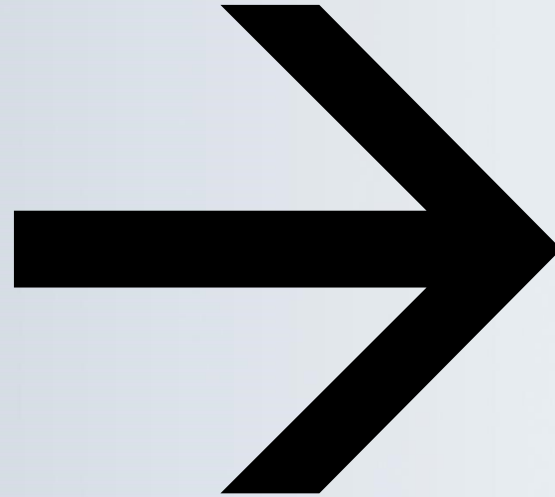


— Hybrid AI, In Projects

Thierry Caminel

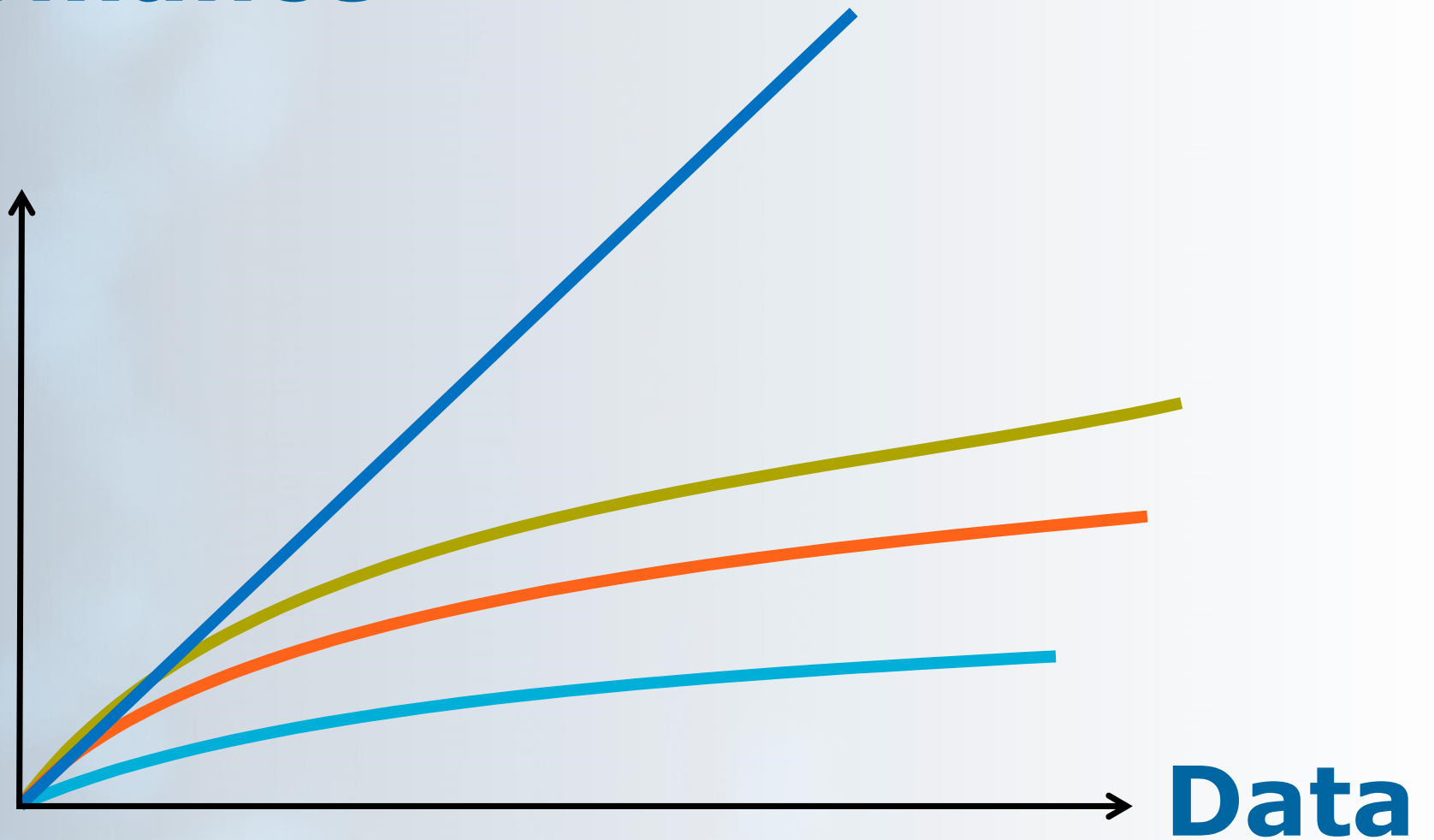
*AI Technology and Innovation Leader,
Distinguished Expert,
Member of the Atos Scientific Community*

A



B

_Performance



The New York Times

June 6, 2018

Computers with common sense

Some experts are hoping to find a smarter path to artificial intelligence

BY STEVE LOHR

For the past five years, the hottest thing in artificial intelligence has been a branch known as deep learning. The grandly named statistical technique, put simply, gives computers a way to learn by processing large amounts of data. Thanks to deep learning, computers can easily identify faces and recognize spoken words, making other forms of humanlike intelligence suddenly seem within reach.

