DATAVERSITY™

July 22 Webinar
Understanding the World of Cognitive Computing

About the Webinar

A panel of experts will discuss the technology, where it's headed and current practical applications. The discussion will start with some slides from recent DATAVERSITY on how Cognitive Computing is currently understood by your peers.

The panel will also review many components of the technology including:

- Cognitive Analytics
- Machine Learning and Deep Learning
- Reasoning and next generation artificial intelligence (AI)
- And get involved in the discussion with your own questions to present to the panel.

All webinar registrants will be sent soon to be published Research Paper on Cognitive Computing produced by DATAVERSITY and co-authored by Moderator Steve Ardire. Included in the paper is as a coupon code to receive a $200 discount on first annual Cognitive Computing Forum to be held in San Jose, California August 20 – 21st.

The following charts represent responses to DATAVERSITY Survey on Cognitive Computing conducted in May and June 2014. All data, charts, and analysis contained in these slides and report remain the copyright of DATAVERSITY Education, LLC.

Moderator

Steve Ardire
'Merchant of Light'
sardire@gmail.com
@sardire www.linkedin.com/in/sardire/
Steve advises cognitive computing, AI, machine learning startups and for past 20+ yrs advised / consulted with 30+ software startups in US, Canada, Europe in semantic technology, Big Data, cloud computing, predictive analytics, infoviz, DAM, plus much more

Panelists

Tony Sarris Founder and Principal, N2Semantics
tony.sarris@n2semantics.com
www.linkedin.com/in/tonysarris
@n2semantics Technology evangelist, consultant and advisor specializing in semantic technologies (e.g., knowledge representation, ontology, intelligent software agents). Tony would like to see apps that are software agents or automated assistants actually helping us humans in our day-to-day lives.

James Kobielus Big Data Evangelist, IBM
jgkobiel@us.ibm.com
@jameskobielus (FOLLOWERS 13K)
www.linkedin.com/pub/james-kobielus/6/ab2/8b0
Industry veteran and IBM Big Data Evangelist; Sr Prog Dir, Product Mktg, Big Data Analytics; Editor-in-Chief, IBM Data Mag. He spearheads thought leadership activities in Big Data, Hadoop, enterprise data warehousing, advanced analytics, business intelligence, data management.

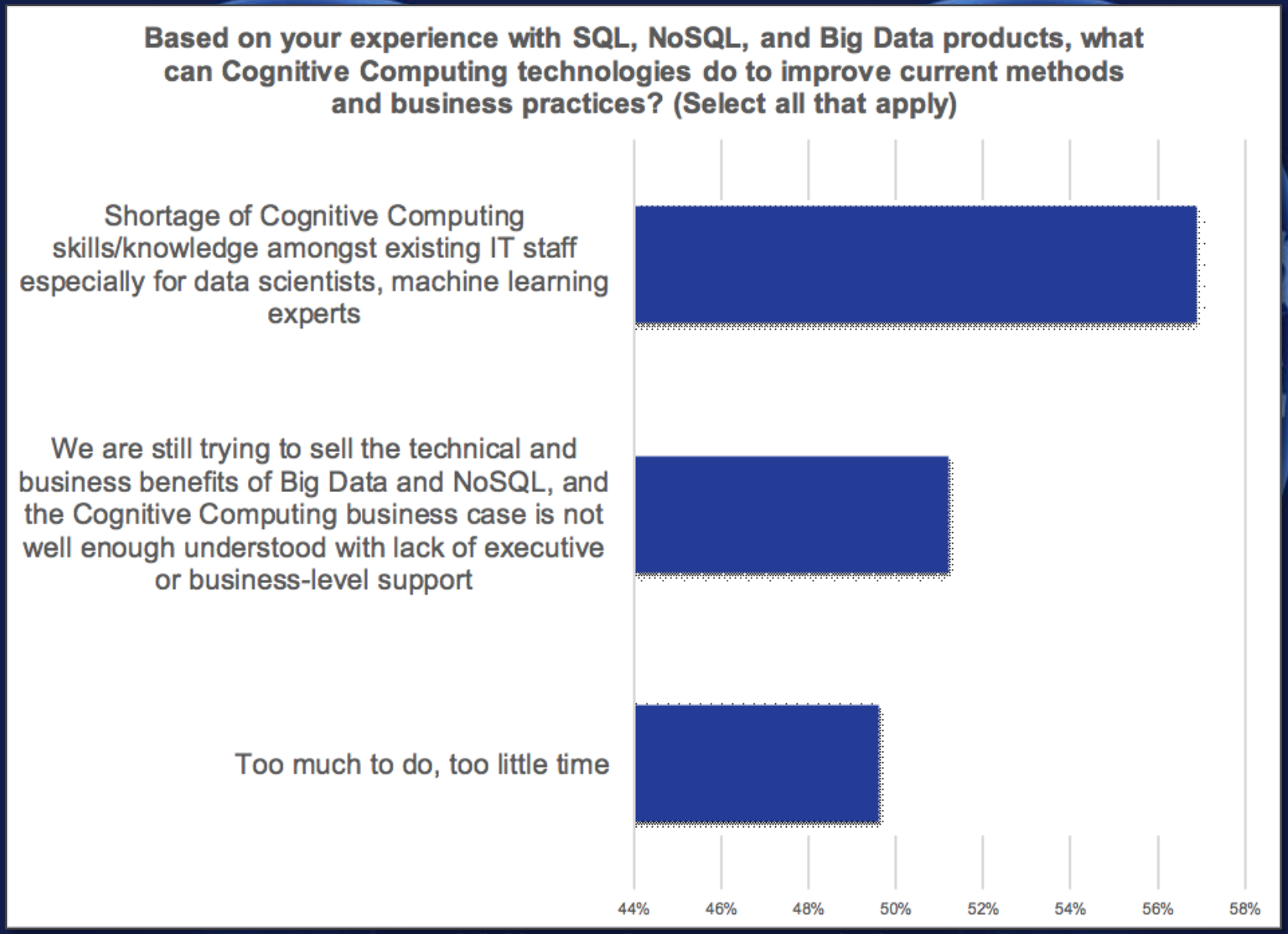
Adrian Bowles Founder of STORM Insights, inc.
adrian@storminsights.com
www.linkedin.com/in/ajbowles
@ajbowles STORM Insights - a new approach to market intelligence
Adrian is an industry analyst and recovering academic, providing research and advisory services for buyers, sellers, and investors in emerging technology markets including cognitive computing, big data/analytics, and cloud computing. He has held executive positions at several consulting and analyst firms.

