LEARNING MACHINES AS ARTIFICIAL THERAPISTS

Magnus Boman

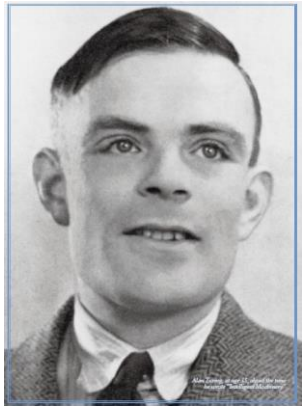
Learning Machines (1948)

Intelligent Machinery, A Heretical Theory*

A. M. TURING

'You cannot make a machine to think for you.' This is a commonplace that is usually accepted without question. It will be the purpose of this paper to question it.

Learning Machines (1948)



If the machine were able in some way to 'learn by experience' it would be much more impressive. If this were the case there seems to be no real reason why one should not start from a comparatively simple machine, and, by subjecting it to a suitable range of 'experience' transform it into one which was much more elaborate, and was able to deal with a far greater range of contingencies. This process could propably be hastened by a suitable selection of the experiences to which it was subjected. This might be called 'education'.

TREND OVERVIEW (2015)

TOP TECHNOLOGICAL AREAS TO OBSERVE

eit Digital

FORCES OF DIGITAL TRANSFORMATION

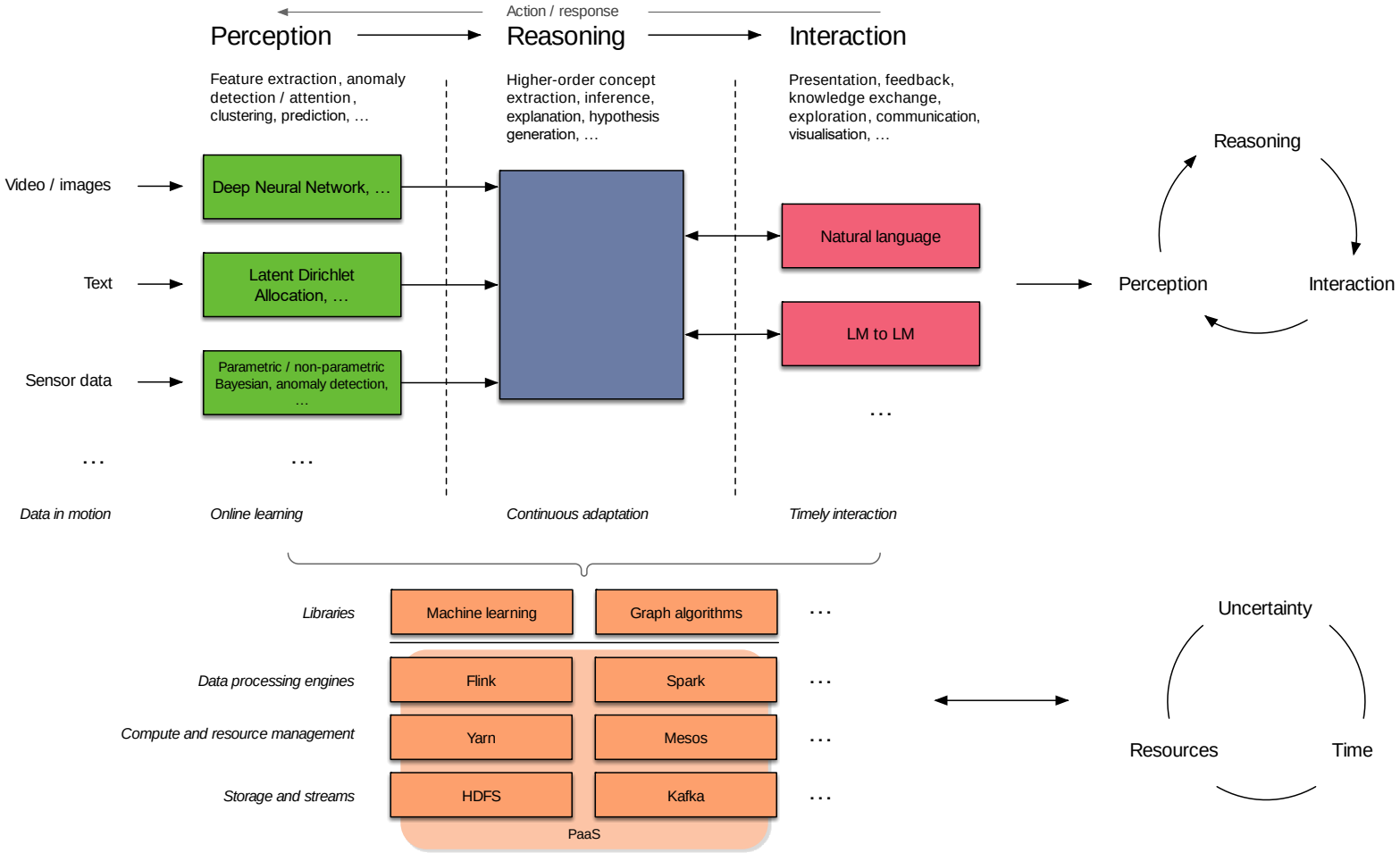
Whatever can be digitized will be. And whatever can't be digitized will have an increasingly complex web of interconnected digital layers. Whether leveraged to fuel growth, cut costs or spur innovation, these core truths lie at the heart of the dramatic changes that are transforming businesses throughout the world.