Companies like Google, Facebook and Microsoft have poured money into deep learning. Start-ups pursuing everything from cancer cures to back-office automation trumpet their deep learning expertise. And the technology's percep-



The Kyndi office. The company's software can identify concepts and not just words.

swer, even when that phrase does not appear in a document.

And Kyndi's reading and scoring software is fast. A human analyst, Mr. Welsh said, might take two hours on average to read a lengthy scientific document, and perhaps read 1,000 in a year. Kyndi's technology can read those 1,000 documents in seven hours, he said.

Kyndi serves as a tireless digital assistant, identifying the documents and passages that require human judgment. "The goal is increasing the productivity of the human analysts," Mr. Welsh said.

Kyndi and others are betting that the time is finally right to take on some of the more daunting challenges in A.I. That echoes the trajectory of deep learning, which made little progress for decades before the recent explosion of digital data and ever-faster computers fueled leaps in performance of its so-called neural networks, digital layers loosely analogous to biological neurons. The "deep" refers to many layers.

Cognitive Stages

YOUNG CHILD

Symbols or words represent objects



Exploration, direct sensory input

Connectionist AI
Deep-learning...



ADOLESCENT, ADULT

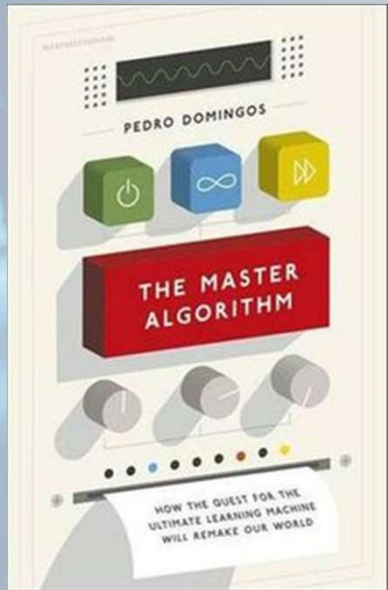
Abstraction and reasoning



Symbols

Symbolic AI
Rule engines...

5 tribes of AI



The Master Algorithm,
Pedro Domingo

1

SYMBOLISTS

From logic, philosophy
Deduction

2

CONNECTIONISTS

From neuroscience
Backpropagation

3

EVOLUTIONARIES

From evolutionary biology
Genetic programming

4

BAYESIANS

From Statistics
Probabilistic inference

5

ANALOGIZERS

From psychology
Kernel machines

Examples Hybrid AI

Hybridation

Use case

Semantic Graphs embedded in Neural Networks

Better fraud detection
Job search

Production Rules created by ML

Understandable decision (credit scoring, troubleshooting,...)

Learning parameters in expert created Bayesian network

Diagnostic, troubleshooting

Neural Networks to create a Semantic Graphs

Better graphs of users, resources, ..

Semantic graph to provide more features in ML models

Better analysis (ex access control)