Some Highlights from Cognitive Computing Survey

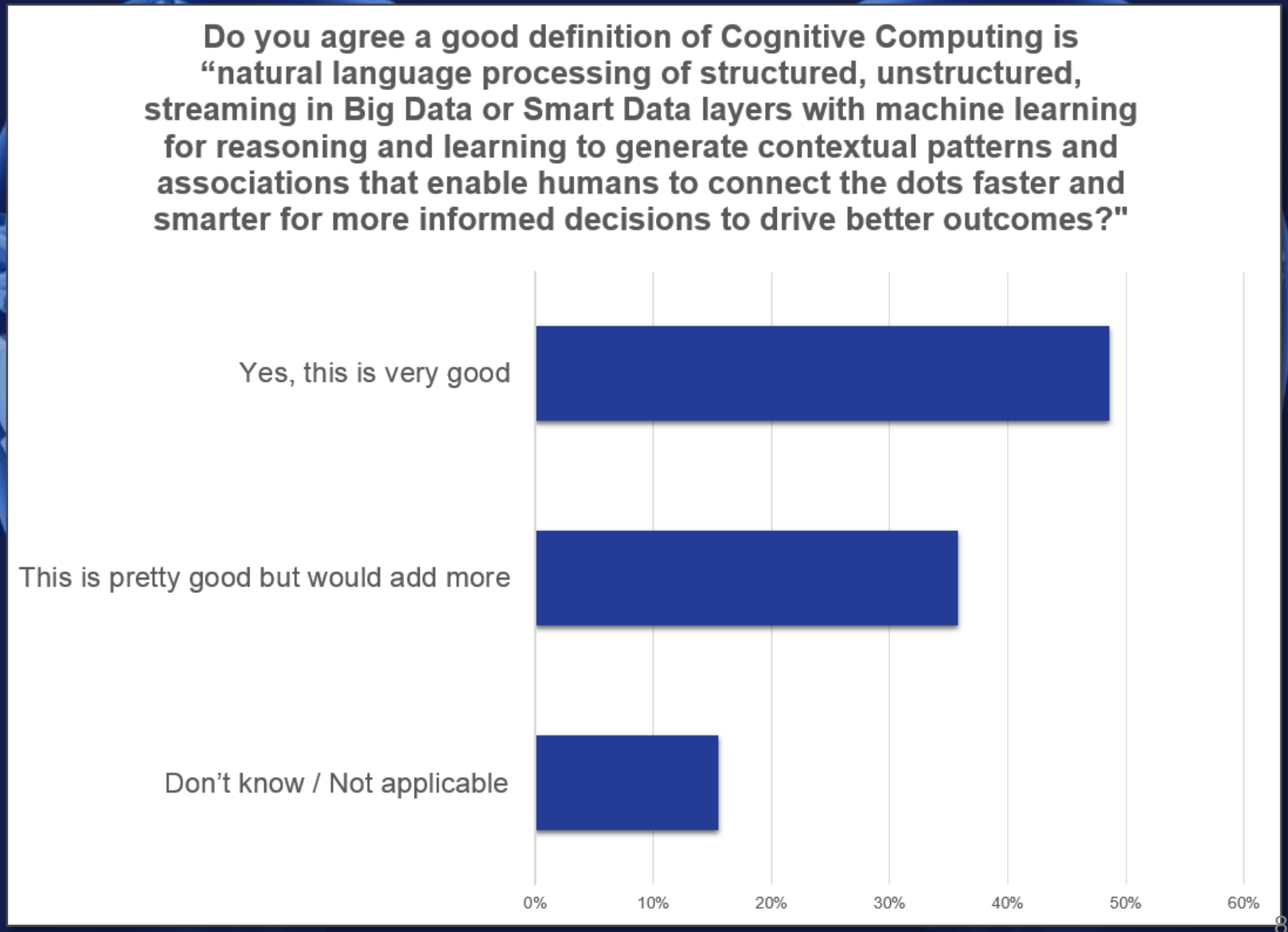
- 53.4% of respondents believe that Cognitive System technologies need to provide more clarity in terms of business perspectives.
- 16.7% of respondents either are not aware of technologies like IBM's Watson, Siri, and Google Now or don't find them applicable to a discussion of Cognitive Computing.
- Some of the most needed resources for eventual enterprise integration of Cognitive Systems include better education of benefits, more case studies, easier to use tool sets, and vendor demonstrations.
- More than a third of respondents said that they were still unclear about their organization's plans for Cognitive Systems implementation due to a lack of understanding about how to present the business case.
- 26% remarked that their organizations are early adopters of emerging technologies such as Cognitive Computing, NoSQL, and Big Data.
- Almost 60% said that one of the primary drawbacks to current integration with Cognitive Systems is the lack of knowledge and skills among existing IT staff, especially in terms of Data Scientists and Machine Learning experts.
- Business Intelligence/Cognitive Analytics was the top choice (81.8%) for how Cognitive Computing can help the enterprise.

Cognitive Computing Plans

What can Cognitive Computing do to improve current methods



A definition of Cognitive Computing



Similarities in Big Data & Cognitive Computing Stack

Application Engagement and UI
(Insights, UIX experience)

Descriptive, Predictive, Prescriptive, Cognitive Analytics
algorithms, AI / Machine Learning (Supervised and Unsupervised) Deep Neural Network Learning

refine & improve

refine & improve

Big Data, Smart Data, KnowledgeBase
(SQL, NoSQL, RDF or combinations of)

