-467	Johnston	Luchda	LeftArm	Thursday 08-10-2019 10:34 AM
POSITIVE	401-612-1256	Lewis	Smith	Pelvis	Thursday 08-10-2019 10:12 AM
DOUBT	407-003-9332	Dominic	Watts	RightHand	Thursday 08-10-2019 10:01 AM
DOUBT	512-724-5758	Nicolas	Hamilton	LeftFoot	Thursday 08-10-2019 09:52 AM
NEGATIVE	008-392-2699	Eli	Cook	Spine	Thursday 08-10-2019 09:34 AM
NEGATIVE	402-458-0003	Jason	Francis	RB Cage	Thursday 08-10-2019 09:05 AM



## Sunucu düzeyi





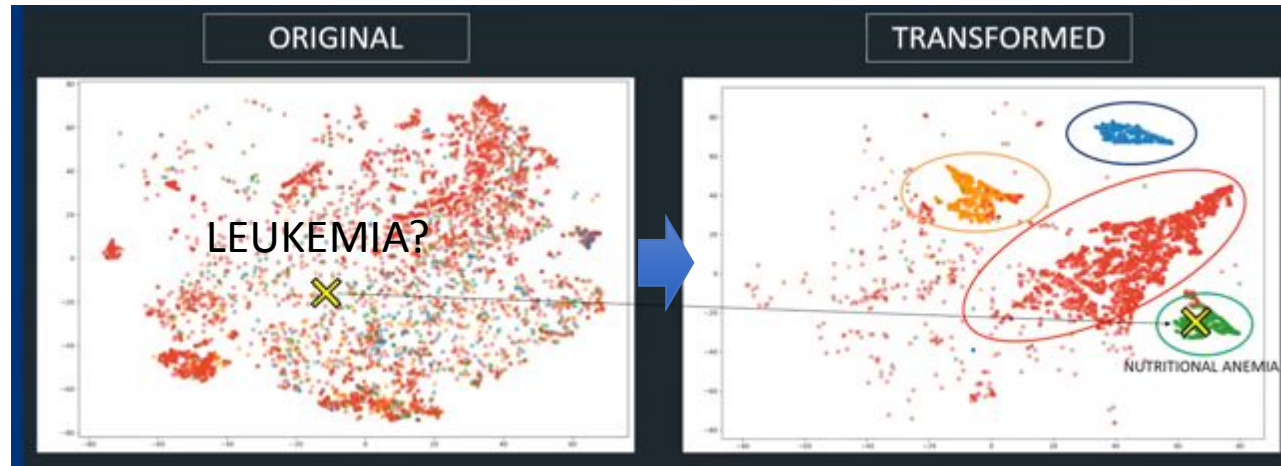
# Bireysel düzey: Hastalık tanılama

A laborvizsgálatok összefoglalása

Neve	Típus	Érték	Referencia	Referencia
Fehérvérsejt szám (WBC)	Vérkép	9.1	lept	4.4
Újsejt szám (NEC)	Vérkép	3.8	Termin	0.1
Hemoglobin (Hgb)	Vérkép	106	g/L	128
Hematokrit (Hct)	Vérkép	0.31	L/L	0.39
MCV	Vérkép	90	fL	90
MCH	Vérkép	27	pg	30
MCHC	Vérkép	300	g/L	310
Thrombocytopen (PLT)	Vérkép	392	lept	150

Red Cell Distribution Width (RDW)	Vérkép	18.9	%	11.8
Mean Platelet Volume (MPV)	Vérkép	10.2 <th>%</th> <th>7.3</th>	%	7.3
Neutrofil granulocita (%)	Vérkép	65.5 <th>%</th> <th>50</th>	%	50
Limfocita (%)	Vérkép	28.7 <th>%</th> <th>28</th>	%	28
Monocita (%)	Vérkép	0.5 <th>%</th> <th>2</th>	%	2
Bazofil granulocita (%)	Vérkép	3.8 <th>%</th> <th>1</th>	%	1
Bazofil granulocita (%)	Vérkép	0.0 <th>%</th> <th>-</th>	%	-
Neutrofil granulocita (x10 <sup>9</sup> )	Vérkép	5.97	lept	2.2
Limfocita (x10 <sup>9</sup> )	Vérkép	1.04	lept	1.1
Érvénytelen	Vérkép	0.5	lept	0.1



## PROVIDED INFORMATION

1. Progressive personalized risk score (PPRS)
2. Dynamic personalized probability score (DPPS)
3. Proposed further medical tests




## SUPPORTED MEDICAL CONDITIONS

1. Common acute and chronic conditions
2. Malignant conditions
3. Rare (metabolic) conditions

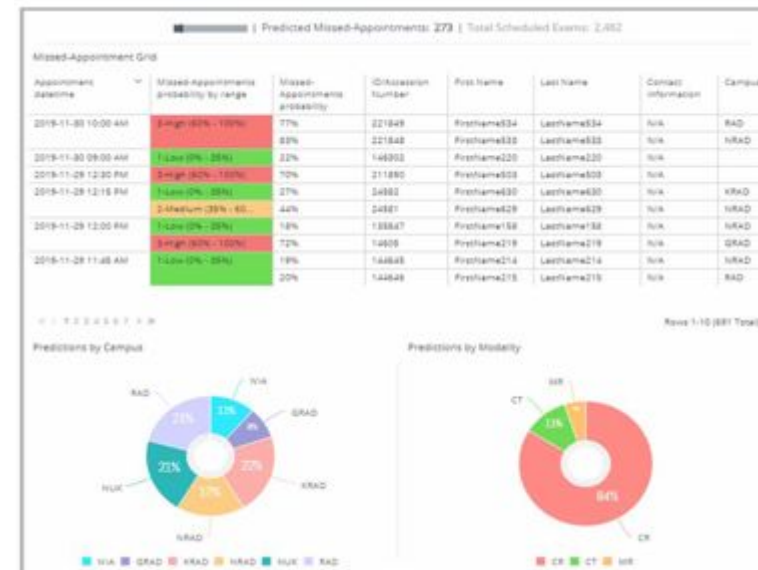
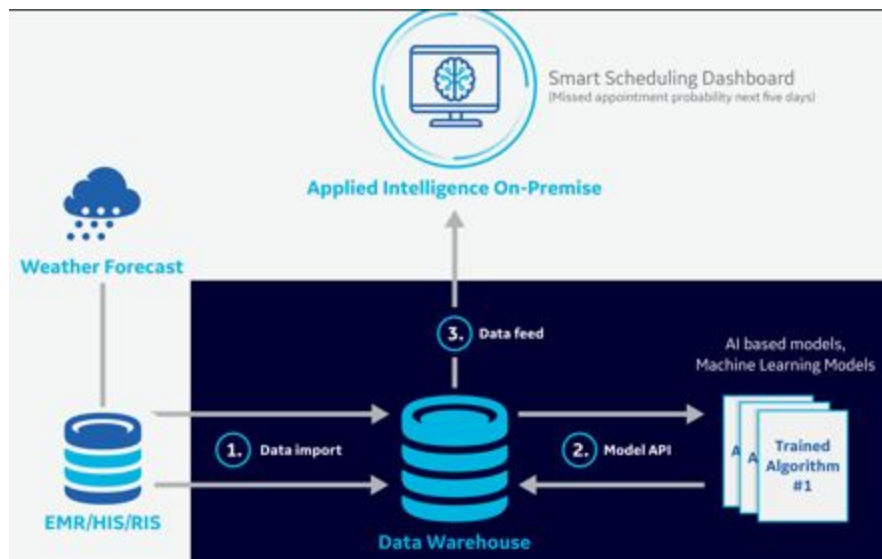
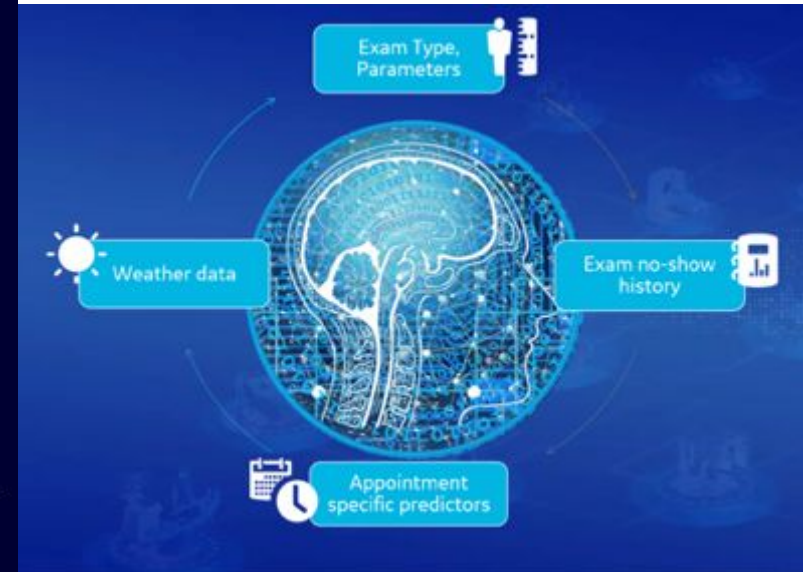
Főmes! Azonos szinkódhoz (betegség kockázathoz) különféle betegségcsoportok esetén különböző becslés valószínűség tartozhat. A becslés valószínűség értéke ugyanis - többek között - függ az adott betegség gyakoriságától és az alkalmazott matematikai modellek paramétereitől. Látogasson el a [www.medisave.hu/okoslelet](http://www.medisave.hu/okoslelet) weboldalra ahol részletes információt talál az okoslelet módszerről.