THE SICS VIEW ON TRENDS
Why the Learning Machines initiative?

Everything is moving towards pervasive intelligence

SWEDISH ICT SICS

Learning Machine system overview



LEARNING MACHINE CHARACTERISTICS

Extensively perceiving
Continuously learning
Purposefully reasoning
Naturally interacting
Curiously exploring

Largely unsupervised learning from secondary data

Changing the world (into a world with LMs), feedback loop (taking into account that it is in the world, and that there are other LMs in the world)

SWEDISH ICT SICS

ARTIFICIAL THERAPISTS

Funding for 2017-2019 from VR
PI Viktor Kaldo, KI Internet Psychiatry
Pioneers of Internet-based CBT
Long history of artificial therapists
Data use secured early 2016
Pilot work at SICS in 2016

PILOT EXAMPLE RESULT

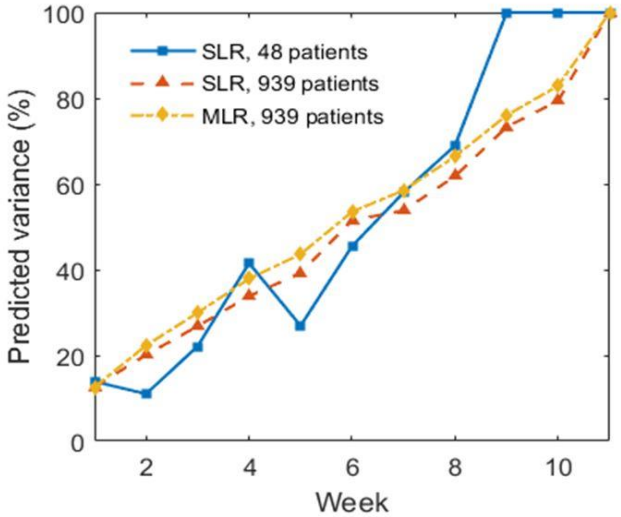
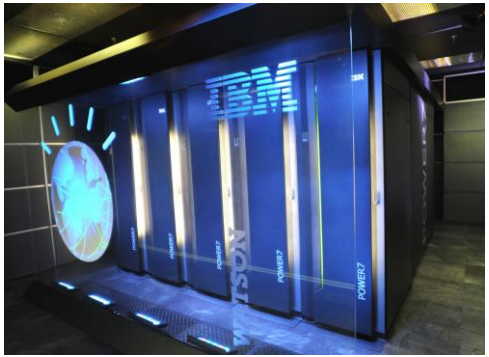
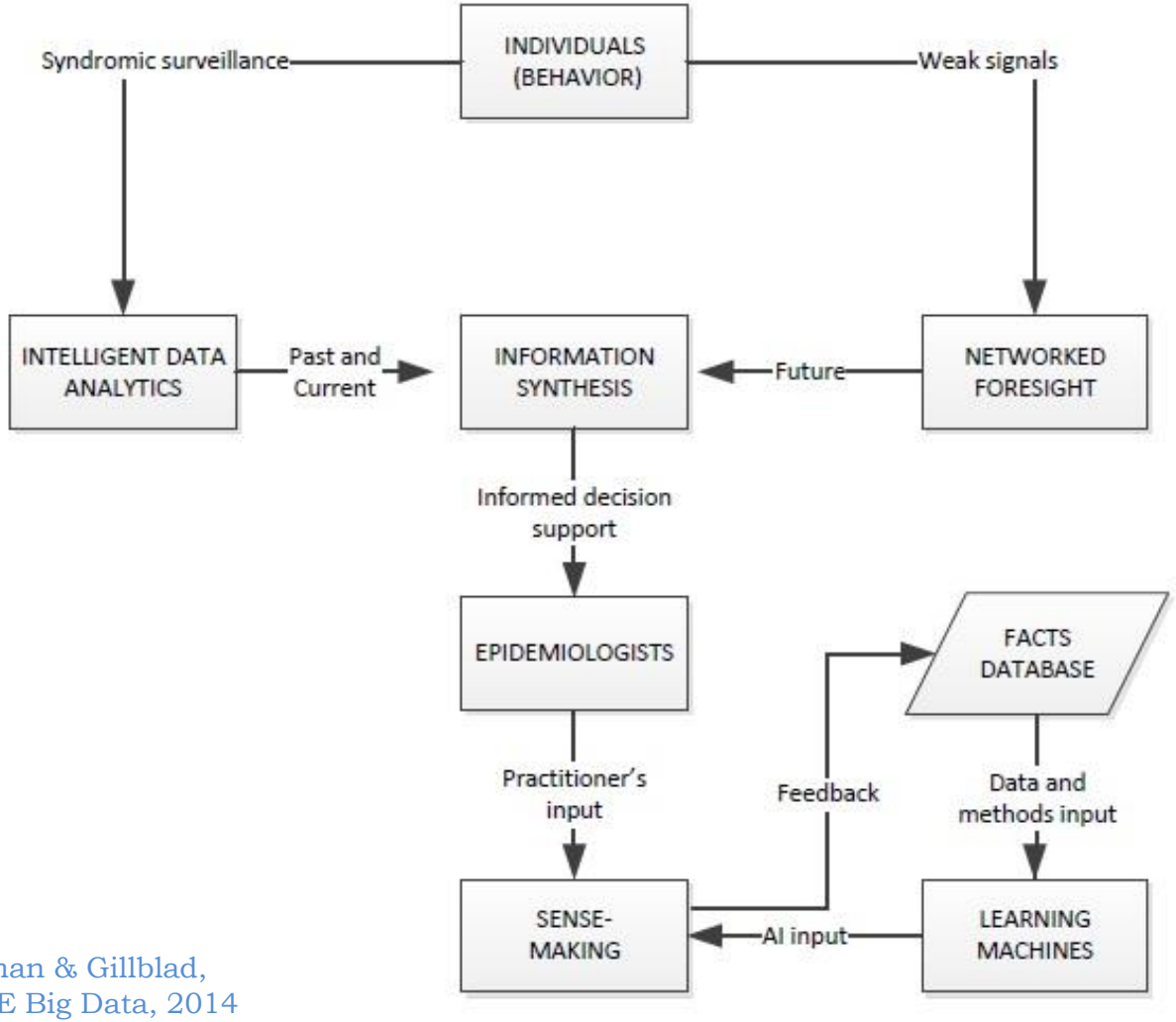


Figure 1. Predicted variance in outcome for the questionnaire MADRS-S. A small number of patients in a simple linear regression (SLR) may result in a model not representative of the population (blue curve) as a whole. Adding more patients (red curve) and increasing the complexity of the model by using a multivariable linear regression (MLR) (yellow curve) decreases the risk of obtaining unexplainable results caused by anomalies in a small group of patients.