ecosystems becoming enterprise data hubs

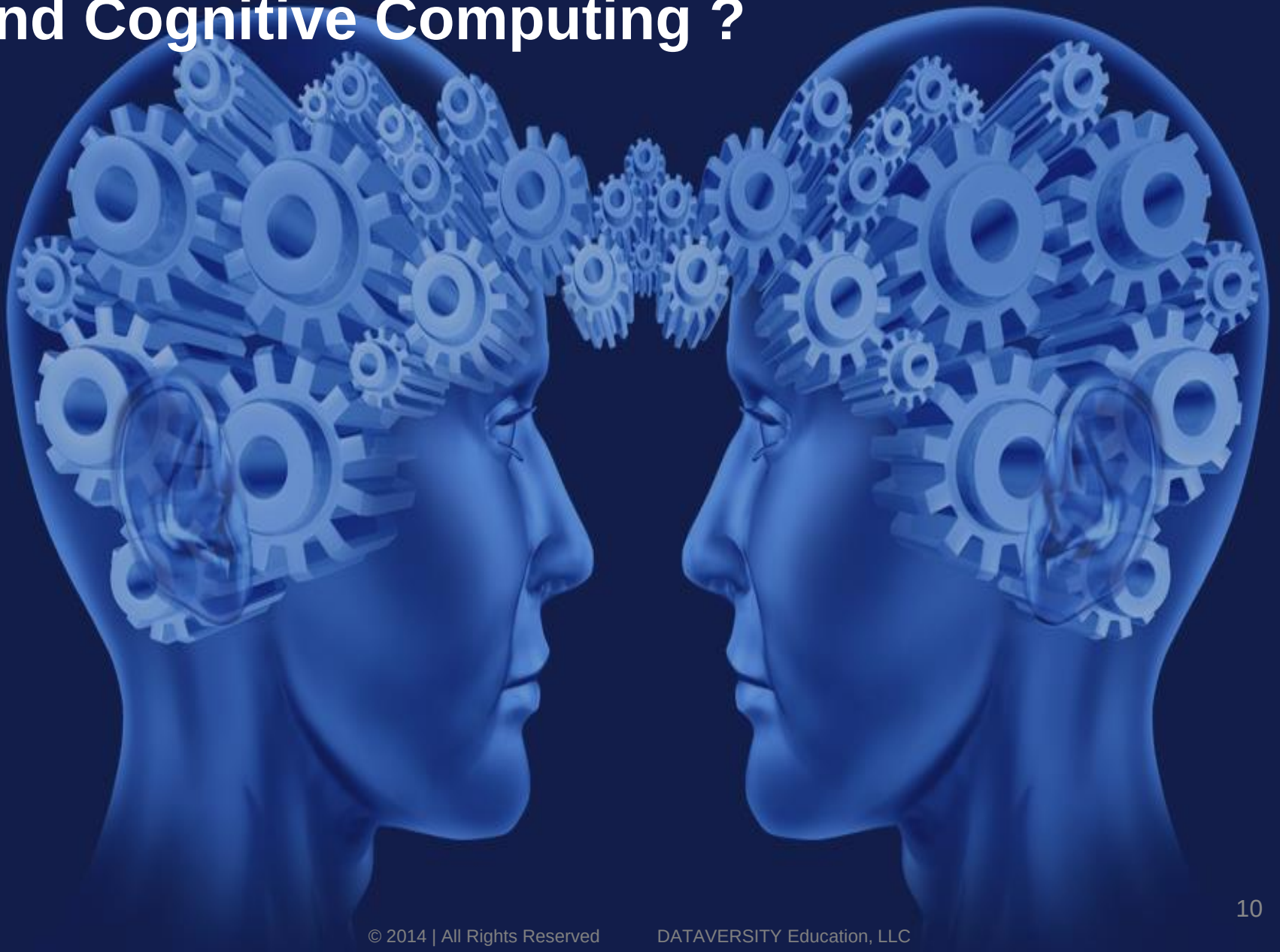
refine & improve

ETL with NLP text analytics, entity extraction etc

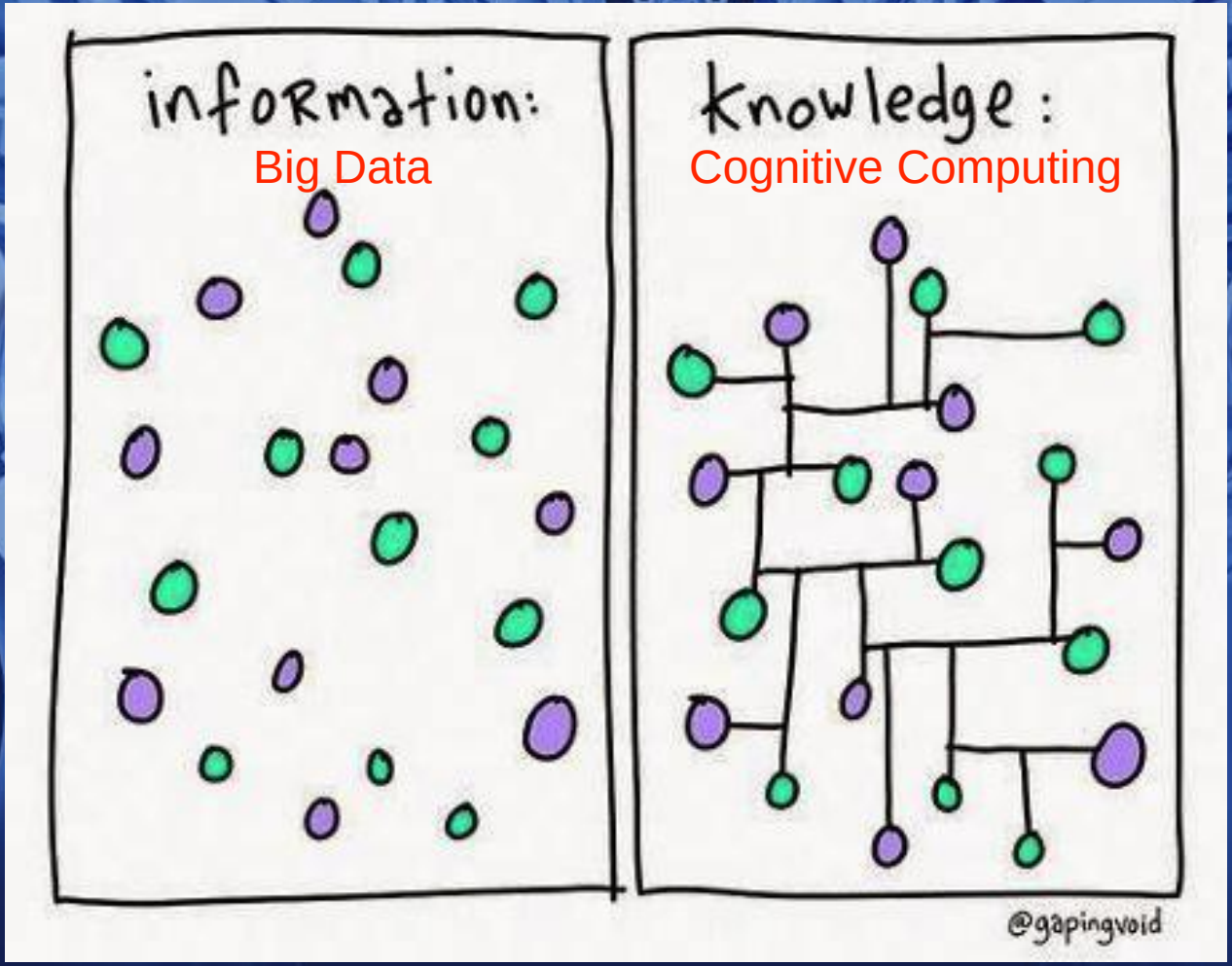
Data Sources | Structured | Unstructured | Streaming | Other

by Steve Ardire @sardire

What are key DIFFERENCES between Big Data and Cognitive Computing ?



In short the key differences are ;-)



IMO the 3 key differentiators of Cognitive Computing Solutions

(your thoughts)

1) Context driven dynamic algorithms for automating pattern discovery and knowledge.

2) Reasons and learns instantly and incrementally to discern context for sense-making.

3) Cognitive Systems infer, hypothesize, adapt, and improve over time without direct programming.