Betegségcsoport	Becslés valószínűség	Betegség meglétének kockázata
Pajzsmirigy betegségek	3.5% alatt	<span style="display: inline-block; width: 20px; height: 10px; background-color: green;"></span>
Immundefektusok	0.8% alatt	<span style="display: inline-block; width: 20px; height: 10px; background-color: green;"></span>
Diabétes és kapcsolódó kórképek	4.3% alatt	<span style="display: inline-block; width: 20px; height: 10px; background-color: green;"></span>
Májbetegségek	1.5% alatt	<span style="display: inline-block; width: 20px; height: 10px; background-color: green;"></span>
Táplálkozási anémiák	16%-40% között	<span style="display: inline-block; width: 20px; height: 10px; background-color: orange;"></span>
Egyéb anémiák	4.1% alatt	<span style="display: inline-block; width: 20px; height: 10px; background-color: green;"></span>
Gyulladásos bélbetegségek	0.5% alatt	<span style="display: inline-block; width: 20px; height: 10px; background-color: green;"></span>
Zsíranyagcsere betegségek	4.3% alatt	<span style="display: inline-block; width: 20px; height: 10px; background-color: green;"></span>

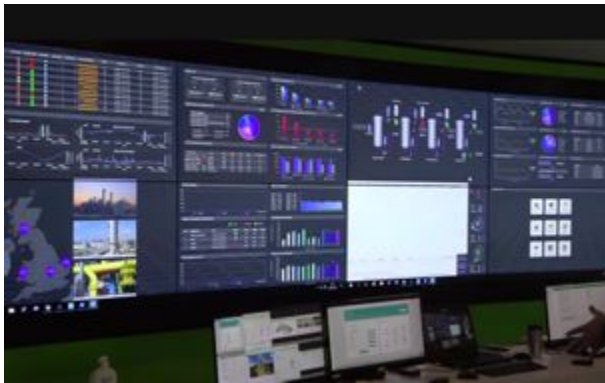
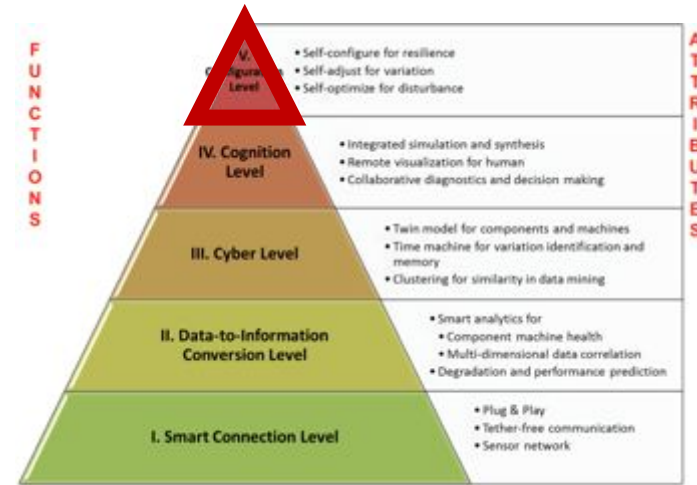
# Bölüm düzeyi: Akıllı randevu

- 
**Personalized**  
 Machine learning models trained on your own site scheduling data from up to one year to account for seasonality.
- 
**Engaged**  
 Advisory service engagements up to 12 times a year to monitor progress, if there is a need to retrain the model, and help define common definitions of key metrics used in scheduling.
- 
**Predictive**  
 Use up to 40 different data factors to best understand patient probabilities for missing appointments.

Smart Scheduling takes the power of artificial intelligence and utilizes data factors, both internal and external to a customer's practice, to help determine probabilities of a patient's arrival to their scheduled examinations on time. It utilizes the data aggregation of Imaging Insights Radiology Operations Module. When combined, it helps capture full visibility of the practice that enables meaningful changes that assists driving relevant outcomes.



# Kuruluş düzeyi: Operasyonel farkındalık



Schneider Electric-powered  
*Unified Command Center*

Hopkins Capacity Command Center

**OPERATIONAL AWARENESS**

The management medical director works with the center's administrator to ensure the command center as related to patient and implement strategies that improve and supports day-to-day activities of the center including refining operating mechanisms, patient flow and resolving service assignment

**HOPKINS ACCESS LINE (HAL)**

- **Role:** The Hopkins Access Line connects outside providers with providers at The Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center, including facilitating patient transfers.
- **Peak Staffing:** 9

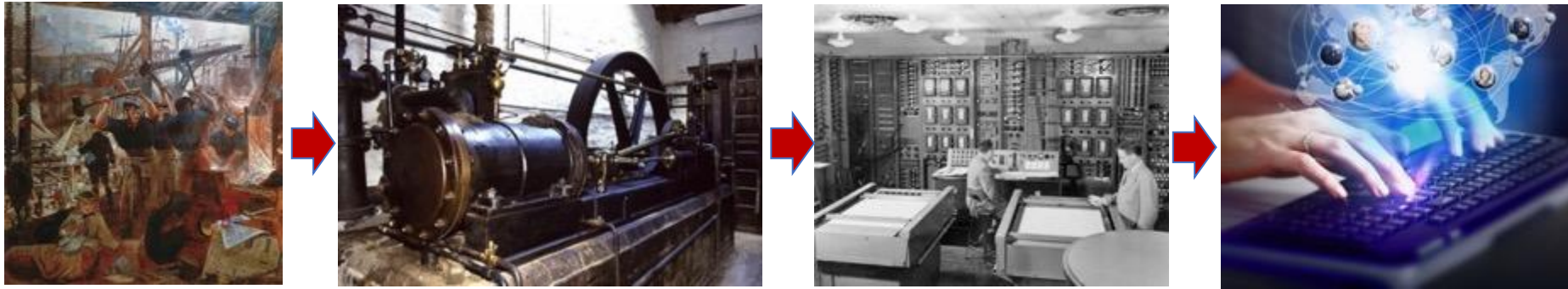


T Sise Cam Fab AS  
*Command Center*

General Electric-powered  
*Capacity Command Center*



# YZ'nin temel önerisi üretkenliği arttırmaktır

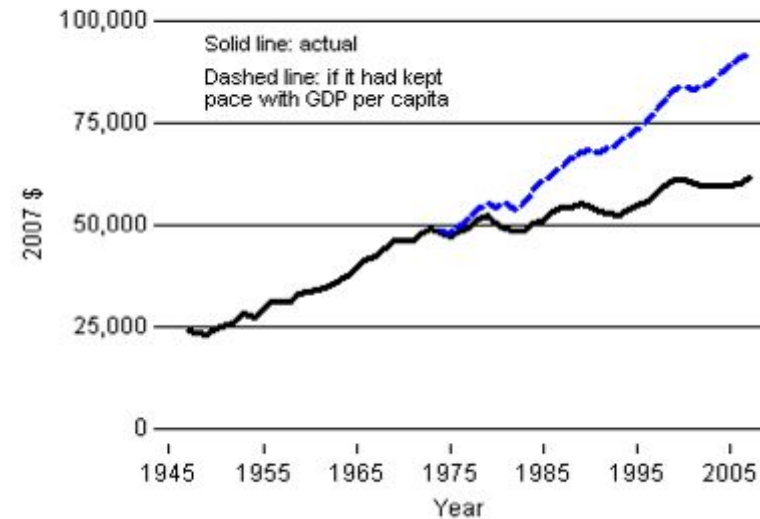


The US Productivity Decline and Rebound



Source: United States Department of Labor, Bureau of Labor Statistics, Labor Productivity and Costs Database, Annual Data, November 2012. <http://www.bls.gov/lpc/>

