

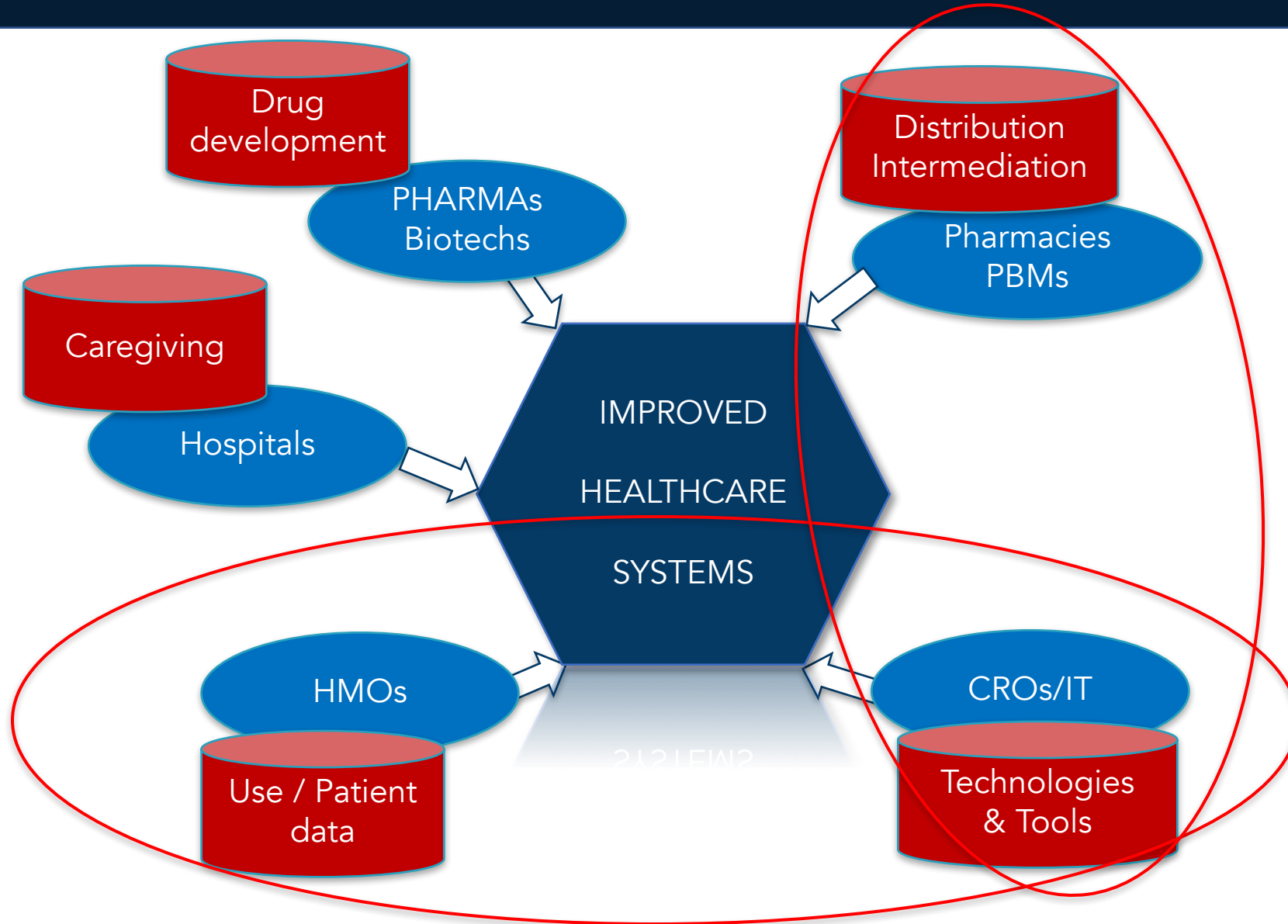
Big data analytics and AI for precision medicine.

BIG DATA FOR PRECISION MEDICINE SYMPOSIUM
NCSR DEMOKRITOS , Athens 11 July 2018

Dr. Andreas Persidis

CEO, Biovista Inc. & President, Hellenic BioCluster

Changing landscape of healthcare



Data is the new oil



Where is the value? data or model?



MIT Technology Review

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UNSPASHI TIMON STUDLER

Business Impact

Facebook may stop the data leaks, but it's too late: Cambridge Analytica's models live on

Long after the training data has been deleted, the models can

Advertisement

Is artificial intelligence out-pacing human capability?
Not if the next generation of leaders has anything to say about it.