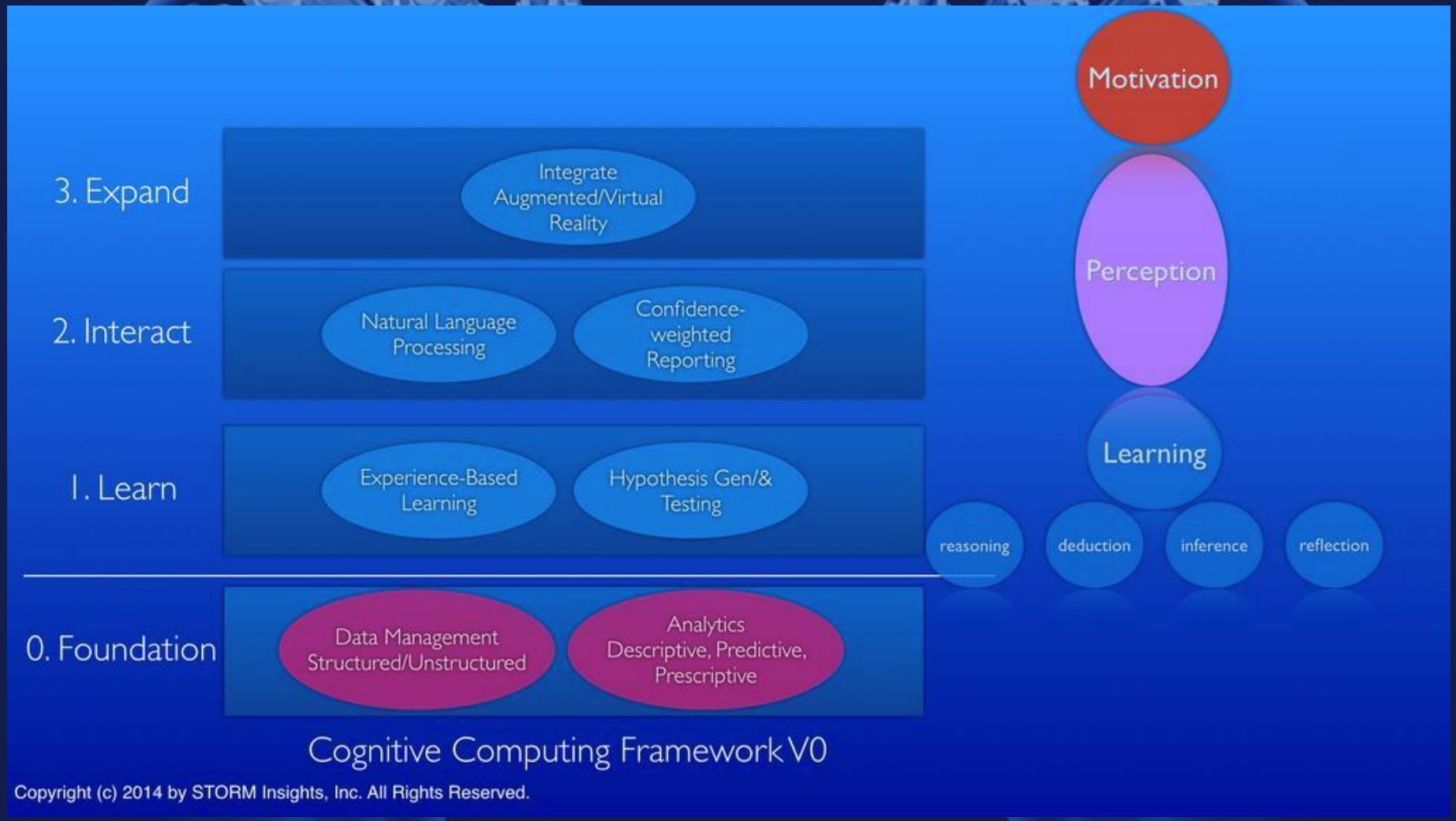
James please elaborate on Cognitive computing can take the Semantic Web to the next level

Jan 30, 2014 By James Kobielus As big data analytics pushes deeper into cognitive computing, it needs to bring the Semantic Web into the heart of this new age

Cognitive computing can't achieve its potential without a strong semantic-processing substrate that executes across diverse content sources.

You could view cognition in the cloud as the next evolutionary plateau for the semantic Web but this demands we have a shared understanding of the relationship between the concepts of "cognitive computing" and "semantic computing."

Adrian please elaborate on your Jun 11 tweet #IBMWatson Foundations maps to our Cognitive Computing



Tony please elaborate on your tweets below on knowledge representation and designed serendipity

In **How to say AI** (It's a long "A" and Short "I") was trying to illustrate in my own post about the complexity of encoding knowledge. **Knowledge representation is not the same as text processing, or natural language processing for that matter.**

Tony Sarris @n2semantics · Feb 23
Concerns about #MachineLearning http://goo.gl/tGybSK . **How about a little more 'designed serendipity'** ? http://goo.gl/FzfM6k

Let's discuss Machine Learning (the New Black)

Machine learning (ML) is branch of AI where algorithms process data, draw conclusion

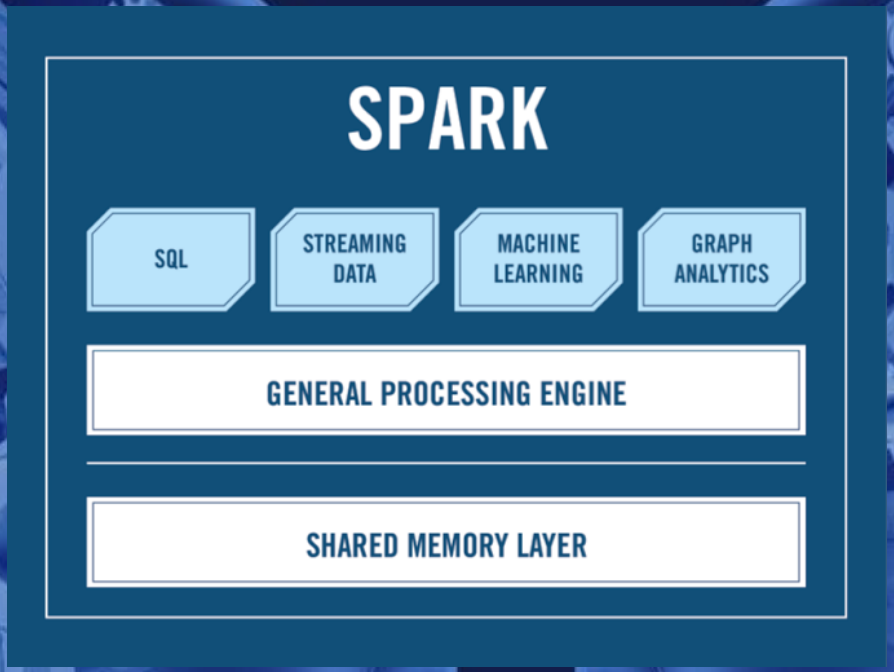
	Category	Algorithm	Goal
Supervised	**Classification**	*Logistic Regression & Random Decision Forest*	Pattern Recognition
	Regression	*Generalized Linear Models*	Predict Future Values
Unsupervised	**Clustering**	*K-means++*	Segment Historic Data
	Collaborative Filtering	*Alternating Least Squares*	Recommend Items