Median family income, 1947-2007



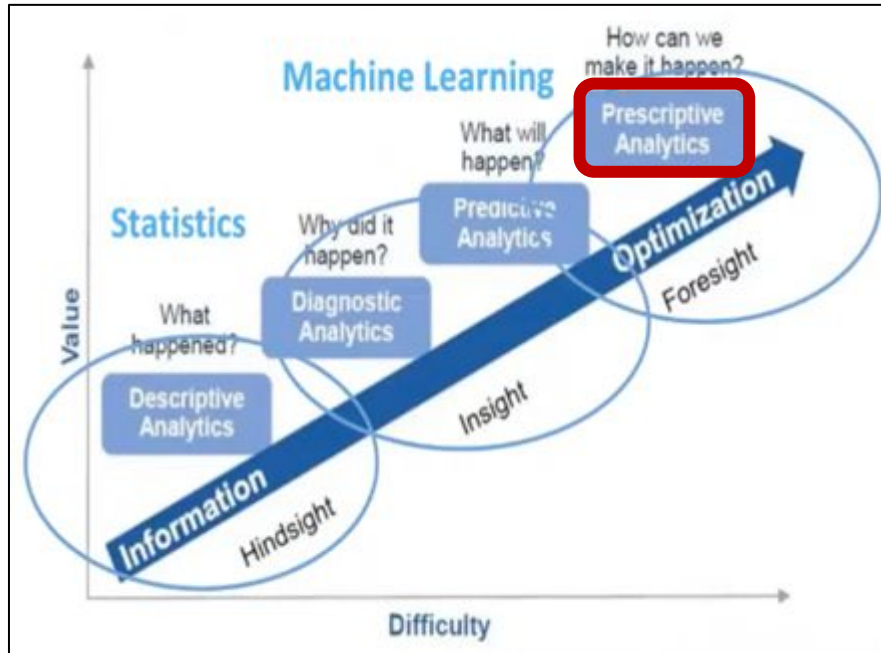




**Hakki M. Karakas**

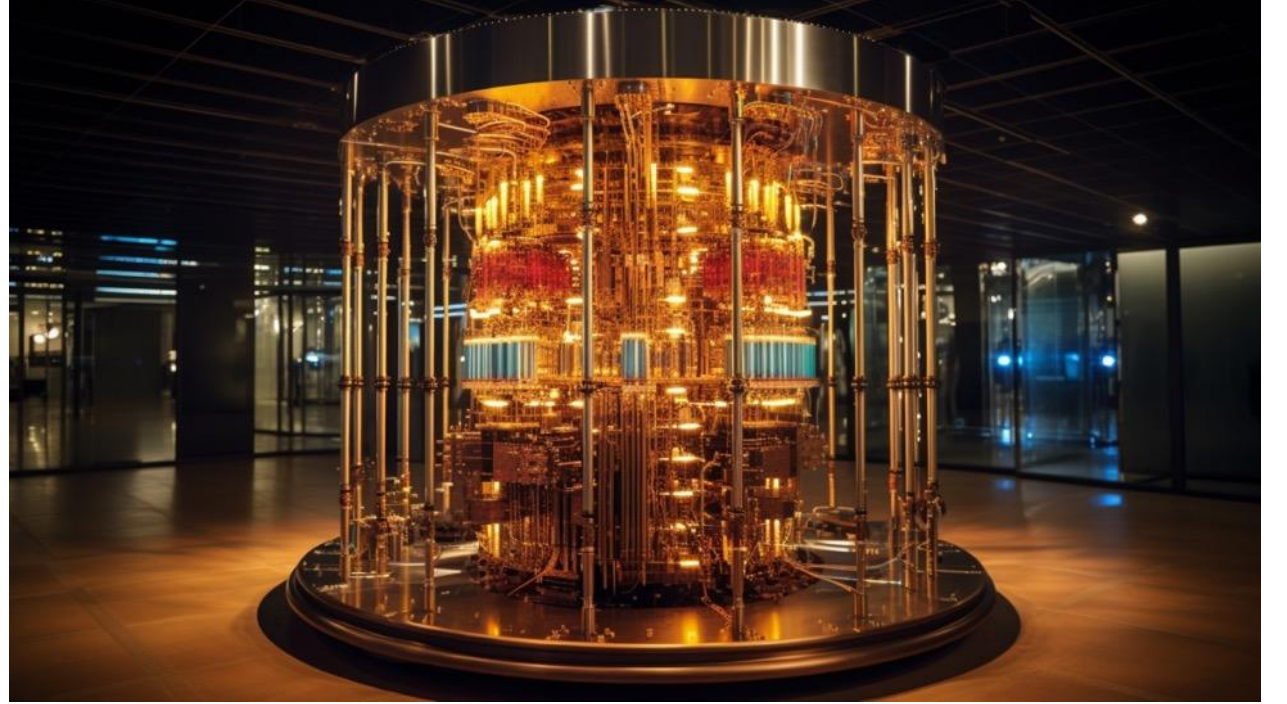
Prof | MD | MBA | Director of Medical Imaging Services of Istanbul Province

*Yapay zekanın temel deęer önerisi doktorun zamanını tüketen ve hasta ile arasındaki baęı koparan iş ve işlemleri yerine getirmek ve onlara mesleki yaşamlarında kaybettikleri anlamları geri kazandırmak.*



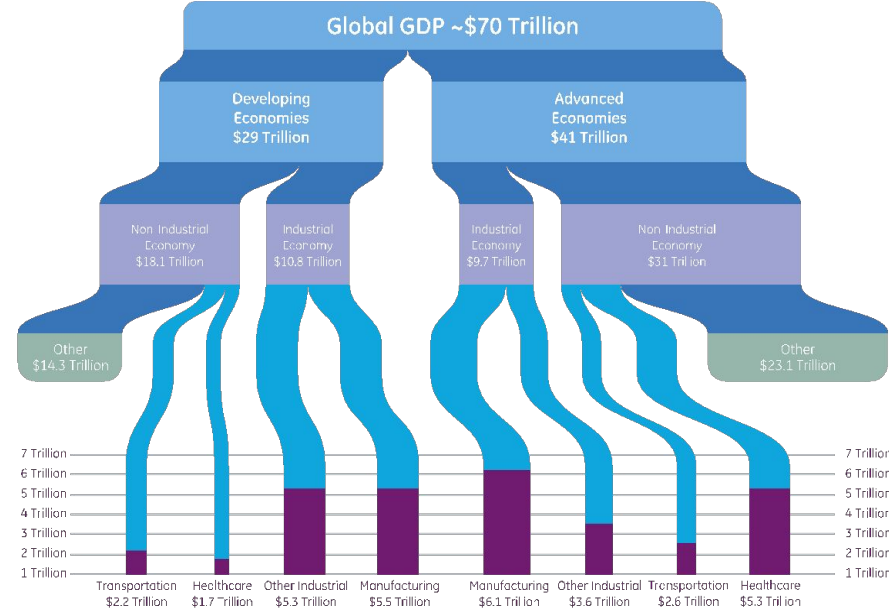
## Kuantum Bilgisayarlar

Bilim adamları, insan beyninin avantajlarını bilişim sisteminin çabukluğu ile birleştiren, insan gibi düşünebilen yeni bir bilgisayar türünü yaratmak için çabalıyorlar.





# Fırsat ne kadar büyük?



Küresel sağlık harcamaları : \$ 7T

Verimsizlik: %10 (40'a kadar çıkabilir) = \$ 700 B

Klinik/operasyonel verimsizlik : %59 = \$ 413 B

Beklenen iyileşme : %25 = \$ 103 B

**Toplam YZ satışları (2021): \$ 8B**

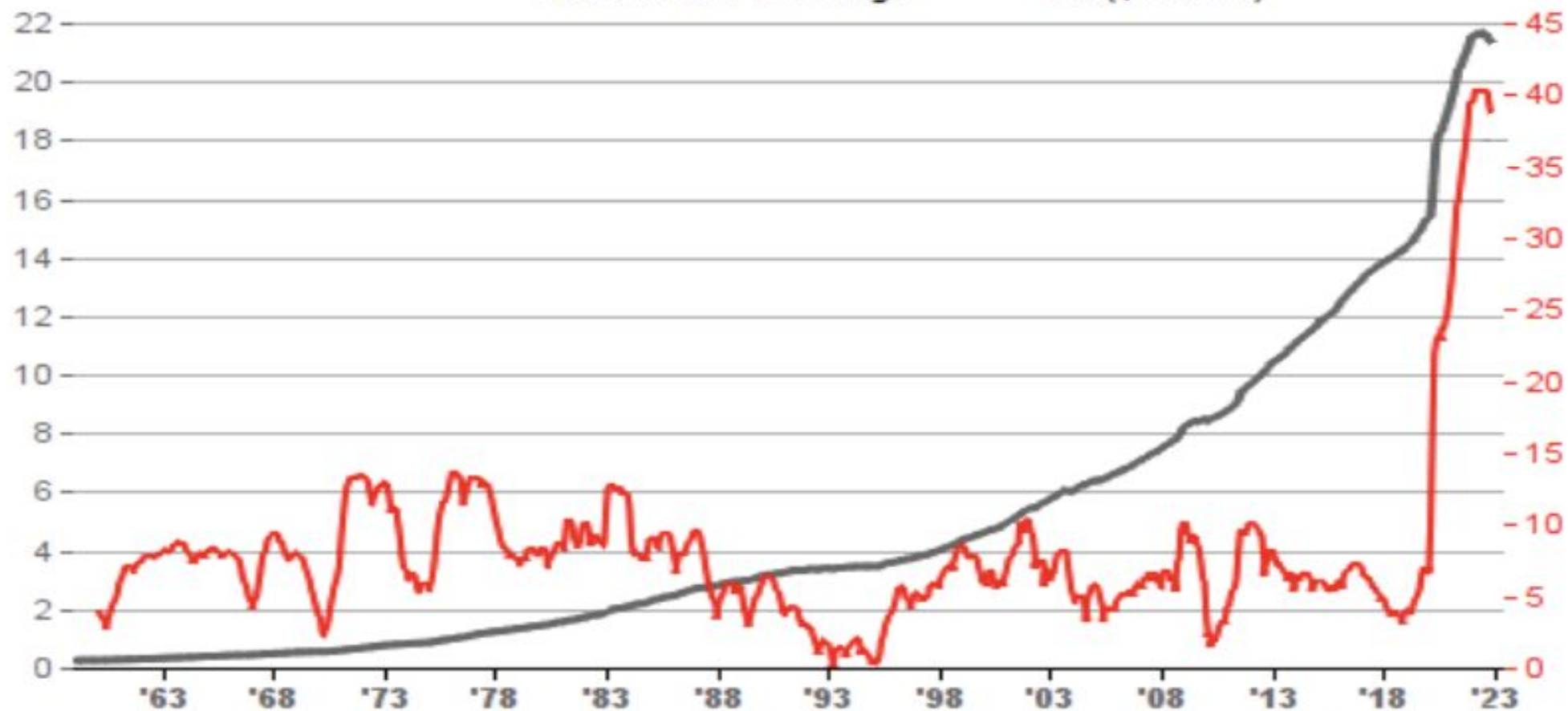


**GİRİŞİMLER**

## M2 Money Supply

Mthly Avg. Seasonally Adj. Jan. 1959 - May 2023 (FRB)