Download the article

EXECUTIVE MASTER IN Science and Technology Leadership

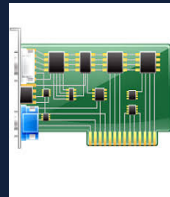
flags about the amount of data being collected because of Kogan's academic credentials, and now claims that he deceived people at Facebook about his intents.

However, though Cambridge Analytica built profiles of 30 million US voters, its central goal wasn't to craft ads targeted at *those* people. Rather, the models it built from that much smaller cohort of 270,000 quiz-takers would allow an advertiser to create proxy profiles of much larger collections of *similar* people on Facebook. This capability is what enabled the company to craft ads precisely targeted at small groups of voters based on personality traits. And it continues to exist even after the original data is deleted.

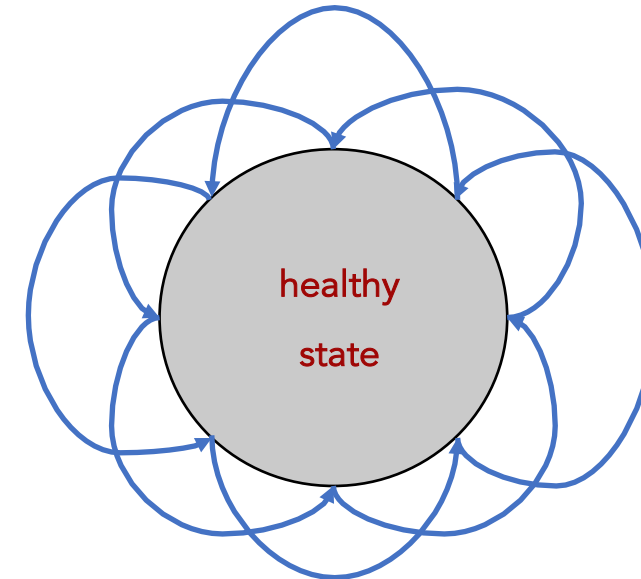
The method

Kogan's technique—emulating an **innovation** by psychology researchers at the Cambridge Psychometrics Centre, particularly Michal Kosinski and David Stillwell—was **to use** a scientifically validated psychology quiz

Healthcare: a special kind of problem



health is not like
engineering or gaming



multiple interdependencies & feedback/forward loops

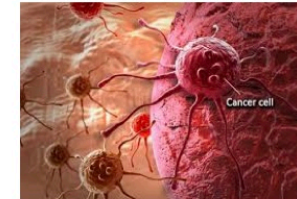
Artificial Intelligence - present day limits



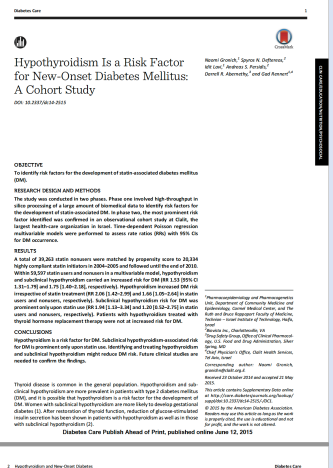
University of Pittsburgh Medical Center

Predict **30-day all cause readmissions** across pediatric patients **at discharge**
79% accuracy

Computer Assisted Diagnosis (CAD) **spotted 52% of the cancers as much as a year before** the women were officially diagnosed



cure for cancer

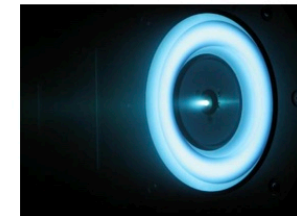


Identified hypothyroidism as an unknown risk factor for statin patients developing diabetes.

Can't do



Comorbidities



ion drive

Financial Trading - Marketing Personalization - Fraud Detection -
Engineering optimizations - Recommendations - Search - Self-driving Cars

Can do

Problems with ML/DL/GAN



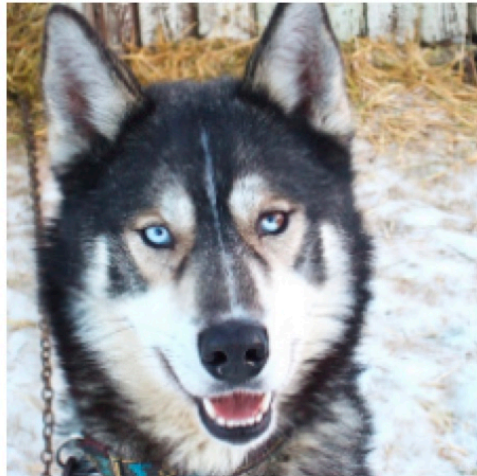
Bias

Black box – trust

Overfitting - Context?