"Google is not really a search company. It's a machine-learning company"

- Matthew Zeiler, CEO of visual search startup Clarifai | Enterprise | WIRED

The State of Apache Spark in 2014

http://databricks.com/blog/2014/07/18/the-state-of-apache-spark-in-2014.html



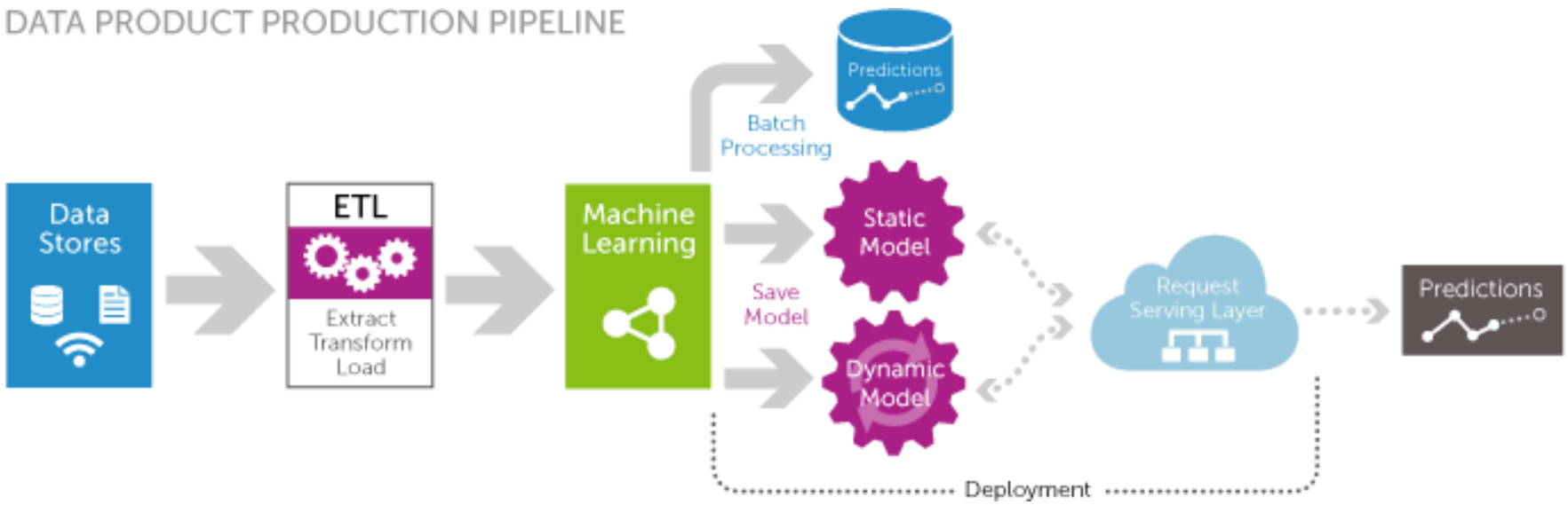
Every major Hadoop distributor has made Spark part of their distribution with Spark replacing MapReduce for Hadoop and other data stores (e.g. Cassandra, MongoDB)

Enterprises are deploying Spark for ETL, machine learning, data product creation, and complex event processing with streaming data and increasingly is the backend for higher-level business applications like for advanced analytics using Spark's scalable machine learning library (MLlib)

Vertical-specific cases include churn analysis, fraud detection, risk analytics, 360-degree customer views.

Democratization of machine learning ?

(comments)



http://graphlab.com/products/create/overview.html

most machine learning research has focused on one-off systems and “my curve is better than your curve” demonstrations but GraphLab thinks it can reach 80 to 90 percent of use cases handling the full lifecycle from data engineering through production without requiring a specialized, deep engagement before it’s deployed.

VC $$$ is flowing to ML startups (partial list)

Ayasdi | Automatic Insight Discovery $30.6M Series B July 2013 **(Total $51M)**
BeyondCore $9M Series A Feb 2014
BigML - Machine Learning Made Easy closed $1.4M seed
Context Relevant **$21M** Series B May 2014
Emerald Logic - closing $2M Series A
ersatz labs - deep neural networks in cloud closed $500K seed
Lumiata $4M Series A Jan 2014
Microsoft Azure Machine Learning - recently launched and is significant
Nervana Systems $600K seed April 2014
Nutonian, Inc. $4M Series A Oct 2013
0xdata H20 $1.7M in Jan 2013
PredictionIO Open Source Machine Learning Server just closed $2.5M seed
SKYMIND : DEEP LEARNING FOR EVERYONE
Skytree closed $18M Series A April 2013
Vicarious http://vicarious.com/ $40 Series B Mar 2014 **(Total $60M)**
Wise.io | Machine Learning as a Service $2.6M Series A Mar. 2014

Automating the Data Scientist
(comments)

AUTOMATING THE DATA SCIENTIST by @louisdorard
http://www.louisdorard.com/blog/automating-the-data-scientist?utm_content=bufferea381&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer

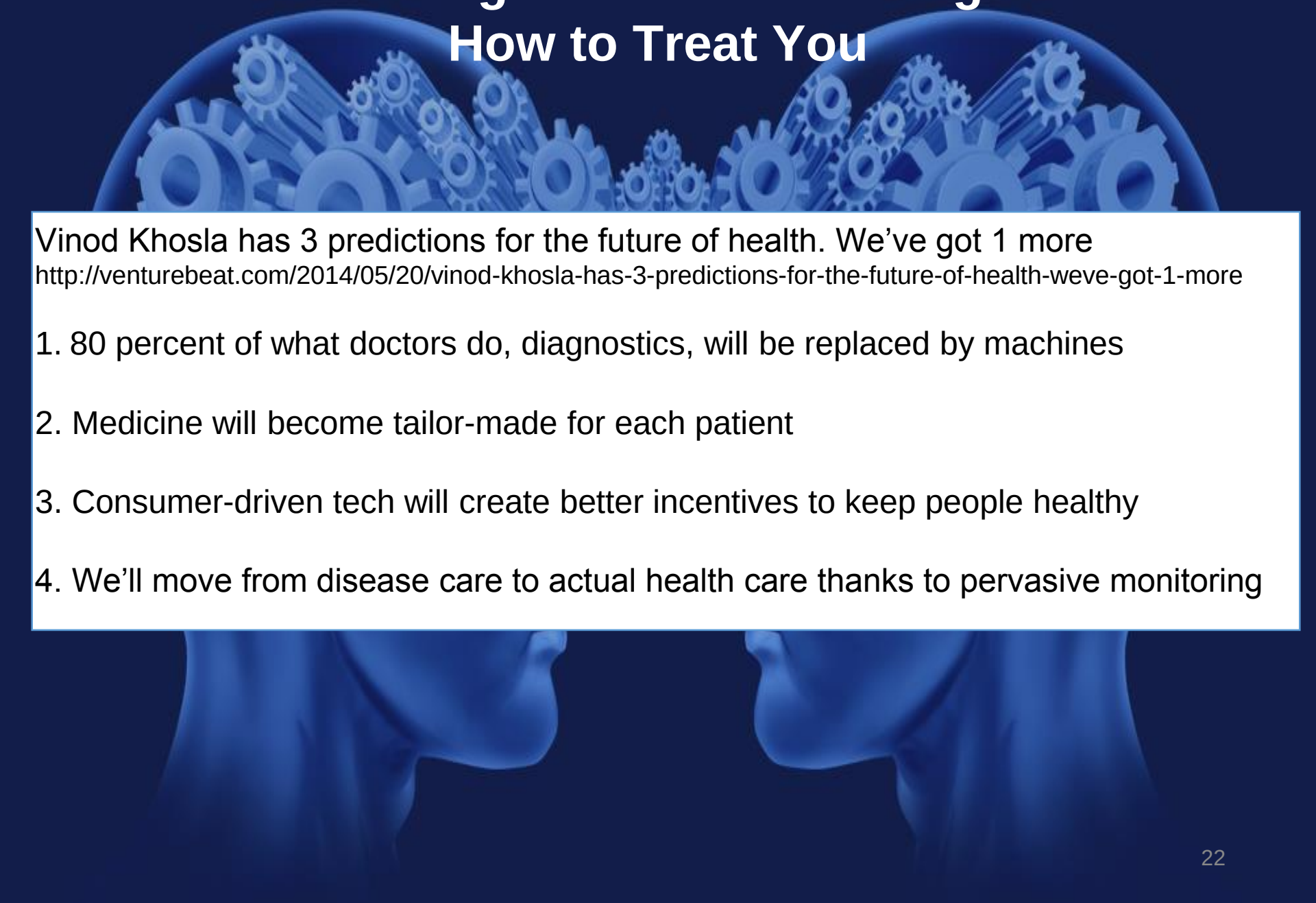
To me, a Data Scientist is someone who has business acumen, technical skills, and who knows Machine Learning. The last point is key. Those who do not have Machine Learning expertise are Data Engineers, Data Analysts, Data Artisans, Data Somethingelse.

Why Algorithms are the Next Star Designers
(comments)

http://www.fastcodesign.com/3029756/why-algorithms-are-the-next-star-designers

- Rather than having a team of data scientists creating algorithms to understand a particular business issue, **cognitive analytics** seeks to extract content, embed it into semantic models, discover hypotheses and interpret evidence, provide potential insights—and then continuously improve them.
- The data scientist's job is to **empower the cognitive tool**, providing guidance, coaching, feedback, and new inputs along the way. As a tool moves closer to being able to replicate the human thought process, answers come more promptly and with greater consistency.

Artificial Intelligence Is Now Telling Doctors How to Treat You



Vinod Khosla has 3 predictions for the future of health. We've got 1 more
http://venturebeat.com/2014/05/20/vinod-khosla-has-3-predictions-for-the-future-of-health-weve-got-1-more

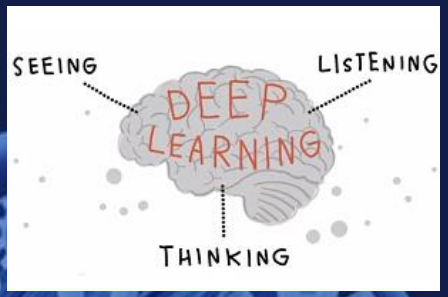
1. 80 percent of what doctors do, diagnostics, will be replaced by machines

2. Medicine will become tailor-made for each patient

3. Consumer-driven tech will create better incentives to keep people healthy

4. We'll move from disease care to actual health care thanks to pervasive monitoring

Let's discuss Deep Learning



Deep learning is a set of algorithms that uses multi-layer neural networks that can teach themselves to understand complex patterns, non-linear transformations, and features that comprise the data they're on which they're trained.

Google, Facebook, Microsoft (Project Adam), Apple, et al embracing more powerful form of AI known as "deep learning" to improve everything from speech recognition and language translation to computer vision, the ability to identify images without human help.

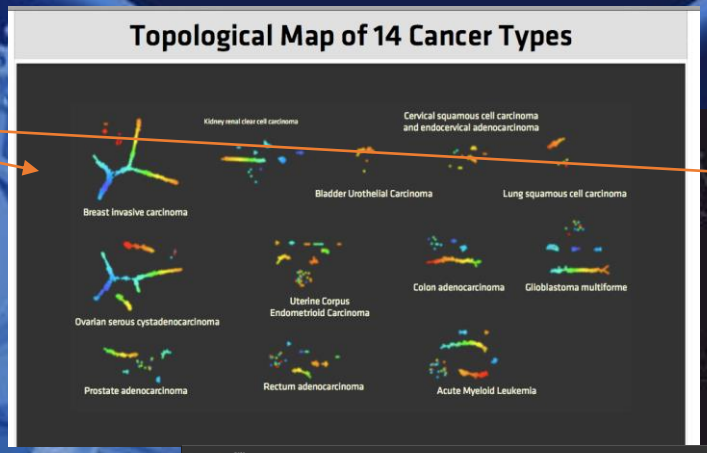
Google improved Android's voice recognition and acquired DeepMind for $400 - 500M, Microsoft created live voice translation system called Skype Translate, Baidu has invested $300M and picked up Stanford's Andrew Ng, and Apple is building out a team too.

- Computers recently matched humans (correct 97.53%) at facial recognition.
- Facebook DeepFace 97.25% required 7.4 million images for training its system,
- Chinese University of Hong Kong 99.15% accuracy with 200,000 images using a better classifier and neural network (essentially a vast artificial brain)

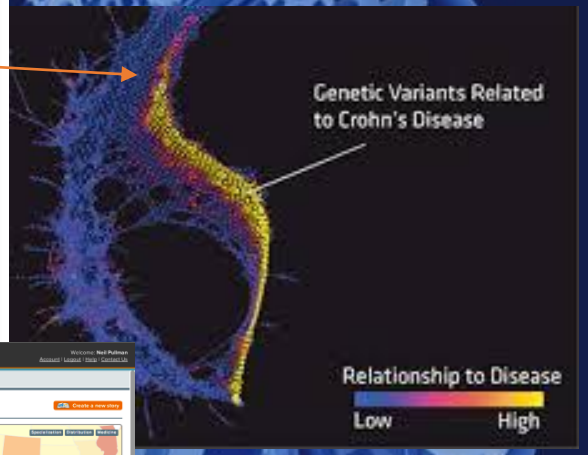
With deep learning, computer scientists build software models that simulate—to a certain extent—the learning model of the human brain e.g. After nine years of research, Numenta finally has apps that mimic the way the brain works (interview)
http://venturebeat.com/2014/07/09/numentas-brain-research-has-taken-a-long-nine-years-but-it-starting-to-pay-off-interview/

