

It's all about the algorithms!

Data & Analytics



Einat Shimoni



Pini Cohen



Algorithms are disrupting markets



Connected cars



Programmatic Marketing



TV & media



Retail shopping



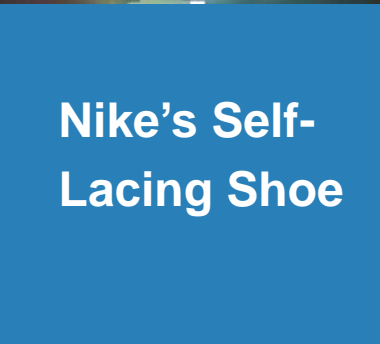
Everything is getting smarter



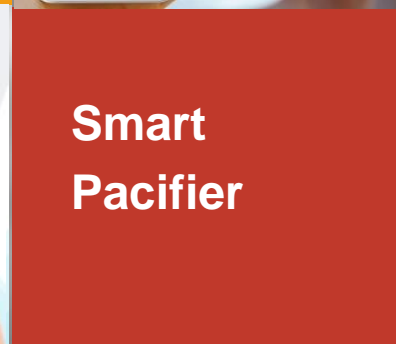
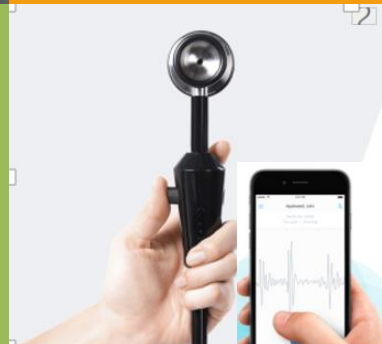
Smart Cup



