JOE ROUSHAR – MACC 2017 BREAKOUT

NOVEMBER 9, 2017

TRACK D: Tools and Technologies
Business Value from AI and ML with Less Pain

Agenda

Implementing Watson, Einstein, TensorFlow, Azure ML, Amazon Chatbots, Swarm Intelligence, Intelligent Security and Countermeasures makes for a complex array of choices. In this presentation I will talk about the "Hype Cycle" or Business Value cycle for which technologies are mature enough for commoditization vs. exciting but not yet ready for any but the most well-funded adventurers. I will focus on my areas of deepest expertise, ML, Semantic Search, Enterprise Information Management and self-service analytics, and show how smart Bots in combination with EIM tools can dramatically reduce human analysis needed to get to deep insights and make better business decisions.

- Introduction to the session
- The Business Case for AI
- Array of Technologies and the Hype Cycle
- Specific Use Cases and Architectures
- Implementation Challenges and Learning Curves
- Reducing Human Labor with Meaningful Systems

From the front lines:

"Cognitive computing is still in its infancy. However, it's not too soon to imagine how your business and industry could be positively disrupted by this new technology." *(Deloitte)*

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Business Case for AI

What can AI do for me?

- Reduce tasks that are more and more complex so
  - Your most qualified workers spend less time
    - Gathering information
    - Arranging it
    - And preprocessing it
  - So they can derive useful insights and actionable information faster
- So the company can compete more effectively
- Learn about things that would otherwise take too much human effort to even investigate

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The Rise of Digital Innovation (from 2015 Presentation)

1960s — Infancy — Childhood — Youth — Chaos — Maturity — 2020s

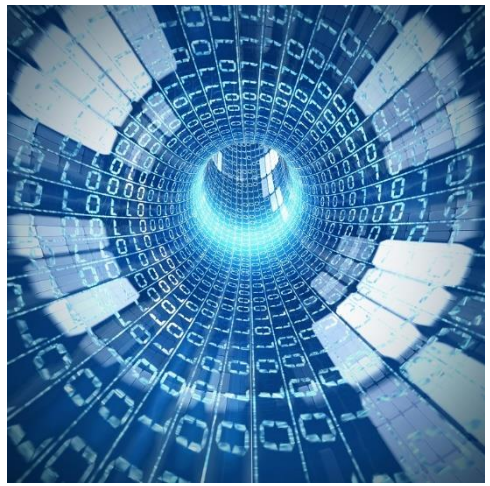
1964 – 2014

Digitize

Ideas and Insights become Algorithms and Systems

Recurring actions and e-commerce become commoditized

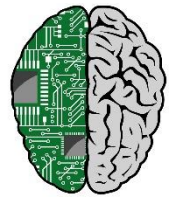
Digital information from and about things drive digital economy