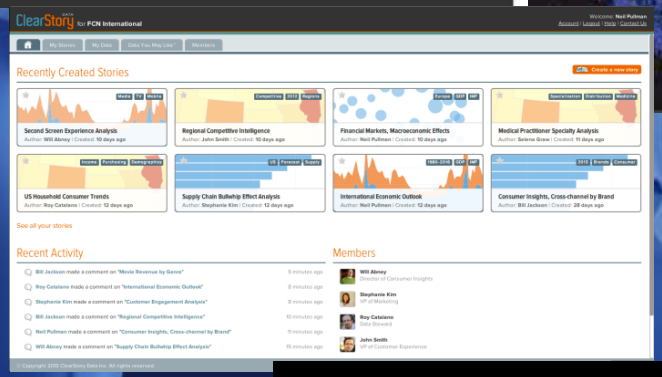
Cognitive Computing UI's contingent on vertical use case and targeted user e.g. clinician, knowledge worker, consumer

- Life Sciences
- Oil & Gas
- Public Sector
- Financial Services
- Manufacturing
- Retail
- Collaboration
- Customer Service
- etc.

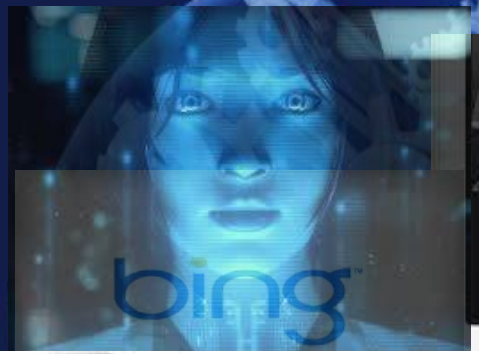


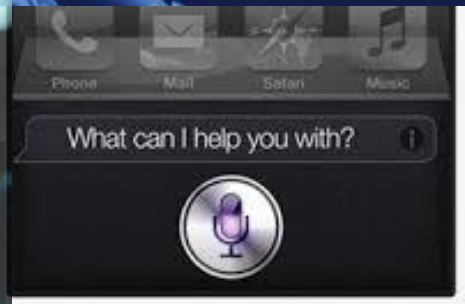
Data Shape Has Meaning

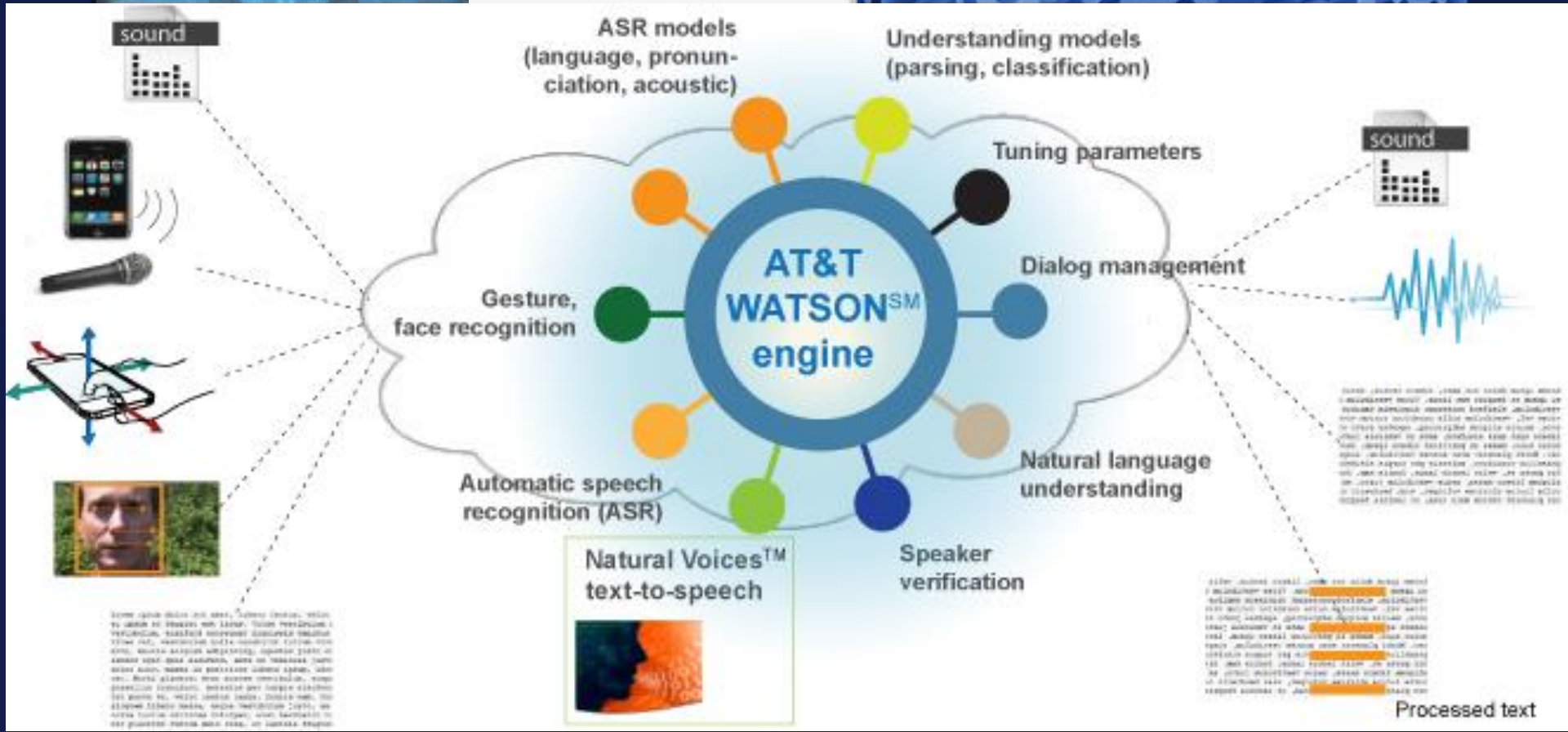




UI for Cognitive Computing esp. mobile devices







IBM's billion-dollar bet on Watson

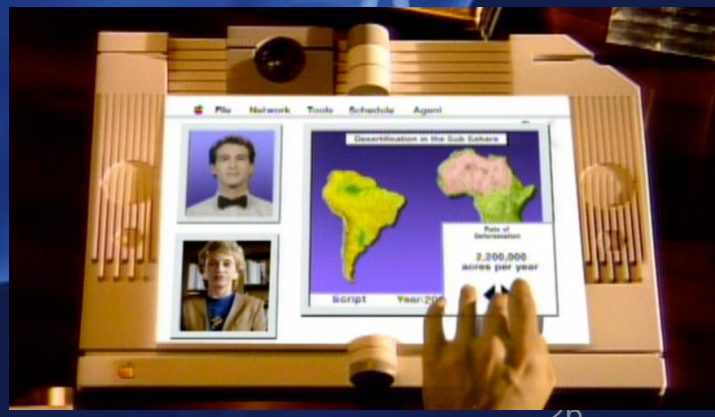
July 18, 2014 http://venturebeat.com/2014/07/18/inside-ibms-billion-dollar-bet-on-watson/