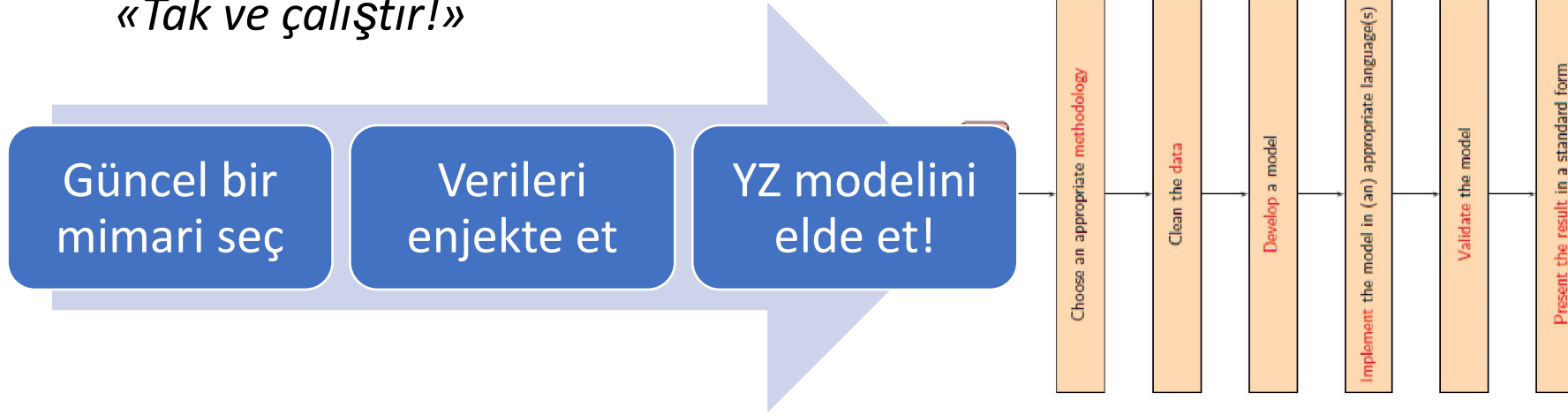
— Year-to-Year % Change    — M2 (\$Trillions)

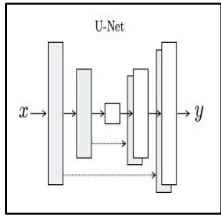
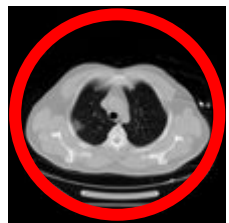




# Fırsatlar (kolay)

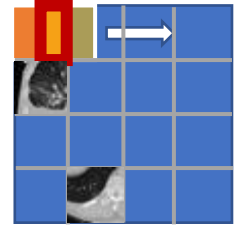
*Derin öğrenme çok kolay bir şeymiş gibi görülebilir:  
«Tak ve çalıştır!»*



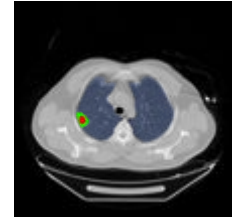


Image

Annotation & feature extraction



Modelling



Prediction



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Home > Health Care > GE Healthcare > GE Healthcare & Curea sign first strategic collaboration in Turkey to accelerate...

# GE Healthcare & Curea sign first strategic collaboration in Turkey to accelerate AI-based software development in medical imaging

February 16, 2021

164

## NEWS FROM TÜRKİ

HOME PAGE / NEWS / NEWS FROM TÜRKİYE / Türkiye

FEB 26, 2021

### Türkiye's CUREA Software Develop

The University of Health Sciences Health Te artificial intelligence (AI) in medical imaging... A distinguished group of clinicians, radiolog established CUREA company, has teamed u... The cooperation between CUREA and GE Hı Türkiye. Leveraging GE Healthcare's Edison Health S categorization and severity grading of COVI resonance imaging (CESM).

Dijiport GALERİLER VİDEOLAR YAZARLAR DERGİLERİ

ENDÜSTRİ YATIRIM PROSES ÇÖZÜMLERİ DİJİTAL DÖNÜŞÜM ROBOTLU UYGULU

#### GE Sağlık ve TEKNOFOL İSTANBUL merkezli Curea, Türkiye'de yapay zekâ tabanlı sağlık yazılımı için birlikte çalışıyor.

GE Sağlık ve Curea, tbbi görüntülemeye yapay zekâ tabanlı yazılım geliştirme sürecini hızlandırmak için ilk stratejik iş birliğine imza attı

ENDÜSTRİ GÜNCEL 16.02.2021, 12:05 16.02.2021, 11:10 Melike Kaya Bayram 527



HSE INDUSTRIAL PPE FIRE SAFETY EVENTS TRAINING HSE F



YOU ARE HERE: HOME INDUSTRIAL GE HEALTHCARE, CUREA PARTNER TO ACCELE

## GE Healthcare, Curea partner

Gulsah Yildirim, Yasar Alper Ozkaya, Hakki M. Karakas. Development of an Artificial Intelligence Method to Detect COVID-19 Pneumonia in CT Images: A Multiplanar and CNN Based Approach. European Congress of Radiology, ECR 2021 RPS-105



### GE Healthcare and Istanbul's CUREA to accelerate AI-based health software development in Turkey

Using GE Healthcare's Edison Health Services, CUREA's tea will first work on AI-based applications focused on COVID- and breast cancer.

By Ahmed El Sherif | February 17, 2021 | 10:39 AM



# *Tuzaklar (fakat...)*

- Sistematik olarak yanlış açıklamalar
  - → Sistematik olarak yanlış çıktılar
- Tutarsız açıklamalar
  - → Sınırlı performans
- Tüm çeşitliliğin kapsanmaması
  - → Gerçek dünyada başarısızlık
- Gürültüye dayanıksızlık
  - → Tekrarlanan çalışmalarda farklı çıktılar
- → **Gerçek dünyaya uyumsuzluk** → →

IT'S

NO

USE



# What Next: TBD

JAN 28, 2022 • 6:00 AM

**The Downfall of One of the World's Biggest Brains**

IBM's Watson was supposed to transform health care. Last week, it was sold off for scrap.

tria Chimishkyan

## *What Ever Happened to IBM's Watson?*

IBM's artificial intelligence was supposed to transform industries and generate riches for the company. Neither has panned out.