2014 – 2021

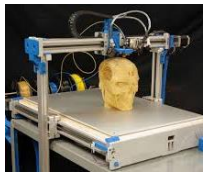
Materialize

Cognitive systems convert information to actionable knowledge



Robotics, IoT and Mobile automate more brain tasks

Synthetic biology and 3D Printing accelerate knowledge economy



Parts Based on IDC

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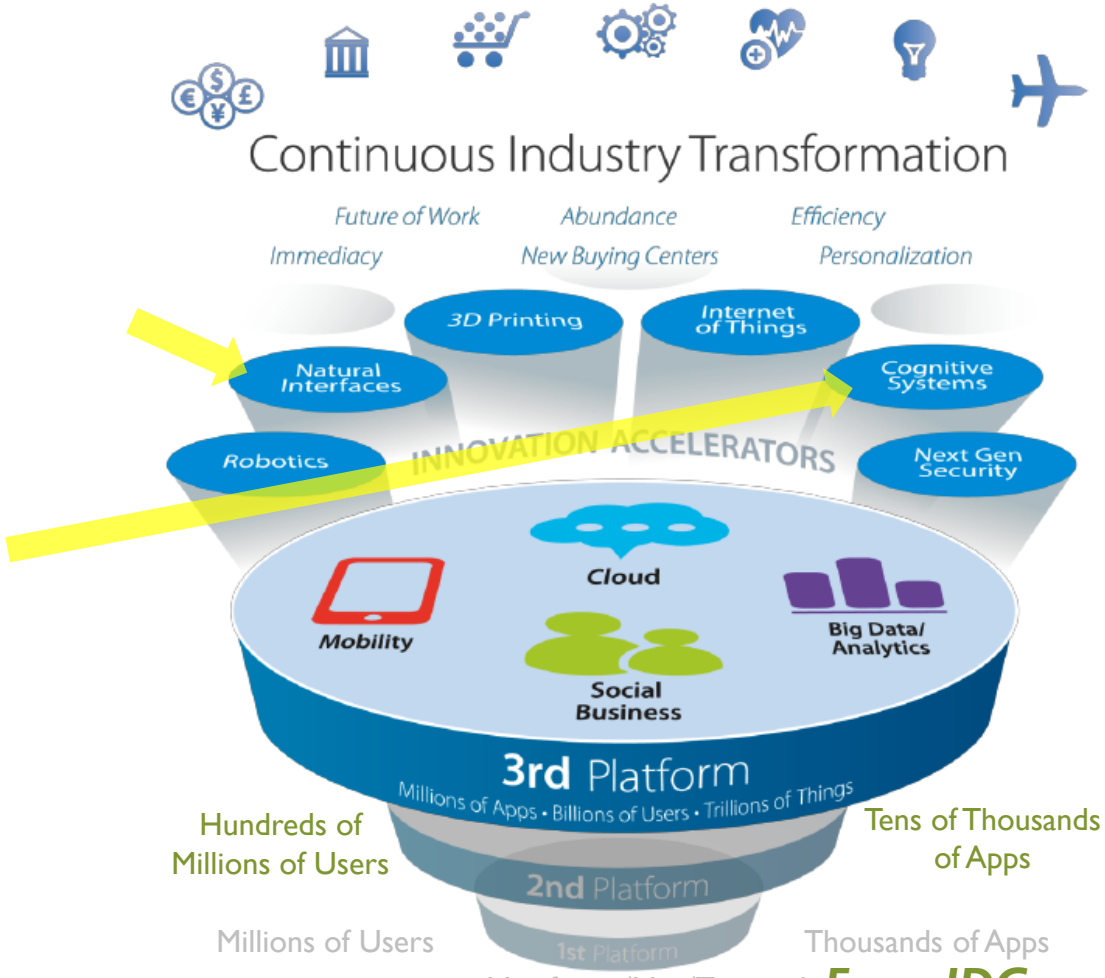
IDC Definition of the "Third Platform"

IDC FutureCast 2015

- Cognitive Systems
  - Formerly AI
  - Includes Semantics and machine learning
  - Needed to make humans more efficient and data more usable

FRAMINGHAM, Mass., October 26, 2016 – *"Widespread adoption of cognitive systems and artificial intelligence (AI) across a broad range of industries will drive worldwide revenues from nearly $8.0 billion in 2016 to more than $47 billion in 2020"*



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Array of Technologies and the Hype Cycle