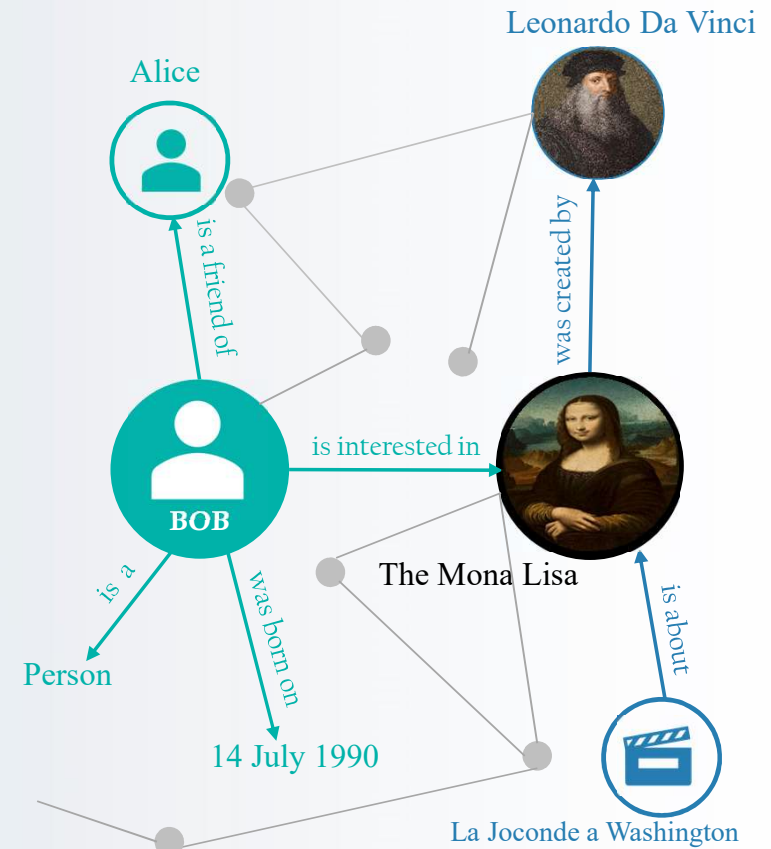
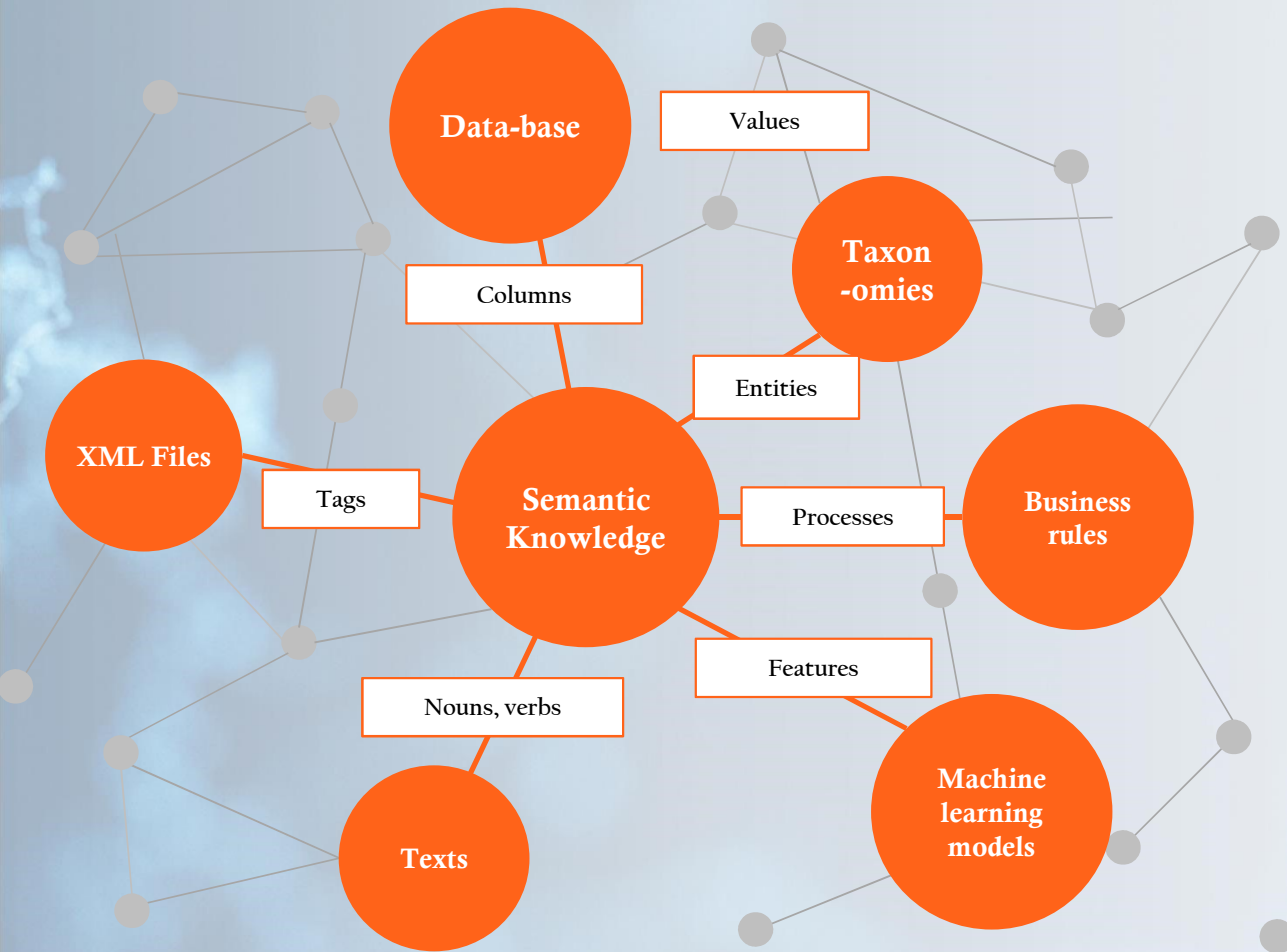
Bayesian reasoning in Neural Networks

More robust decision making

Neural Networks in Multi Agent Systems

Autonomous defense systems

Link together different data silos > Create Knowledge Graphs > Integrated knowledge



Bring AI Magic to the Enterprise



"Your restaurant is booked for 6 pm"



"How to configure the new production line to meet new customer requirements?"

"I will evaluate all constraints and provide a list of possibilities."

Take-aways

1

Create a **global data reference model** to break down **internal silos**

2

Add **formal semantic representations** to existing data to allow **inference and machine processing**

3

Start **building knowledge graphs** for each business domain to **ease integration** of multiple data source, machine learning models and business rules.

Question ?