Artificial General Intelligence

The problem of bias



Husky classified as wolf



Explanation for classification



Tesla drives into left lane barrier



Shotgun shell: Google's AI thinks this turtle is a rifle

<https://www.theguardian.com/technology/2017/nov/03/googles-ai-turtle-rifle-mit-research-artificial-intelligence>

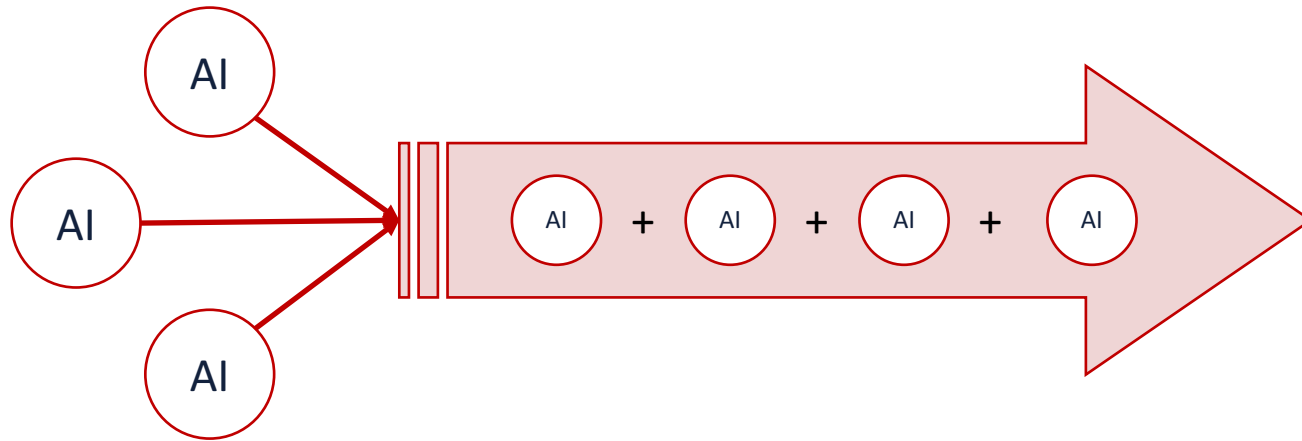
"Why Should I Trust You?" Explaining the Predictions of Any Classifier
MT Ribeiro, S Singh, C Guestrin <https://arxiv.org/pdf/1602.04938>

Undesirable correlations in the training data are hard to detect yet can influence the performance of many ML/DL systems.

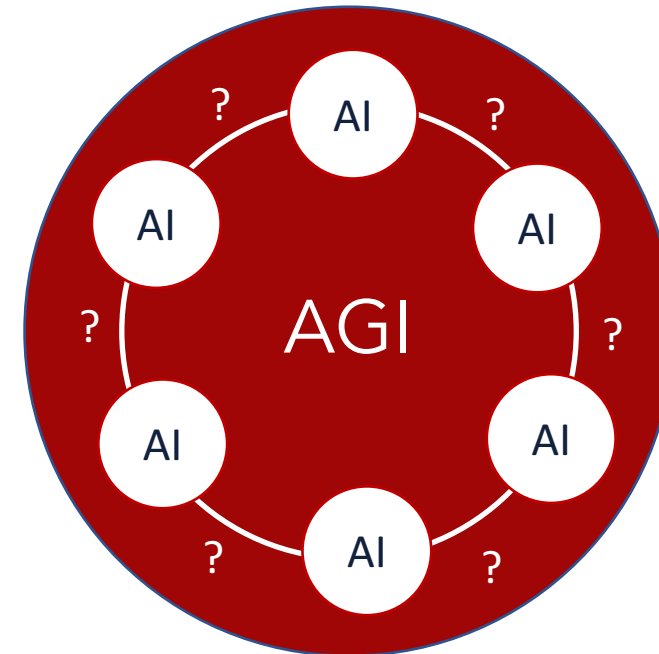
The challenge of Artificial *General* Intelligence (AGI)

Now

Multiple, individual single-task AIs



The future?



... but how are the individual AIs *combined* to create the AGI?
Are they simply "added"? Are they executed in some "sequence"?

Share my data?... no thank you.