Jun 9, 2020, 09:20am EDT | 927 views

## Three Insights From Google's 'Failed' Field Test To Use AI For Medical Diagnosis



David Talby Forbes Councils Member

Forbes Technology Council

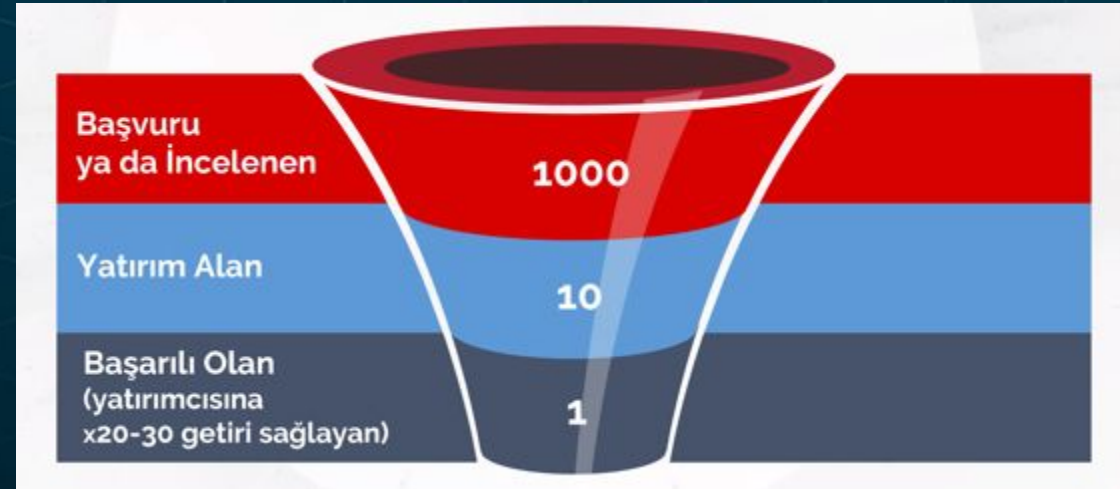
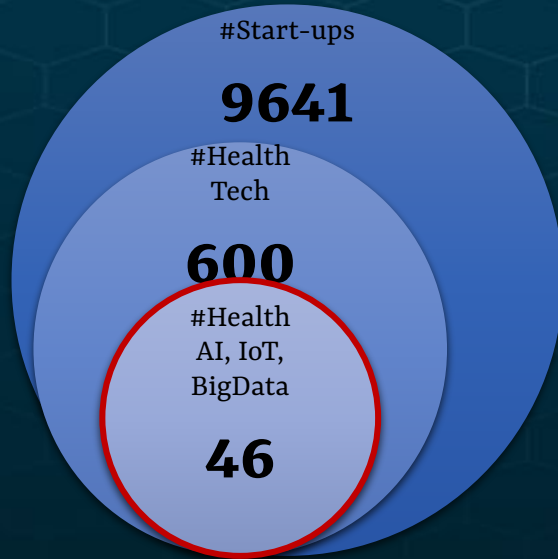
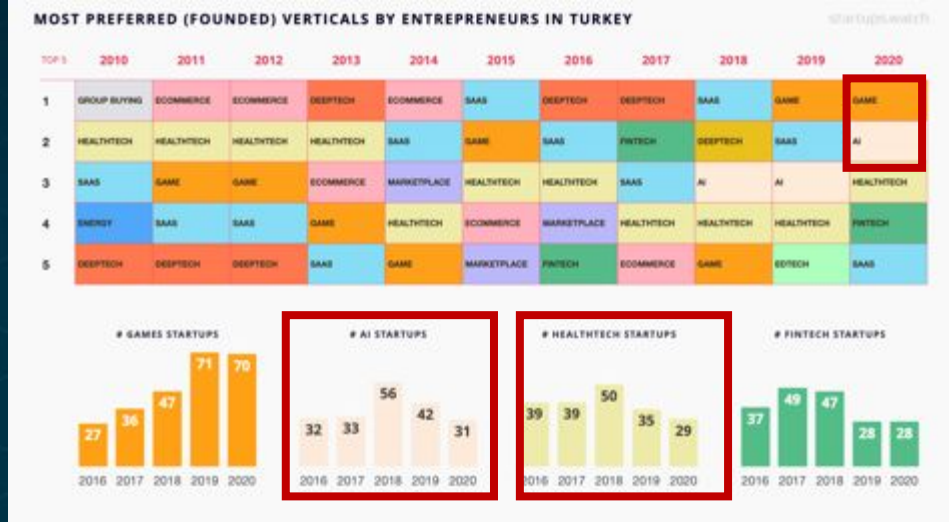
COUNCIL POST | Membership (fee-based)

Innovation

*PhD, MBA, CTO at Pacific AI. Making AI, big data & data science solve real-world problems in healthcare, life science and related fields.*

# Giriřimcilik









# ÖRNEKLER

# Speakers



**Prof.  
Hakkı Muammer Karakaş,  
MD, MBA**

## ***Health Sciences University-TR.***

Studied medicine, radiology and neurology at Hacettepe, Cukurova, MoH, and Bonn universities; MBA at Istanbul Technical University. Interventional radiologist and translational cognitive neuroscientist; director of public medical imaging services of Istanbul; responsible for the realization of more than 0.5% of the world's radiological output. Led creation of the national telemedicine system. Chairs Medical Sector Branch of Turkish Society of Artificial Intelligence and Technology (member of AAI); works on the creation of a national ecosystem that will take a global role in the AI-based digital transformation of healthcare.



**Assoc. Prof.  
Deniz Can Aliş,  
MD**

## ***Acıbadem Mehmet Ali Aydınlar University and Hevi AI-TR***

MD and radiology residency at Istanbul University (Cerrahpasa). Engaged in high-end cardiovascular radiology applications such as cardiac MRI and coronary CT; primary focus in the Acıbadem Healthcare Group is to contribute to the group's highly developed healthcare facilities with innovative cardiovascular imaging and AI solutions. He is also the co-founder and CEO of Hevi AI that develops deep learning-based software solutions for medical imaging.



**Eng.  
Mert Burcak Çöteli,  
PhD**

## ***MantiScope-TR***

B.Sc. and M.Sc. in electrical and electronics engineering and the Ph.D. in information systems from the Middle East Technical University- Ankara/TR; industry experience of 13 years in defense and medical sectors; founded of MantiScope which creates medical technologies on digital hematology and pathology; researches interests on image-based artificial intelligence, microphone array signal processing and acoustic scene analysis.



**Eng.  
Recai Serdar Gemici,  
BSc**

## ***Albert Health-TR***

B.Sc. in industrial engineering from Bogazici University-Istanbul/TR; several years of experience in pharmaceuticals sector and in strategy and business development at Siemens; founded Albert Health who implements NLP and medical voice recognition technologies. Albert Health has successfully collaborated with multinational pharma companies to reach hundreds of thousands patients by now.