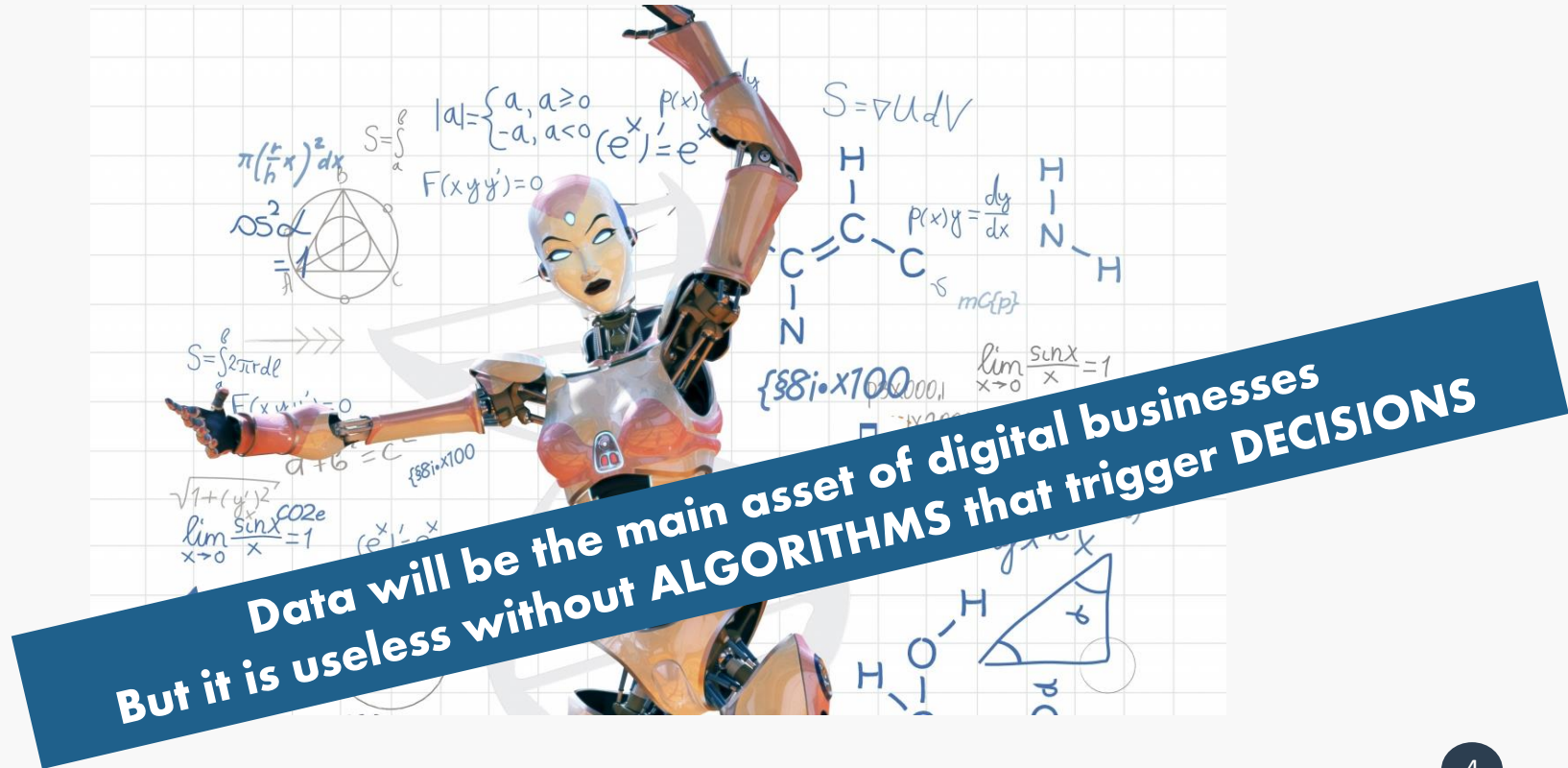
Smart Stethoscope



Smart Toilet



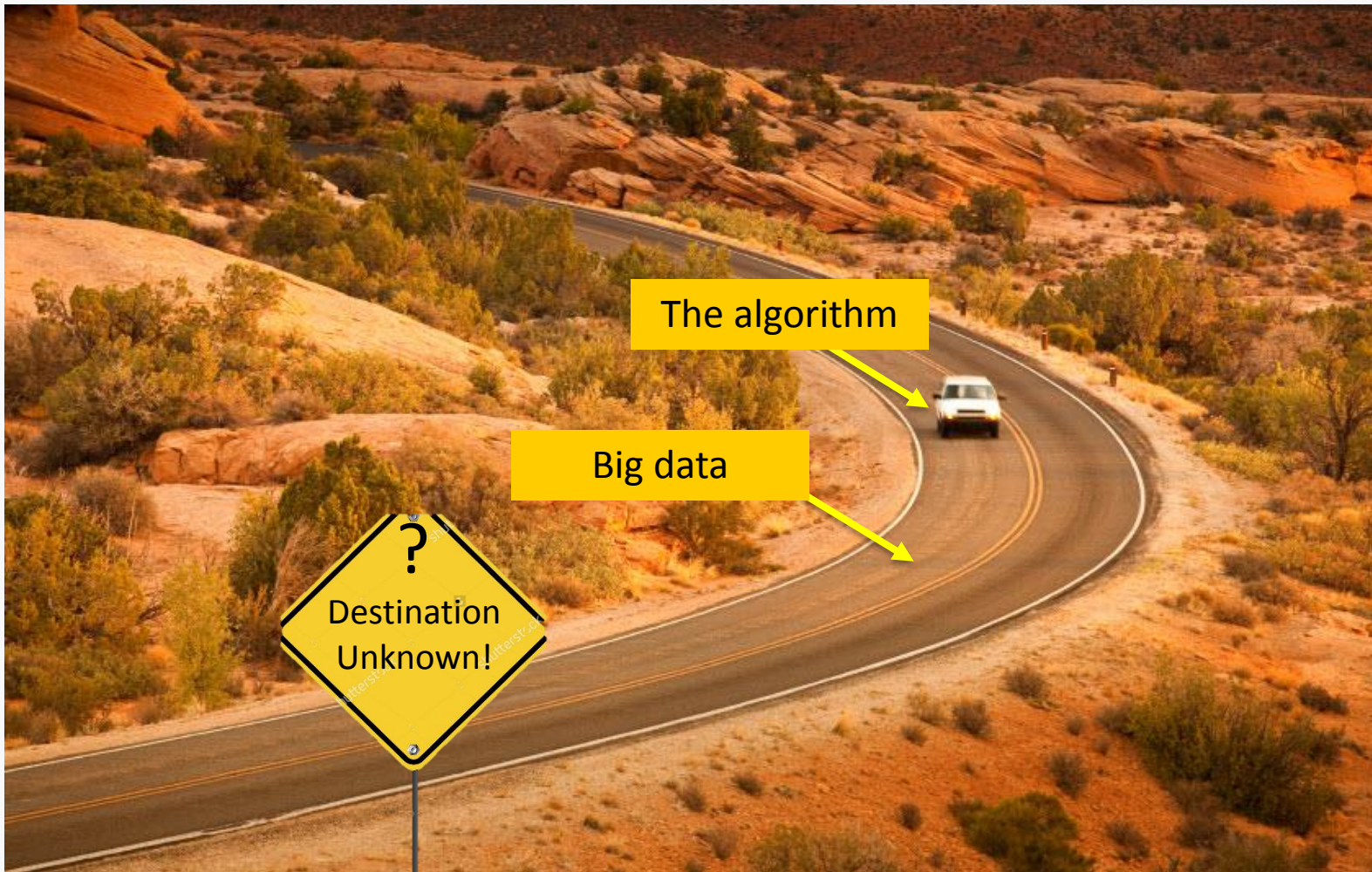
Algorithms are at the heart of ANY digital business



**Data will be the main asset of digital businesses
But it is useless without ALGORITHMS that trigger DECISIONS**

Tremendous technological progress in data & analytics.
Anything is possible.
The only limit is your *imagination*.

Anyone who thinks the sky is the limit, has limited imagination.



The algorithm

Big data

?
Destination Unknown!

What's your problem, business?

Our platform can solve ANY business problem!