- Watson now has 800 clients and partners, like Sloane-Kettering Cancer Center for suggestions on treating cancer patients.
- Watson used as a back end for ***very specific interfaces*** IBM has created

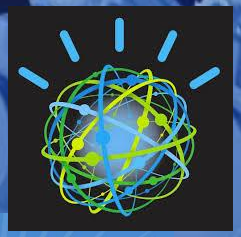
+ was big news last week

Siri as a 'general assistant' could provide lots of data to improve Watson's intelligence

so perhaps 27 years later Apple Knowledge Navigator concept https://www.youtube.com/watch?v=umJsITGzXd0 can be made real with @ibmwatson



Cognitive Computing competition is intensifying



Google to develop "fully reasoning" AI but real-life Skynet still a few years off per co-founder Sergey Brin http://www.pcmag.me/a/2460571

IBM recently acquired AI startup Cognea to give personality to virtual personal assistants and to better understand personality of users

Her name is Cortana. Her attitude is almost human. http://engt.co/1nesb9H

Microsoft's decision to infuse Cortana with a personality stemmed from one end goal: user attachment. "We did some research and found that people are more likely to interact with [AI] when it feels more human," said Susan Hendrich, project manager in charge of overseeing Cortana's personality

Take ‘Personality’ to another level with psychobiological simulation which learns and interacts in real time with neuroscience models

Emotions are Data so imagine a machine that can laugh and cry, learn, dream, and express its inner responses to how it perceives you to feel with emotional intelligence.

The Laboratory for Animate Technologies at Univ of Auckland http://www.abi.auckland.ac.nz/en/about/our-research/animate-technologies.html is combining Bioengineering, Neuroscience, AI and Interactive Computer Graphics to define next generation of human computer interaction.

BabyX incorporates multiple learning models including unsupervised learning, reinforcement learning, conditioning and action discovery using a specialized framework called Brain Language

Robotic Personal Assistants

http://www.myjibo.com/

Meet JIBO, The World's First Family Robot. Friendly, helpful and intelligent. JIBO is the real deal, from social robots pioneer Cynthia Breazeal. JIBO can't wait to meet you.

Edmonton airport is testing out customer service robots designed to interact with people, as well as detect and display emotions. The robots can not only give you directions, but actually take you where you need to go. And they have the potential to do so in 30 different languages.

Neuromorphic computers and Neurosynaptic chips

Like a brain, a neural processing unit (NPU) processes many different data streams at the same time. The end goal is to have devices that can read complex sensory information (like voices) at a fraction of the computational cost of traditional chips.

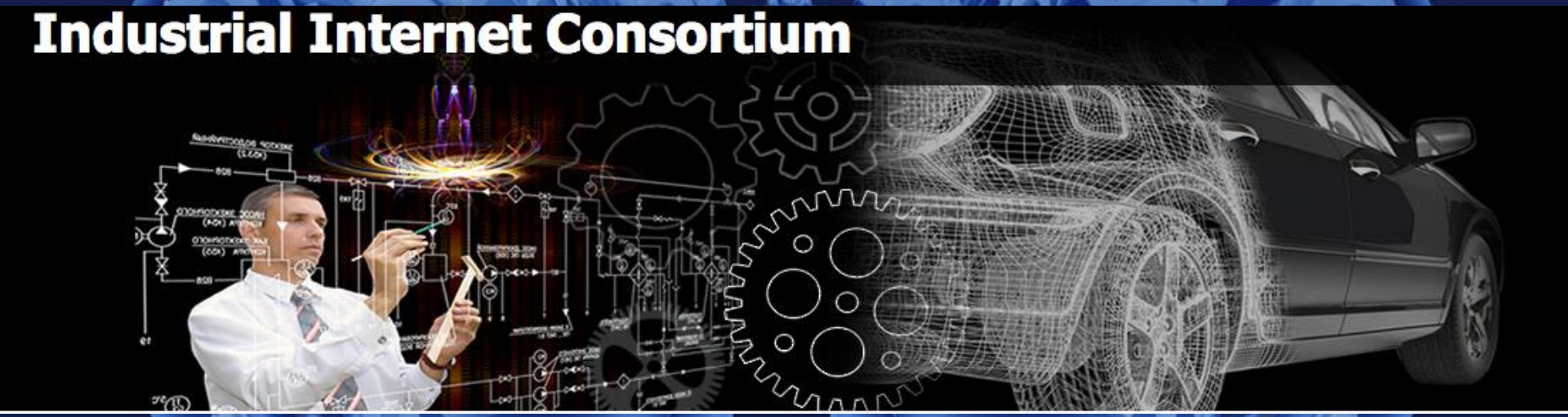
This means that Siri's daughter will be able to answer your questions faster, with less prompting, and without being as much of a drain on your battery.

These NPUs will run alongside traditional, binary CPUs, which will still be essential for running things like operating systems and tip calculators.

Intel, IBM, Qualcomm et al have neurosynaptic chipset programs to mimic the behavior of the human brain and will be used for machine learning and cognitive computing systems like Watson.

Sandia Laboratories working on neuromorphic computers that mimics human brain both in terms of parallel processing power and efficiency.

Cognitive Computing Systems in The Internet of Things (#IoT)



http://www.iiconsortium.org/

Cognitive Computing Systems in The Internet of Things will transform all kinds of machin

Cognitive Computing Potpourri for $100

- Hong Kong venture capital firm just named an AI tool known as VITAL to its Board of Directors with goal of finding better investments through more innovative decision making.
- Google using Cognitive Computing to improve the efficiency of its data centers.
- Spotting rare diseases in family photos from pictures of people with genetic disorders, including Down's syndrome, fragile X syndrome and progeria
- MIT researchers are working on a activity-recognition algorithm that is learning how to understand what is happening in videos, thereby eventually allowing the tagging of indexing of vast online video collections.
- From solar panels to batteries, algorithms are becoming key to designing new materials
- Emerald Logic has created FACET (Fast Collection Evolution Technology) that tests tens of thousands of algorithms to discover the most predictive and valuable ones.
- Allen Institute and Univ of Washington developing LEVAN (Learn Everything about Anything) that can teach itself essentially “everything it needs to know” by examining search engines through natural language processing and Machine Learning techniques.

Final Observations

Cognitive Systems hypothesize, recommend, adapt to learn from interactions then reason through dynamic experience just like humans.

But it’s not about replacing humans with machines. It’s about harnessing combined strengths of both to solve complex problems from ever-changing factors and new information.

The “programmable era" of computers invariably will be transcended by Cognitive Computing systems.

Thanks and it's a wrap……




see some of you at

Cognitive Computing Forum

www.cognitivecomputingforum.com
August 20 – 21 at St. Claire Hotel, San Jose, CA