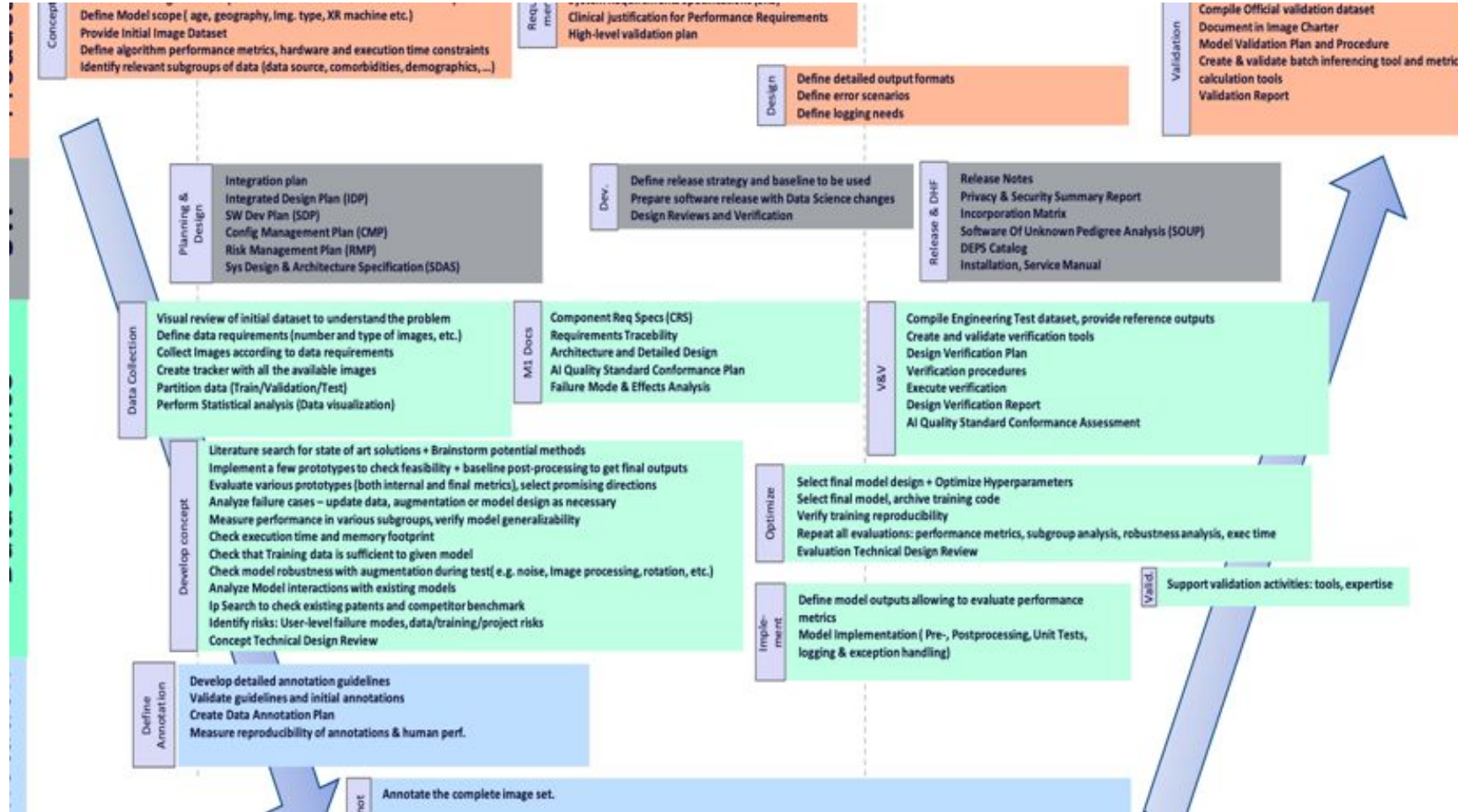


**ÜRÜN**



**Başarılı bir ürün araştırma ya da  
mühendislikle değil (fakat) uygulama  
(tatbikat) ile ilgilidir!**

# Ürünleşme sürecine üst düzey bakış



**Başarılı inovasyon, uygulama ile değil  
(fakat) ticarileştirilebilirlik ve  
ölçeklenebilirlik ile ilgilidir.**

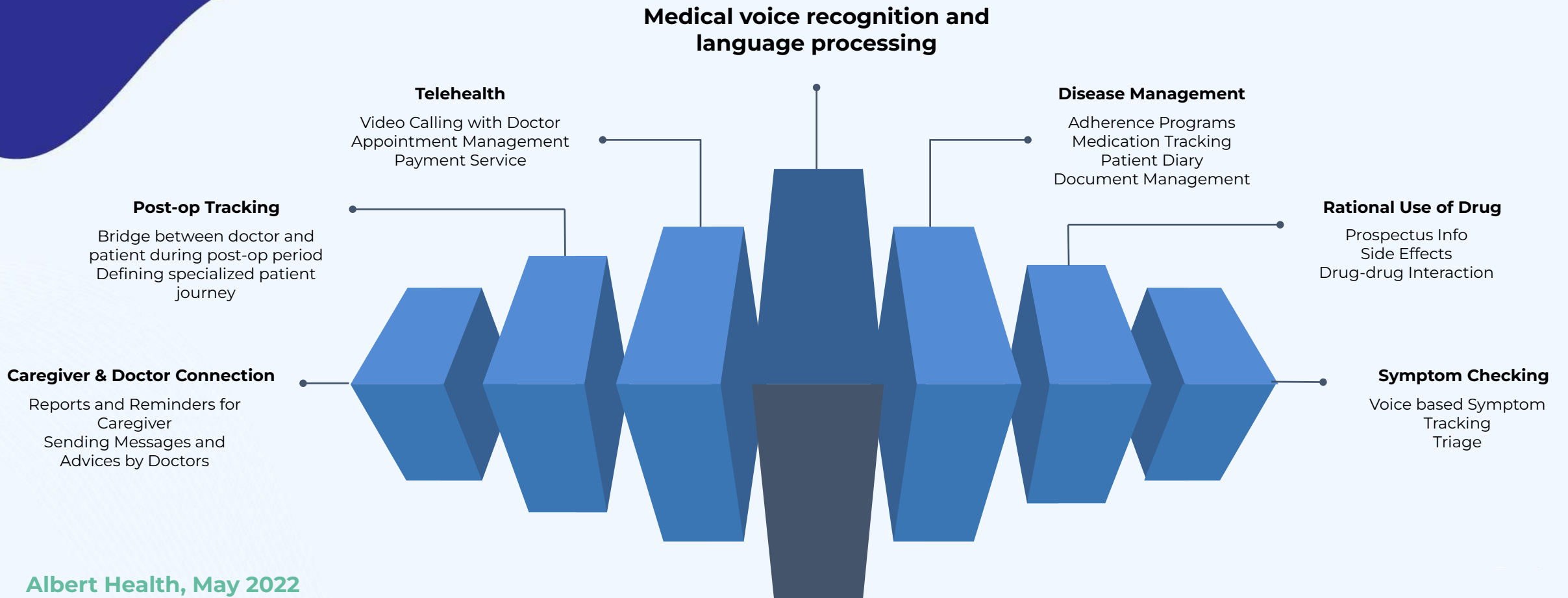


# Albert Health

AI-driven Voice-based Digital Health Platform



# AI-driven, Voice-based Digital Health Platform





DEEP LEARNING. SIMPLE.

# GLEAMER

MEDICAL GRADE AI FOR RADIOLOGY

## ChestView



### Pathologies



Pneumothorax  
Pleural Effusion  
Nodule  
Mediastinal Mass  
Alveolar Syndrom

### Acquisition



AP & PA  
Bedside acquisitions

### Population



Adults &  
Children

**POSITIVE**

2 / 2  
ANALYZED / RECEIVED

DO YOU RECEIVE ALL THE IMAGES?  
Please note that if Gleamer did not receive all the images in the study then the result may be inaccurate.

ChestView



**PNEUMOTHORAX**

YES

**PLEURAL EFFUSION**

YES

ALVEOLAR SYNDROME  
NODULE  
MEDIASTINAL MASS

NO



X-Rays  
Performed



PACS



Existing  
Viewer

GLEAMER  
Gateway

GLEAMER  
AI



# hChestXR

## AI-Based Chest X-Ray Reading

- Rapid and accurate chest X-ray interpretation using AI.
- Identifies 10 most common pathologies, significantly reducing radiologists' workload.
- Seamless PACS integration ensures efficient access and updates. Set for release in Q1 2024.





## A.I. Powered LVO Detection

### Viz Workflow

- ✓ Automated Detection of Suspected LVOs
- ✓ Stroke Triage of Suspected LVOs
- ✓ Automated CTP Perfusion Analysis
- ✓ Workflow Optimization
- ✓ Mobile DICOM Image Viewer
- ✓ Secure, HIPAA-Compliant Messaging



### Viz LVO

#### A.I. Powered LVO Detection

Viz LVO uses artificial intelligence and deep learning to automatically identify suspected LVOs on CTA imaging in your network and to alert your on-call stroke physician within minutes.

Real-Time Specialist Notifications

A.I. Powered LVO Detection

Automated Maximum Intensity Projections (MIP)

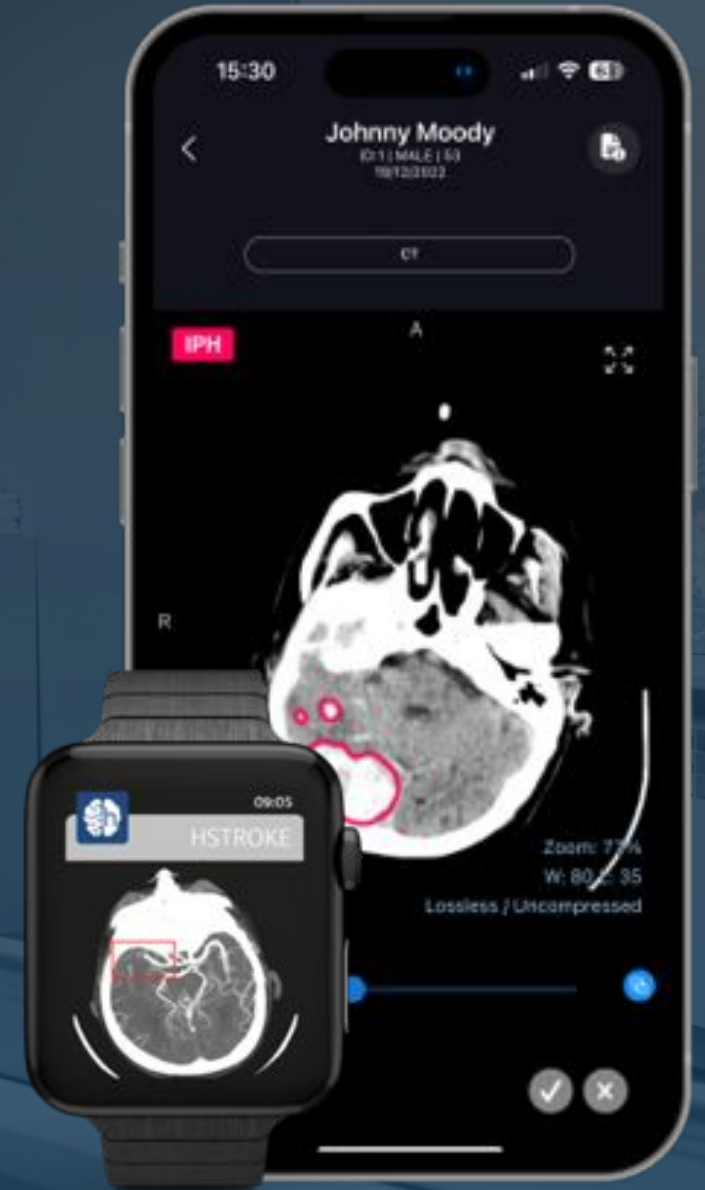
# A Complete Solution from Automated Detection to Timely Treatment

Viz.ai uses artificial intelligence to synchronize stroke care, reducing systemic delays that stand between patients and life-saving treatments. It's an innovative way of using technology to transform stroke workflow and patient care.

# hStroke

## AI-based Smart Emergency Triage

- Employs deep learning for rapid and accurate neuroimaging diagnostics.
- Identifies brain hemorrhages, vessel occlusion, and ischemic stroke.
- Seamless PACS integration for efficient collaboration and result review.



# hStroke

AI-Powered Triageing For  
the Most Critical  
Medical Emergency



# hProstate

AI-Powered  
MRI Reading for the Most  
Common Cancer In Men



# hChestXR

AI-Powered Reading For  
the Most Frequently  
Used Diagnostic  
Modality



# hBreastMMG

AI-Powered  
Mammography Reading  
for the Most Common  
Cancer In Women





mantisc<sup>o</sup>pe

The logo for 'mantisc<sup>o</sup>pe' features a stylized mantis insect. The mantis's body is a large red circle, and its raptorial front legs are two purple spheres with white highlights, positioned above the 'o'. A smaller red circle is located below the 'o'. The word 'mantisc' is in white lowercase letters, and 'ope' is also in white lowercase letters. The background is a blue and purple gradient with a faint, glowing pattern of particles.