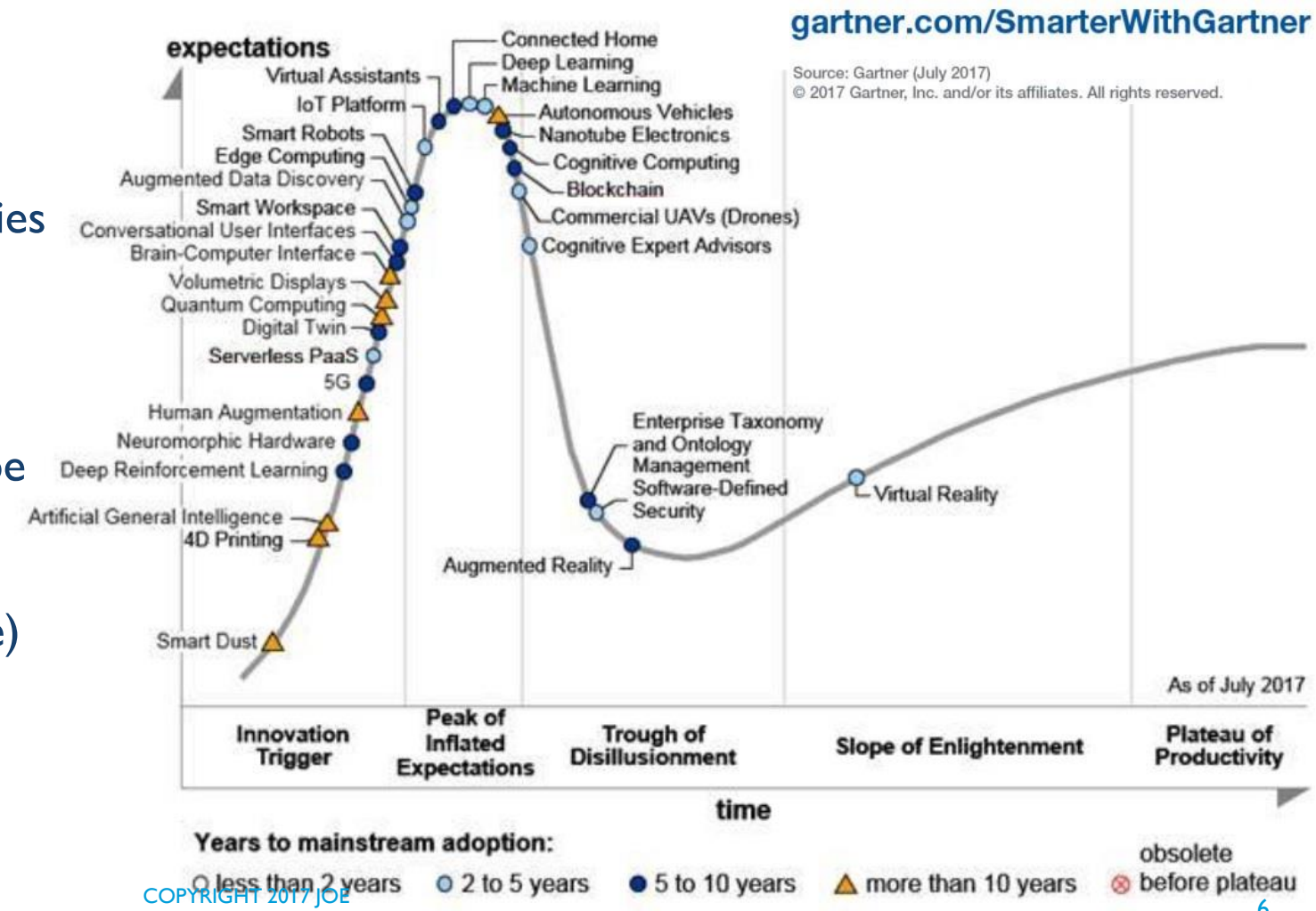
When I last spoke here – I used IDG's predictions – today, Gartner

Gartner's Hype Cycle tells multiple stories

- The array of technologies
- Variance in maturity levels
- Risks and opportunities on the upslope

What is not told:

- Implementation costs (esp. downslope)
- Overlapping capabilities
- The pace of change and disruption



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Gartner Predictions

- By 2019, more than 10% of IT hires in customer service will mostly write scripts for bot interactions.
- Through 2020, organizations using cognitive ergonomics and system design in new artificial intelligence projects will achieve long-term success four times more often than others.
- By 2020, 20% of companies will dedicate workers to monitor and guide neural networks.
- By 2019, startups will overtake Amazon, Google, IBM and Microsoft in driving the artificial intelligence economy with disruptive business solutions.
- By 2019, artificial intelligence platform services will cannibalize revenues for 30% of market-leading companies.

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Gartner AI 2017 Findings

Summary

- Artificial intelligence is changing the way in which organizations innovate and communicate their processes, products and services. Practical strategies for employing AI and choosing the right vendors are available to data and analytics leaders right now.