Vendor

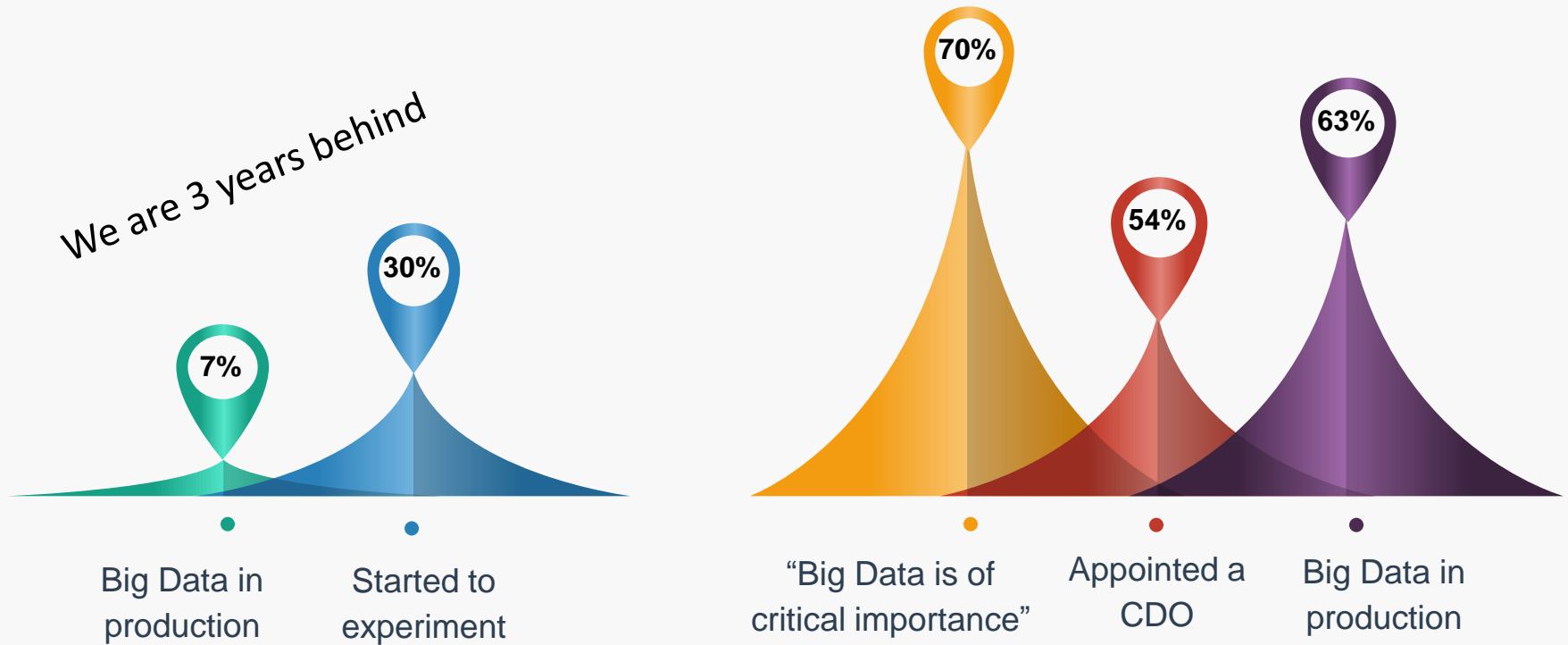
Hmmm, well, that's your decision.
Hey, did I mention we use machine learning?

Which business
problem?



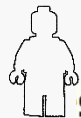
Big data is still a **solution** looking for a **problem**

Adoption – worldwide versus Israel



Source: STKI estimation, 2016 (Enterprises)

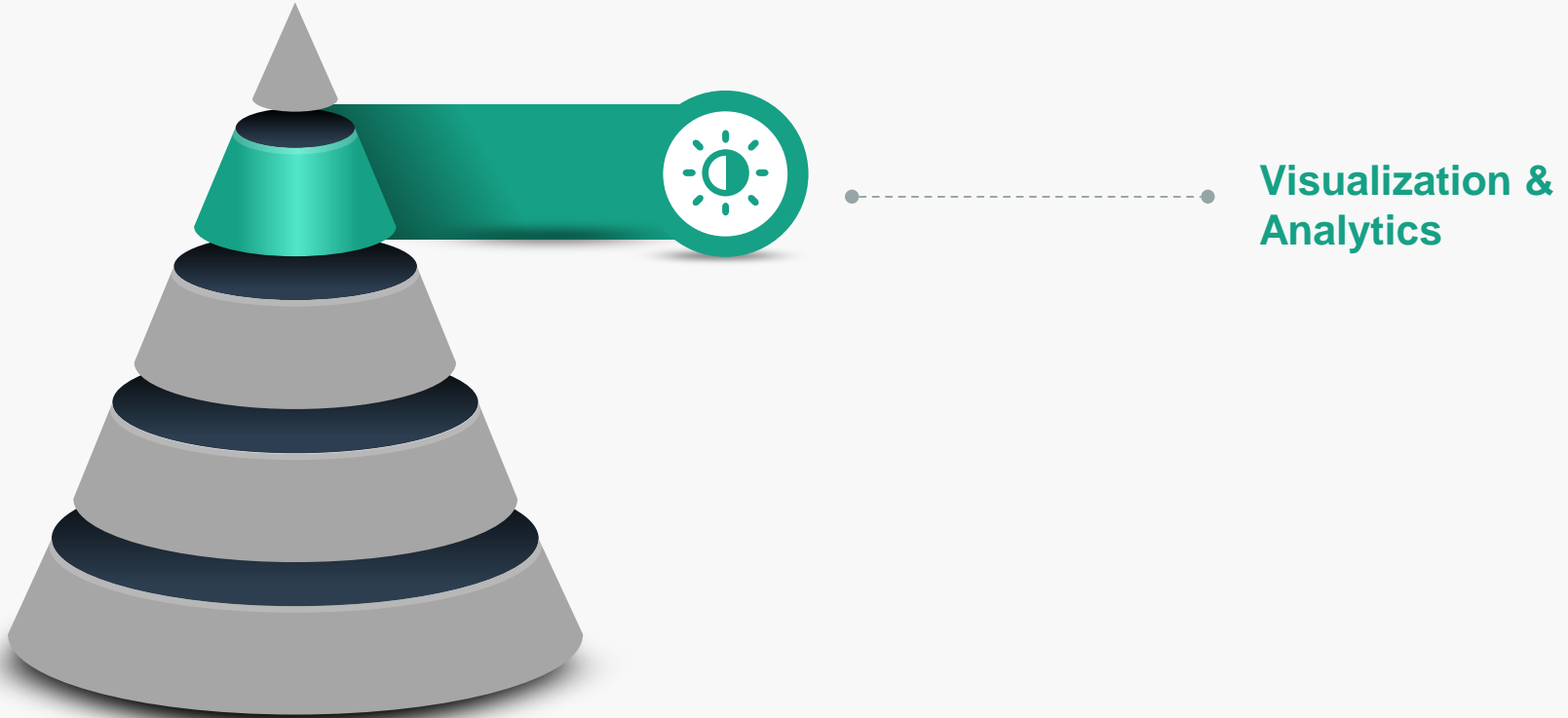
Source: HBR, 2016 Study of F1000



Data & Analysis



Analytics



The evolution of Analytics



1

**Classic
BI/ DW**

“What happened?”