# Our vision for the future of diagnostics



Scalable and cost-effective diagnostics service (For primary healthcare organizations)



Decrease the total diagnosis time



Early diagnosis to decrease the treatment costs

# The 5 Levels of Automation In Medical Procedures



Human  
Only



Shadow  
Mode



A.I.  
Assistance



Partial  
Automation



Full  
Automation



## • YZ'nin temel fonksiyonu:

İnsan gözüyle görülebilir ve bazı durumlarda yalnızca yazılım tarafından görülebilen durumlarda aşırı bilgi yüklemesini önlemek için

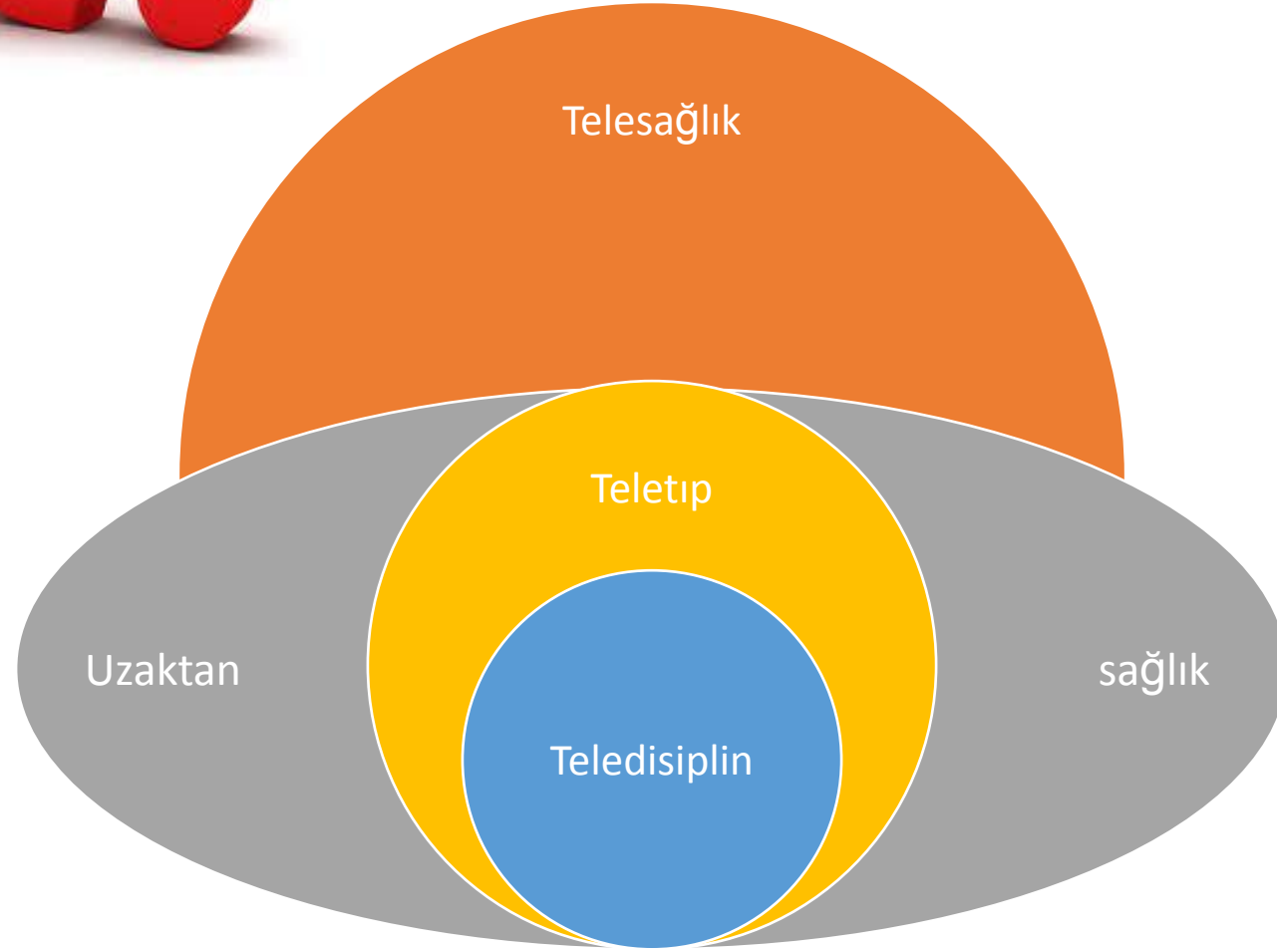
**karar desteği**

## • YZ önce şunları başarmalı:

Farklılıklarla başa çıkabilmeli

Ürünler anlamlı bir bütün halinde birleştirilmeli

- Teşhis ve ölçme gibi basit görevleri başarmalı



# Tanım(lar)

- Uzaktan sađlık
  - Herhangi bir nedenle yerel bir sađlık tesisine gidemeyen bir hastanın aynı fiziki ortamda bulunmayan sađlık alıřanlarınca tanı ve tedavi işlemleri
  - Mektupla diyet danışmanlığı ↔ uzayda robotik cerrahi
- Telesađlık
  - Uzaktan sađlık hizmetinde bilgi ve iletişim teknolojilerinin kullanılması
  - Kapsamı **linik hizmetler, hastaların ve alıřanların sađlıkla ilgili eđitimi, halk sađlığı ve sađlık yönetiminin desteklenmesi** olarak güncellenmiştir
- Teletıp
  - Hastalara bilgi ve iletişim teknolojileri kullanarak uzaktan tanı, tedavi ve monitorizasyon hizmeti sunmak (DSÖ)



JH Capacity Command Center

JR  
management medical director works  
center's administrator to ensure the  
command center as related to patient  
d implement strategies that improve  
: supports day-to-day activities of the  
ding refining operating mechanisms,  
flow and resolving service assignment

#### HOPKINS ACCESS LINE (HAL)

- **Role:** The Hopkins Access Line connects outside providers with providers at The Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center, including facilitating patient transfers.
- **Peak Staffing:** 9



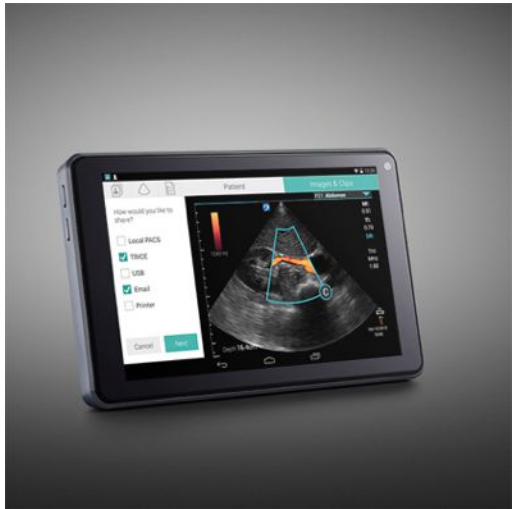
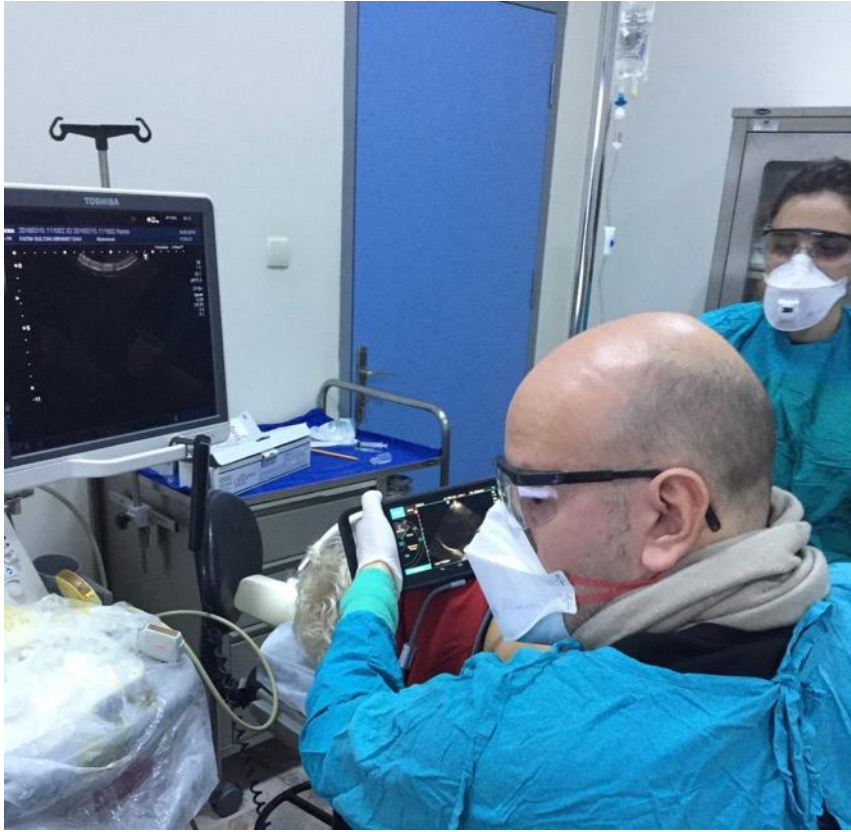
- Teleacil
- Telenütrisyon
- Telehemşirelik
- **Telefarmasi**
- Teledişçilik
- Teleodyoloji
- Telenöroloji
- Telenörocerrahi
- Telepsikoloji
- **Telerehabilitasyon**
- Teletravma bakımı
- **Telekardiyoloji**
- Telepsikiyatri
- **Teleradyoloji**
- **Telepatoloji**
- Teledermatoloji
- Teleoftalmoloji
- Telecerrahi
- Telekürtaj