Boman & Gillblad,
IEEE Big Data, 2014

ty MCS!

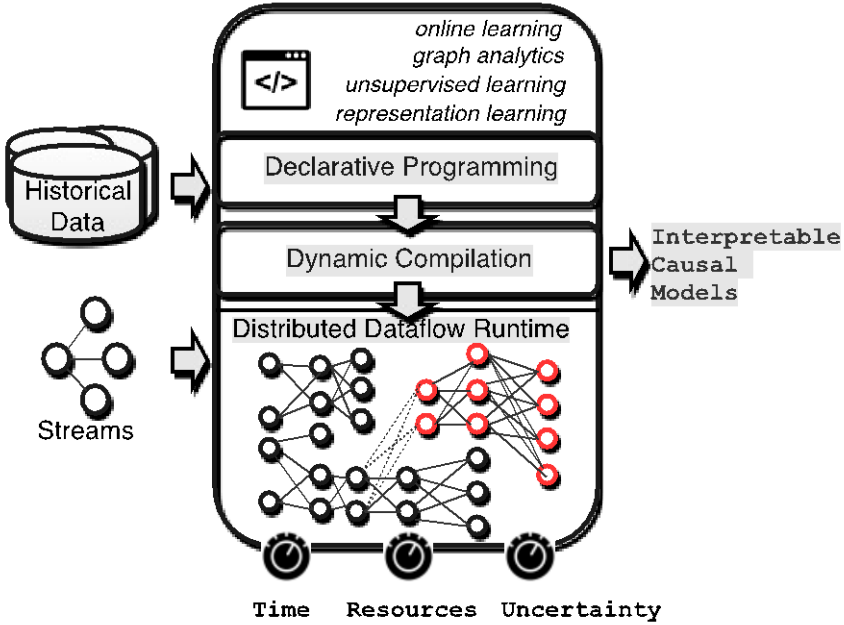
extra

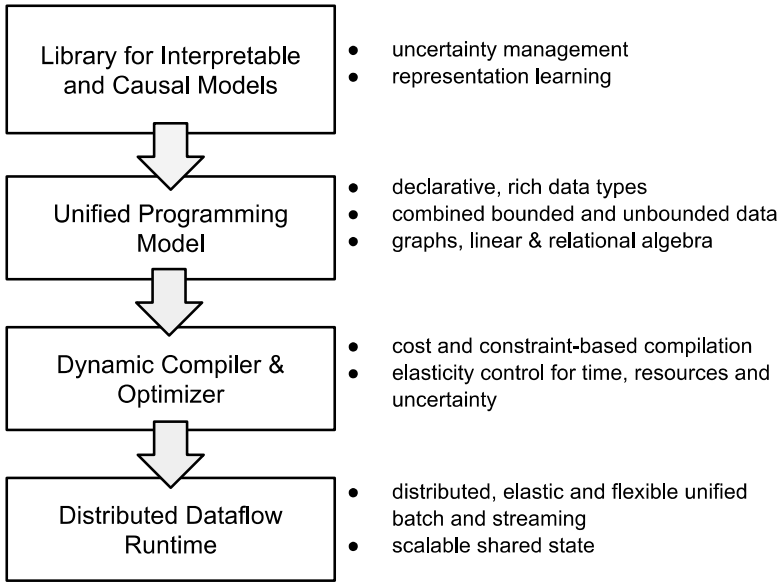
Continuous Deep Analytics

1. Current data intensive systems do not support continuous deep analytics at a massive scale
2. Large-scale Machine Learning systems severely lack scalability and interpretability

Continuous Deep Analytics (**CDA**) systems: a radically new approach for data analytics combined with large-scale machine learning, producing interpretable causal models of the world

A Continuous Deep Analytics System





Societal Scale Deep Analytics