2

**Data discovery
Analysis**

“Why?”

3

**Predictive
Analytics**

“What will happen?”

4

**Machine
Intelligence**

“Help me to ask the
right question!”

5

**Autonomous
Decisions**

“Make the
decision for me”

NEW questions we can ask

- What are **relevant** questions to ask?
- What are the relevant **features**?
Entities? **Connections**?
- Optimization & micro-segments
- **Real time** analytics
- Extracting features and **insights**
from highly **unstructured** data

machine intelligence

advanced analytics

streaming analytics

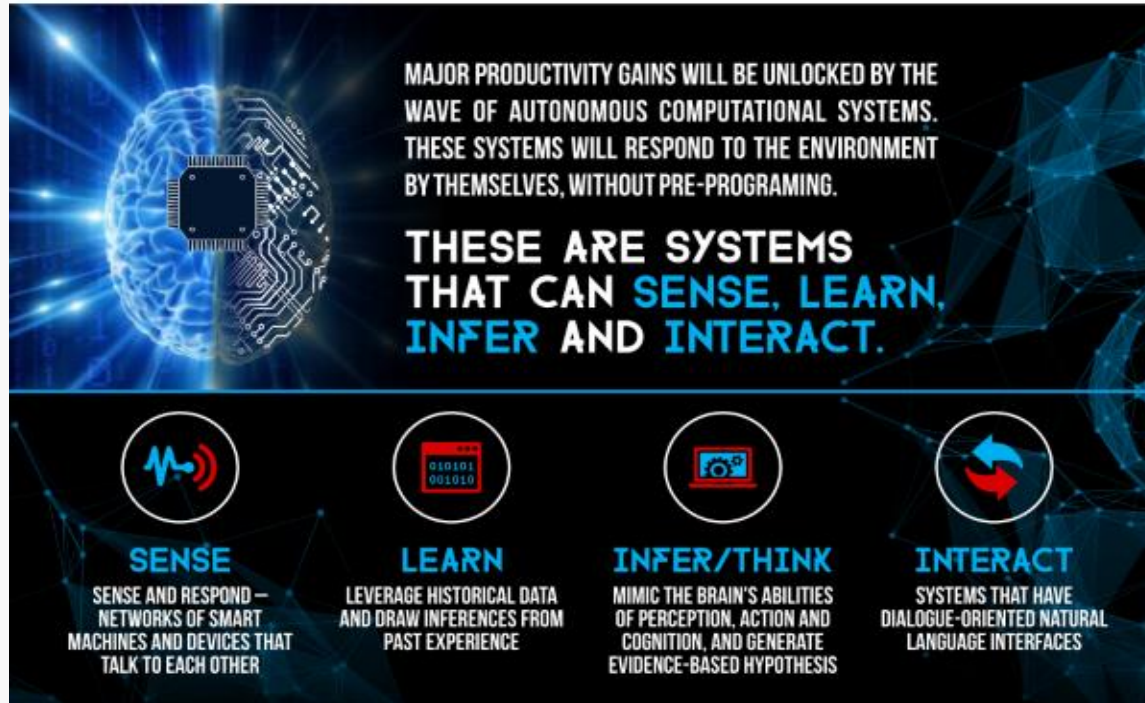
text analysis +
neural networks

Will cognitive-powered machines learn, think and make decisions for us?



Will cognitive-powered machines learn, think and make decisions for us?

COGNITIVE COMPUTING



The infographic features a central brain with a circuit board overlay, set against a dark blue background with glowing light effects. The text is arranged in a top section and a bottom section with four columns. The bottom section includes icons for each function: a pulse line for 'Sense', a data card for 'Learn', a gear for 'Infer/Think', and two arrows for 'Interact'.

MAJOR PRODUCTIVITY GAINS WILL BE UNLOCKED BY THE WAVE OF AUTONOMOUS COMPUTATIONAL SYSTEMS. THESE SYSTEMS WILL RESPOND TO THE ENVIRONMENT BY THEMSELVES, WITHOUT PRE-PROGRAMING.