Key Findings

- Chatbots driven by artificial intelligence (AI) will play important roles in interactions with consumers, within the enterprise, and in business-to-business situations.
- Smart machines need to be properly set up, maintained and continuously governed if they are to be of maximum benefit to the enterprise.
- Smaller "boutique" vendors are offering chatbots targeted at specific industries and can perform niche tasks that the big-name players — like Amazon, Google, IBM and Microsoft — are not equipped to provide.
- Large AI vendors must adjust their strategies to compete with the smaller, more-nimble competitors that are threatening to dominate the market.

Recommendations

- Application leaders, data and analytics leaders and strategists should:
- Find workers who excel at internal communications and articulating processes to lead bot scripting and development.
- Seek out proposals from smaller AI vendors for specific project needs.
- Establish skills programs for developers in algorithm testing, content acquisition and data employment in artificial intelligence projects.

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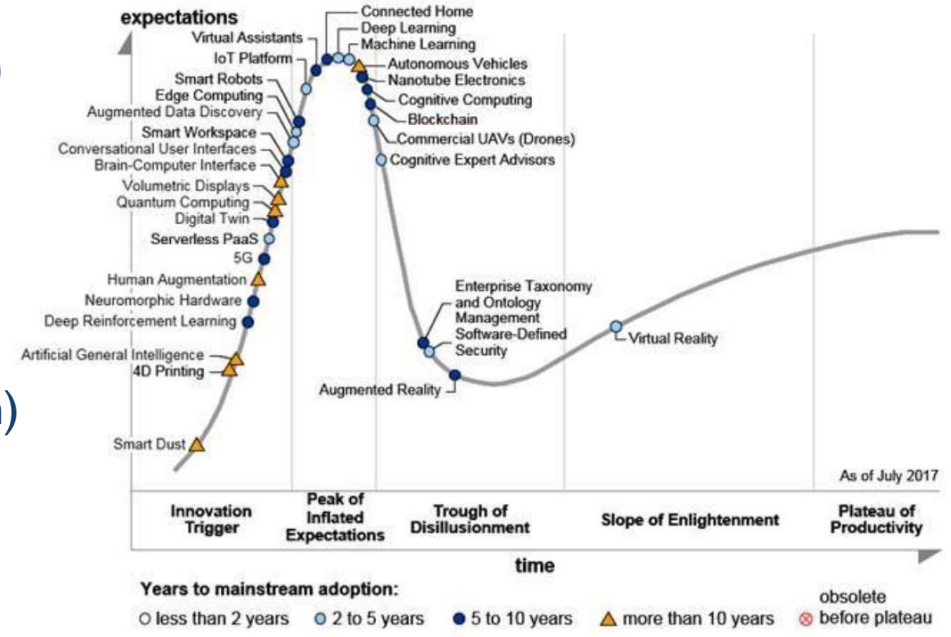
Technology to Business Capabilities (a backward view)

- Virtual and Augmented Reality (Inspection and Hands-Free Help)
- Software Defined Security (Anomaly Detection / Pattern Matching)
- Conversational User Interface (Natural Language Processing - NLP)
- Enterprise Taxonomy and Ontology Management (Semantic Concepts)
- Cognitive Expert Advisors and Virtual Assistants (Model Based DSS)
- Autonomous Vehicles and Drones (Geospatial Rule Based Motion)
- Machine Learning vs. Deep Learning (Patterns and Associations)
- Augmented Data Discovery (Bots for Converged Metadata and Search)
- Smart Workspace and Connected Home (Rule-Based Conveniences)



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Main Use Cases

Consumer

- Autonomous Vehicles / Drones
- Intelligent Virtual Assistants
- Connected Home
- Translators
- Personal Care Robots
- Conversational Interfaces

Enterprise

- Autonomous Delivery / Drones
- Machine Learning and Classification
- Customer Service / Chatbots
- Augmented Electronic Discovery
- Self-Service Business Intelligence
- Data Stewardship and Governance

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Typical Machine Learning Algorithms

- Neural Networks / Perceptrons
- Support Vector Machines
- Bayes Classifiers / Naïve Bayes Classifiers
- Markov Chain / Hidden / Monte Carlo Model
- Regression Algorithms (Linear or Logistic)
- K-Means Clustering / Unsupervised
- Decision Trees / Random Forest / Supervised Learning
- Principal / Independent Component Analysis