Pharma is setting 2 ML system objectives

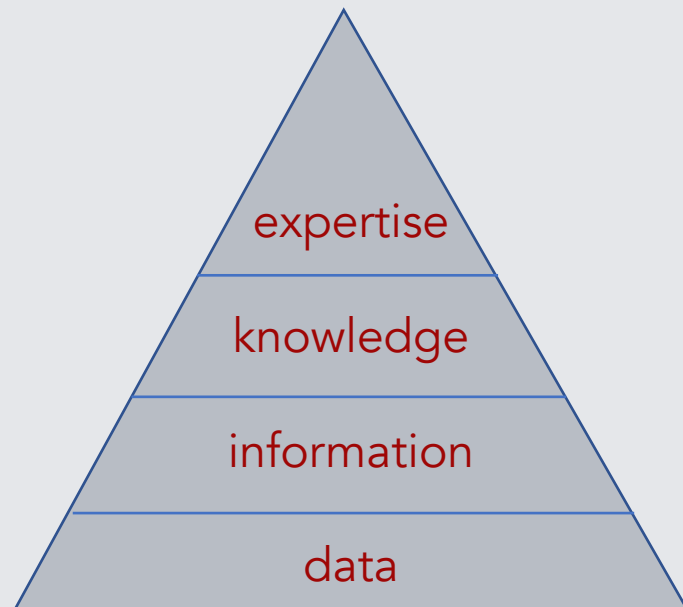


Federated

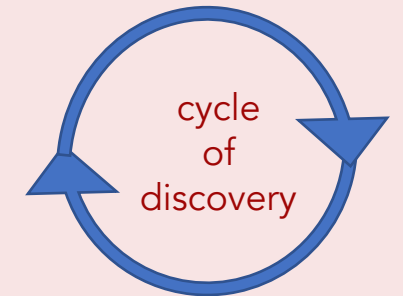
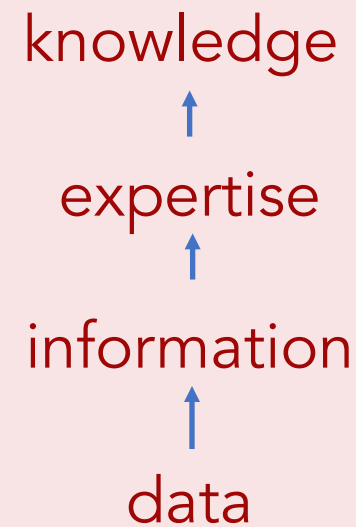
Privacy Preserving

Cycle of Discovery

Value-based view of "expertise"



Process-based view of "expertise"



Hellenic Biocluster



to innovate
to collaborate
to deliver



**YOUR
GATEWAY
TO THE
GREEK LIFE
SCIENCES
AND
HEALTHCARE
COMMUNITY**

Who we are

- The **first biosciences cluster** in Greece.
- Established in 2006, by an initial group of 8 companies and the PRAXI Network, the technology transfer arm of the Foundation for Research & Technology- Hellas (FORTH).

Industry-led structure

- Greek knowledge-intensive biosciences companies
- Strong R&D focus.
- International business outlook

Some Statistics

Biotech and
Pharma

11

Diagnostics

7

Medtech

3

Specialist
Services

14

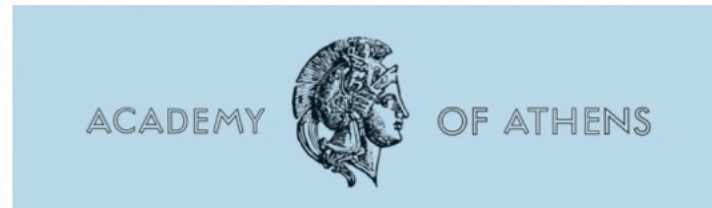
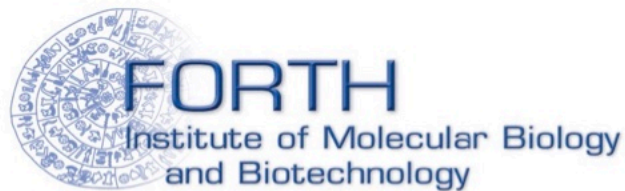
Academic
Research
organisations

9

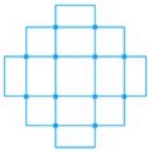
Top Research centers as Associate members



Top Bioscience research centers with activities in basic & translational research.
Support HBio companies through the development of creative research & development partnerships,
and the provision of access to state-of-the art facilities and specialized services.



External Relations



Synergies
Connecting Changemakers



Policy making
for new
Programmes

HBIO Flagship Projects



- International interest
- Realistic for Greece
- Real interest of stakeholders
- Contribute to positioning of Greek biopharma industry

Thank you

andreasp@biovista.com