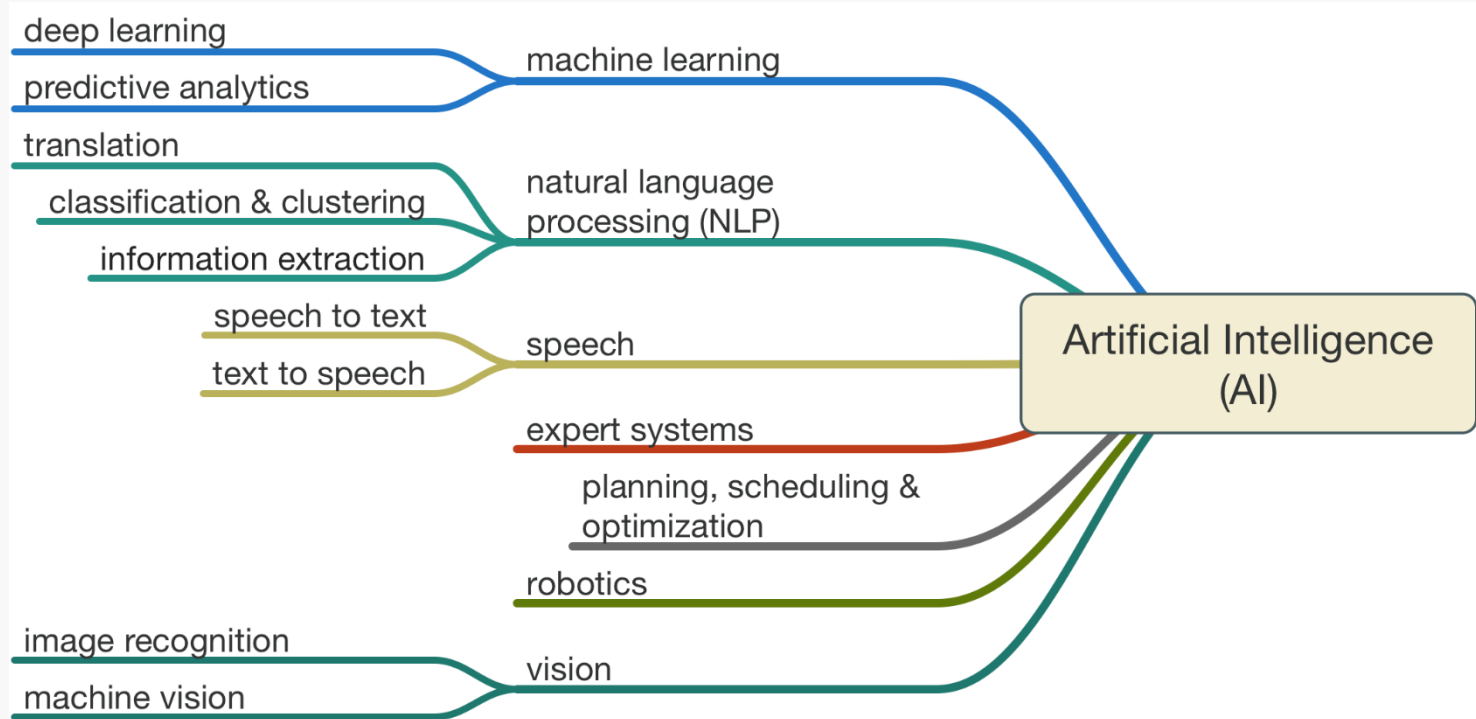
THESE ARE SYSTEMS THAT CAN SENSE, LEARN, INFER AND INTERACT.

SENSE	LEARN	INFER/THINK	INTERACT
SENSE AND RESPOND – NETWORKS OF SMART MACHINES AND DEVICES THAT TALK TO EACH OTHER	LEVERAGE HISTORICAL DATA AND DRAW INFERENCES FROM PAST EXPERIENCE	MIMIC THE BRAIN'S ABILITIES OF PERCEPTION, ACTION AND COGNITION, AND GENERATE EVIDENCE-BASED HYPOTHESIS	SYSTEMS THAT HAVE DIALOGUE-ORIENTED NATURAL LANGUAGE INTERFACES

WARNING

**MASS
CONFUSION
AHEAD**

Many branches to Artificial Intelligence



MACHINE INTELLIGENCE 2.0

Physical

Self-driving cars
Autopilot drones
Robots daily tasks

AGENTS			AUTONOMOUS SYSTEMS			
PROFESSIONAL	PERSONAL	OS INTERFACES	AIR	GROUND	SEA	INDUSTRIAL
Howdy! x.ai clara KASIST® DigitalGenius OVERLAP.CC meekan fuse machines PRIMER	facebook XIAOICE large assistant.ai nestor @livesome Magic	Siri Cortana VIV maluuba apl.ai COGNEA Google Now	SDR DJI PROJECT LOON VERTICAL DroneDeploy AIRDOG SKYCATCH SKYDIO Airware LILY	Google UBER TESLA CRUISE MOBILEYE COMMA AdasWorks	LIQUID ROBOTICS bluefin data OPENRV BluHaptics	KIVA Systems fetch HARVEST CLEARPATH AVIDBOTS ENERGRID rethink robotics GREYORANGE OSARO

ENTERPRISE						
SECURITY / FRAUD	HR / RECRUITING	SALES	MARKETING	CUSTOMER SUPPORT	INTERNAL INTEL	MARKET INTEL
Sentinel graphistry BITSIGHT feedzai AREA1 drawbridge sift science CYLANCE Brighterion	textio hi gild SpringRole entelo unilive GIGSTER	sense infer people pattern Preact Prism AVISO Vidora sentient salespredict Gainsight	Liftigniter RADIUS brightfunnel retention AIRPR	CLARABRIDGE QUANTIFIND Wiseio ACTIONIQ FRAMED DigitalGenius	Alation ADATAO Palantir saphro lucid Rainbird SKIPFLAG ogolo Digital Reasoning Narrative Science	Quid mattermark Datafox bottlenose PREMISE enigma CB INSIGHTS

PLATFORMS						
RESEARCH / AGI	FULL STACK	MACHINE LEARNING	INDUSTRIAL IOT	AUDIO	VISION	DATA ENRICHMENT
OpenAI vicarious Google DeepMind Numenta Dycorp mnasense SCALED INFERENCE CURIOUS GEOMETRIC INTELLIGENCE	context relevant CognitiveScale NVIDIA TERADEEP QUALCOMM NERVANA SYSTEMS	Dato rapidminer cortical.io AYASDI amazon Azure narologies PredictionIO SKYTREE bigml blueyonder	ThingWorx UPTAKE IMUBIT Preferred Networks Alluim xively PLANET OS	Gridspace TalkIQ nexidia vocaliq NUANCE Expect Labs popUP archive	ORBITAL INSIGHT Descartes Labs DEXTRO cortica clarifai MetaMind	diffbot Paxata TRIFACTA IDIBON WorkFusion loop CrowdFlower