# Sayılarla Ulusal Teletıp Sistemi

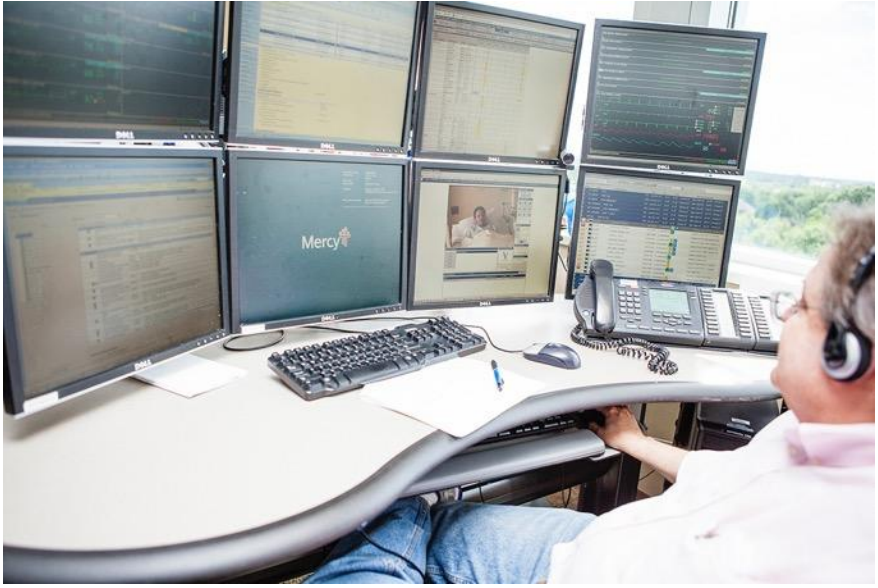
- **2014+** kamu ve özel hastane birbirlerine baęlı
- **342+ M** radyolojik inceleme
- **169+ M** radyoloji raporu

- **Yılda 16+ M hasta ve 129+ K** hekim tarafından erişim
- **Toplamda 134+M** yerleşik tarafından erişim





# Sayısal hastaneler





# Pandemi dönemi sayıları

- ABD'de uzaktan birinci basamak poliklinik sayısı:  
1.4 M (2018 Q2) → 35 M (2020 Q2)
- Telesağlık pazarı 2021'de %40 büyümüştür.
- İngiltere'de aile hekimliğinde uzaktan poliklinik kullanımı %20 → %80'e çıktı.
  - Hasta ve çalışan memnuniyeti ~%70

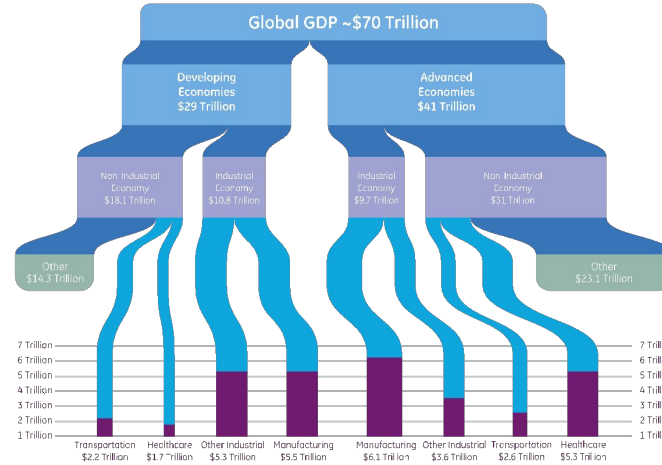
Kaynakların kít olmadıđı kořullarda bile sanal hizmet sunumuna ihtiyaç var.

## Hastaların hastaneye mümkün olduđunca getirilmemesi.

Bu durum, sık ama rutin bir hizmete ihtiyaç duyan, fakat sađlık tesislerine eriřimi zor **yařlılar** için özellikle önem arz ediyor.



# Fırsat ne kadar büyük?



1.5% Reduction  
in System

\$ 103B

Küresel sağlık harcamaları: \$ 7T

Verimsizlik: %10 (ila %40)% = \$ 700 B

Klinik/Operasyonel verimsizlik : %59 = \$ 413 B

Beklenen (Beklediğim) iyileşme: %25 = \$ 26 B

**Toplam telesağlık pazarı (2020): \$ 34B**

# Uzaktan sađlık sistemlerinin vaatleri

## Hastalar



**Hizmete eriřimin  
sađlanması**

*Gerçek hasta  
merkezlilik*

## Çalıřanlar



**Çalıřanların  
güçlendirilmesi**

*Çalıřanların zamanını  
tüketen ve hasta ile  
arasındaki bađı  
koparan süreçlerin  
azaltılması*

## Sistem

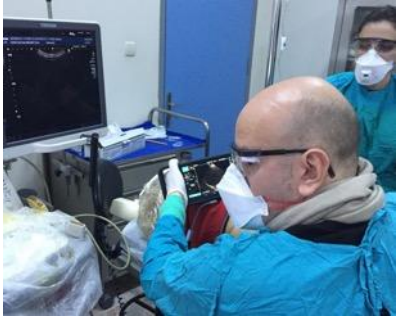


**Verimlilik  
artışı**

*Milyarlarca lira  
tasarruf*



**‘Uzaktan Saęlık’ hastanelerin ve saęlık  
alıřanlarının yerini almayacak.  
Aksine, uzaktan saęlığın gcnden  
yararlanan hastaneler ve saęlık  
alıřanları, ondan yararlanmayanların  
yerini alabilecek!**



# Gelecek

- Teletıp, bulaşıcı hastalıkların tedavisinde çok daha yoğun kullanılacak
  - Salgın kontrolü
- Teletıp, ameliyatlara ve acile yapılan fiziksel başvuruların yerini almayacak
- Teletıbbın kişisel olmadığı düşüncesi azalacak
  - Teletıp – korkulanın aksine- hastalar ve uygulayıcılar arasındaki ilişkileri güçlendirmek için kullanılacak.
- Bakım sürekliliğinde aksamaların önüne geçilecek
  - Sürekliliğin zarar görmemesi için hastaların aynı sağlık profesyonelleriyle bağlantıda olması sağlanacak
- Hastaların daha düzenli kontrollere gitmeye teşvikiyle ciddi sorunların daha erken teşhis edilmesi ve böylece potansiyel olarak birçok hayat kurtarılmasını sağlanacak
  - Hastalar kendilerini hasta hissettiklerinde veya bir şeylerden şüphelendiklerinde hekime kolaylıkla ulaşabilecekler

# Çok kanallı hizmet sunumu





## Will Computers Replace Radiologists?

Medscape Radiology, Saurabh Jha, MBBS, MRCS, May 12, 2016

## ROBOT RADIOLOGISTS WILL SOON ANALYZE YOUR X-RAYS

WIRED,  
Klint Finley,,  
October 27,  
2015

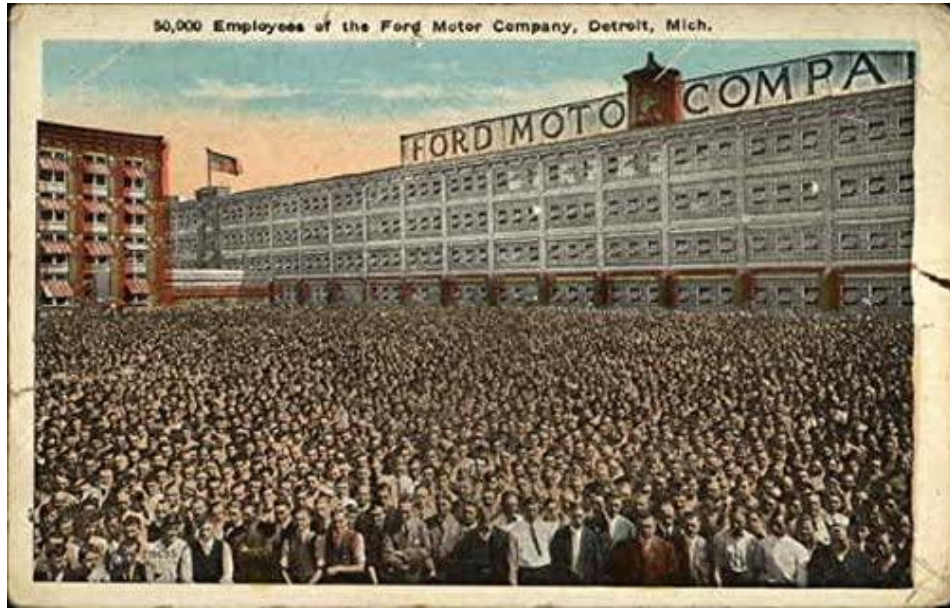
## Artificial Intelligence: Promise or Pitfall for Radiology?

Itnonline, Greg Freiherr, February 17, 2017

## In Radiology, Man Versus Machine

Diagnostic Imaging,  
Whitney L. Jackson,  
February 11, 2016





-Herşeyin bir mevsimi ve gökyüzünün altındaki  
herşeyin bir zamanı vardır.

.

-Ekmenin bir zamanı ve ekileni toplamanın bir zamanı.  
-Doğmanın bir zamanı ve ölmenin bir zamanı.