INDUSTRIES						
ADTECH	AGRICULTURE	FOR GOOD	RETAIL FINANCE	LEGAL	MATERIALS & MFG	HEALTHCARE
ADTHEOREM dstillery BEYONDERBAL METAMARKETS TARD rocketfuel affectiva	BLUE RIVER tule Terraviva mavrx THE CLIMATE CORPORATION CERES HONEYCOMB	Conservation Metrics DataKind thorn BAYES IMPACT	inVenture affirm earnest MIRADOR Lendo zestfinance LendUp	Everlaw RAVEL LEGAL ROBOT sseal BEAGLE R.I.S.S Lex Machina	zymergen AUGMATE GINKGO BIOWORKS TRINE SIGHT MACHINE TECHNOLOGIES CALCULARIO Eigen Innovations	deep genomics 3SCAN enlitic Calico Atomwise Recombine color METABIOTA GRAND SOUNDS Google Life Sciences IBM Watson Health

INDUSTRIES (CONT'D)			TECH USER TOOLS			
EDUCATION	TRANSPORT & LOGISTICS	INVESTMENT FINANCE	DATA SCIENCE	MACHINE LEARNING	OPEN SOURCE	
KNEWTON coursera turnitin gradescope UDACITY KHANACADEMY	NAUTO taleris PRETECKT clearmetal	Bloomberg Quantopian Dataminr KENSHC ISENTIUM NEURENSIC alphasense	DOMINO kaggle Sentiana sense yseop Outlier yhat DataRobot	Cortana Analytics AlchemyAPI glowfsh IBM Watson Platform Anodot MonkeyLearn (h) HyperScience fuzzy.io Oxdata.ho SPARKBEYOND indico	SKYMIND TensorFlow seldon Caffe theano Spark MLlib Microsoft PR spaCy DL4J SciKit CGT	

Bots trained by humans

Virtual



2 Examples of AI-powered apps in enterprises:

x.ai is a personal assistant who schedules meetings for you

No app, all you do is just enter: cc: amy@x.ai

HUMAN + AI CUSTOMER SERVICE.

Helping companies automate customer service via email, social media, and mobile messaging.

Uses Deep Learning to enable automated, human-like conversations with consumers (Salesforce partner)

DigitalGenius

Has analysis reached the level of human thinking?

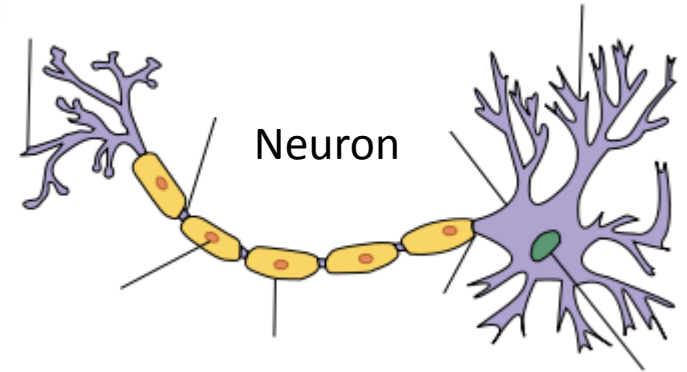
~~No~~

~~Not yet~~

✓ **We are getting there**



Deep Learning: a branch of machine learning that is Inspired by the way the brain works



*The basic unit of the nervous system
A cell that carries messages between
the brain and other parts of the body*

Neural networks *versus* Deep Learning

- **Neural networks** have a hidden layer and perform “supervised” predictions (human intervention)
- **Deep Learning Neural Networks** – have more hidden layers and can perform “unsupervised” tasks like feature extraction & image recognition



2015 - Google opened its DL project to the community

Who makes the decisions?

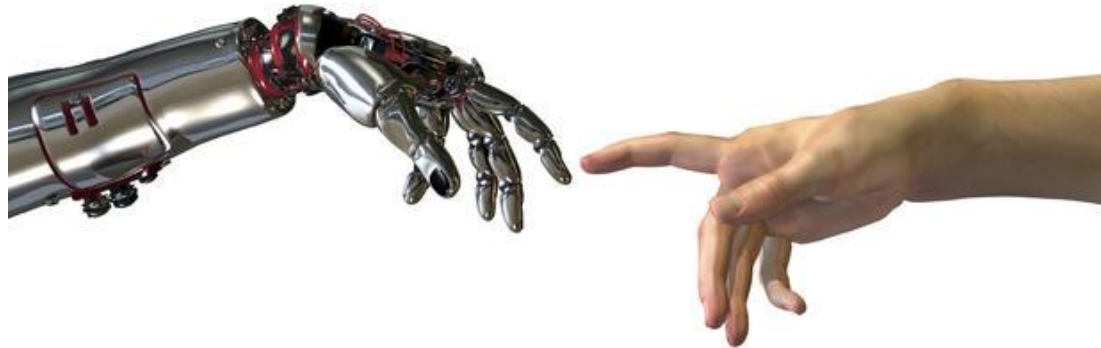


Decisions



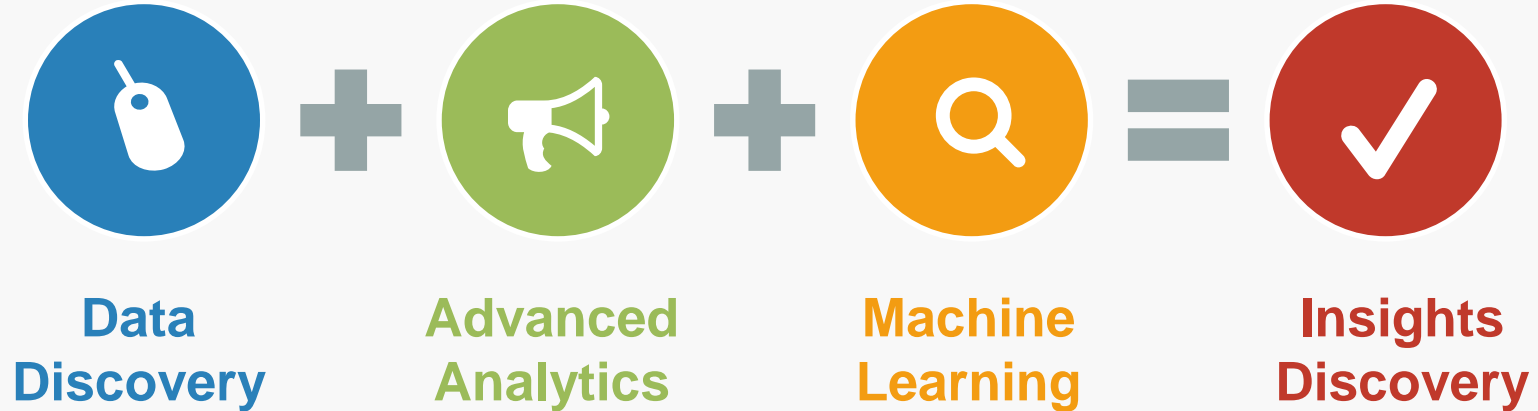
The future Data Scientist: a Robot?!

Artificial intelligence will assist data scientists mainly in data preparation (but not only...)



Data scientists can focus more on *algorithms* instead of *data engineering*

Insights Discovery



Predictive analytics can now reach a broader audience
Does “Citizen data scientist” = an empowered business analyst?

The empowered business analyst



Can use machine learning, visualization and self-service to perform more meaningful analysis



Uses Predictive Analysis



**More Discoveries
Less Reporting**



Less Data Preparation



Uses Machine Learning
For feature extraction and data engineering

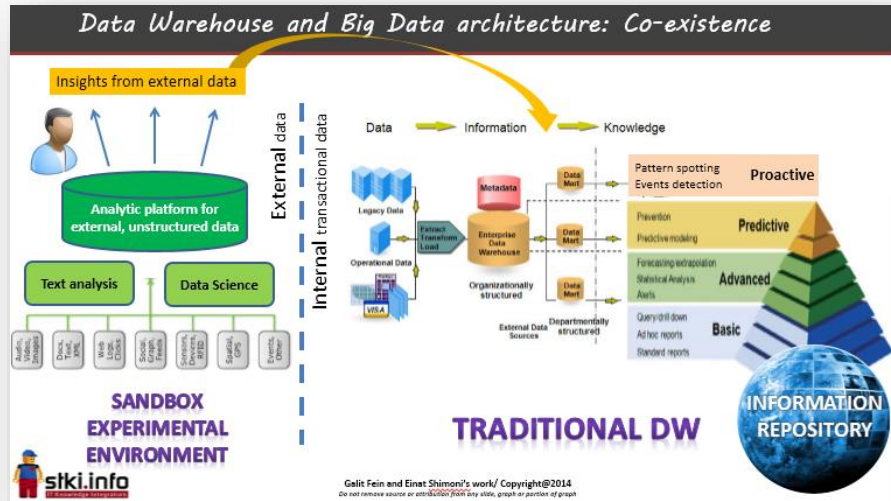
Data Virtualization



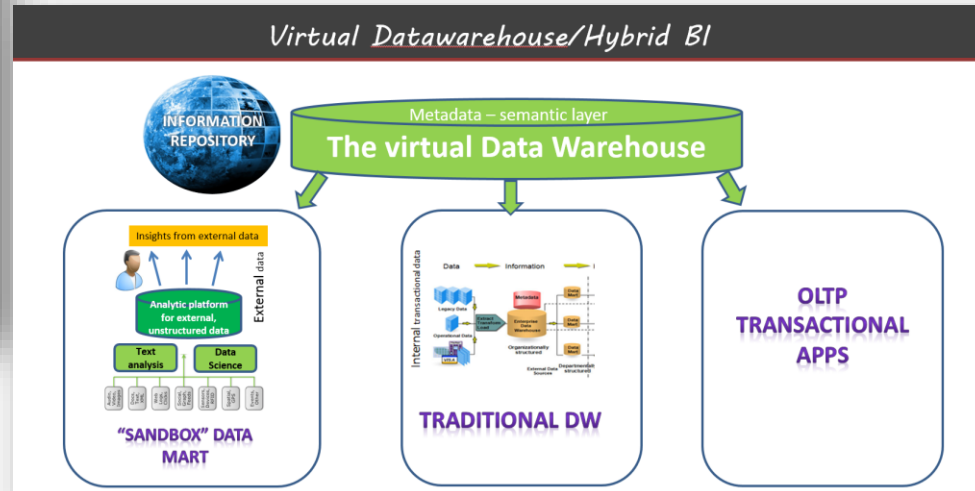
Virtual data layer

Architecture shifts

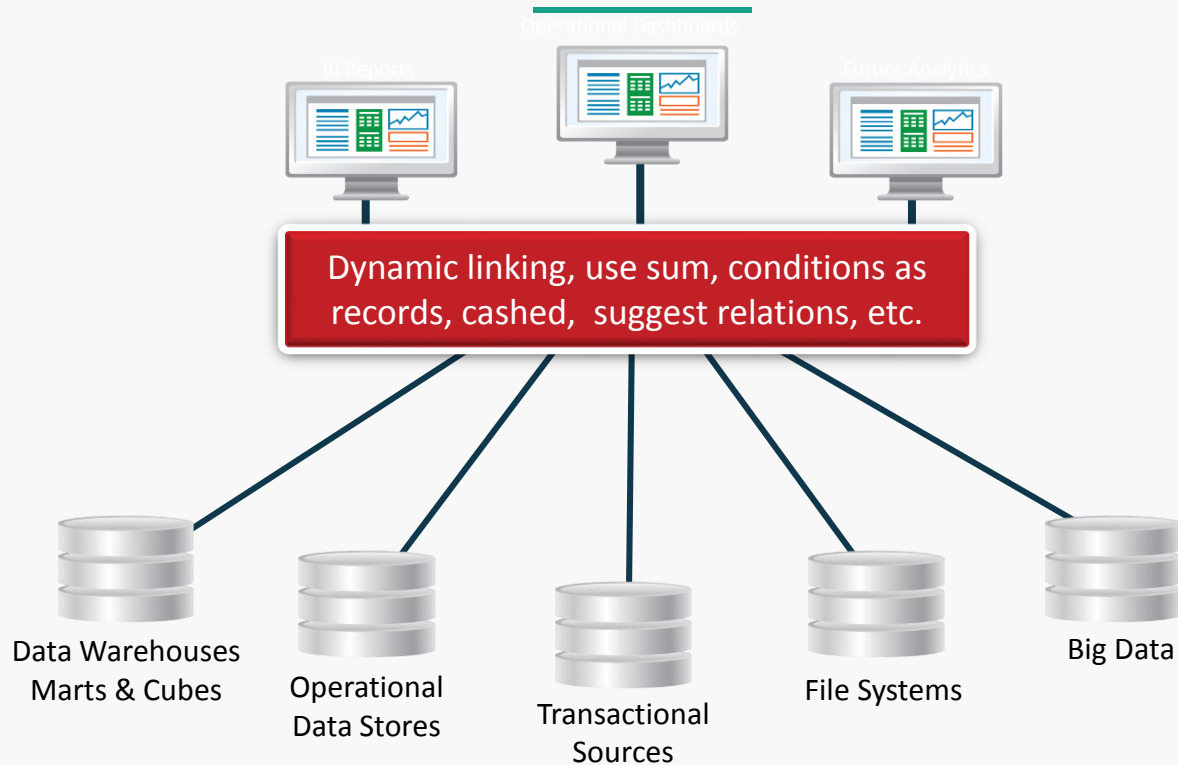
We are moving from this:
Once in a while connection



To this:
Constant connection



Virtual Data Layer



Source: cisco

The virtualized data layer

An Agile approach to Data Integration:

Quick access to data, no replication, in the way you would like to see it

Specialized players – virtualized data layer:



EIM Players' solutions for data federation:

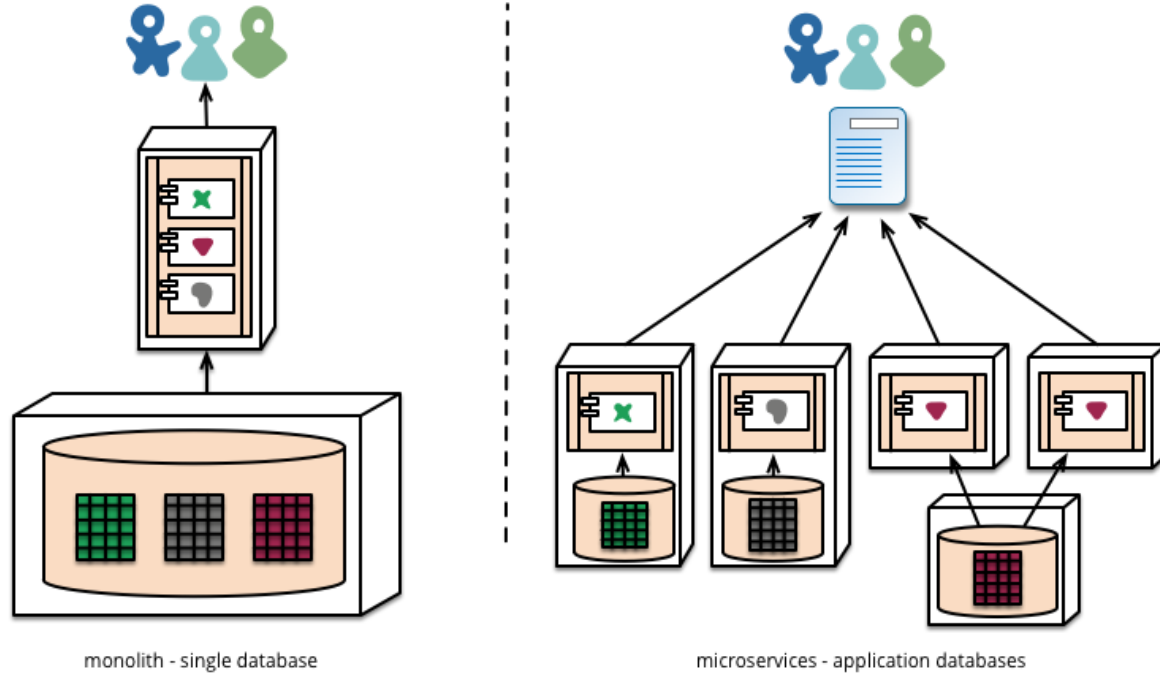


Data Platforms



Data Platforms

Microservices



monolith - single database

microservices - application databases

Source: <http://martinfowler.com/>

What are Microservices implications on data: Polyglot Data (polyglot persistence)



Source: Martin Fowler

Evolving DBA Roles



Devops

Automation and self service in general



Development expertise

For supporting NoSQL



Freedom to the Developers

Developers in NoSQL DBMS are more free



Cloud DBA

Leverage cloud offering (limitless scale, elasticity, new functionality)

Open Source RDBMS



PostgreSQL



MariaDB



MySQL™

New options: Third party maintenance for DBMS



STKI Recommendations: Data & Analytics

Establish BI/Analytics users KPIs!

“Analysis tools usage” as part of employee assessment

Make advanced analytics a part of your portfolio

Data virtualization will become important
as enabler for business agility

Do now

Be aware

That's it.

Thank you for listening