Collaborative Filtering

GroupLens Recommendation Engine Project at the University of Minnesota

- User-Based
- Item-Based
- Model-based

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Machine Learning – Spectrum of Approaches

"Of course, not everyone is sold on platforms for machine learning in the cloud. Trulia's vice president of engineering, Deep Varma, said he has evaluated the different offerings but has chosen to keep most of the company's machine learning work in-house. His team uses primarily open source tools, including Redis for a database, Kafka for data ingestion and Python for data analysis, to build and deploy an analytics infrastructure.

Varma said the decision of whether to build it yourself or outsource the work to a software vendor comes down to how important machine learning is to your company's operations. In the case of Trulia, Varma said using machine learning to understand its customers is the core of the real estate shopping marketplace's offering, so it's important for employees to have hands-on knowledge of how machine learning models work every step of the way. This makes troubleshooting easier and also allows for a more custom approach."

Ed Burns: TechTarget 29 Sep, 2017

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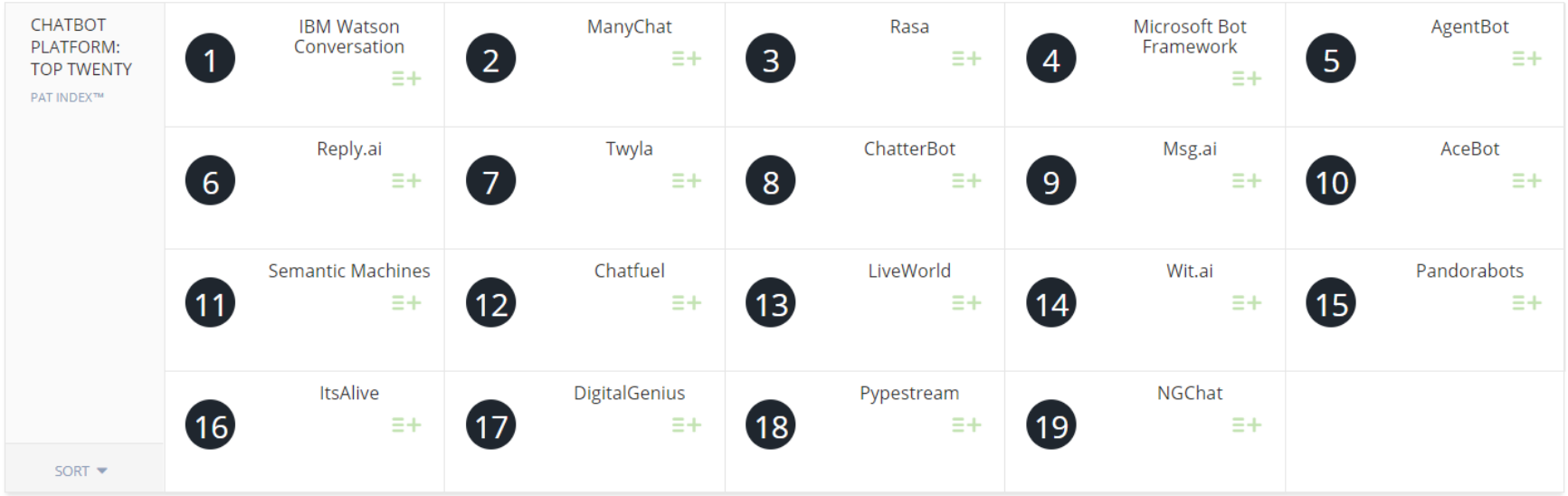
Customer Service Use Case

- Reduce the need for human intervention in all but the most difficult cases
  - Save costs in hiring, training, compensating and retaining people
  - Improve consistency and quality of service

Cautions:

1. Understand the mix of customer needs
2. Incorporate natural speech understanding
3. Provide access to humans for edge cases



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GDPR Compliance Use Case

Implementing a Data Privacy Plan to comply with GDPR

- Classifying information by:
  - Sensitivity
  - Category
- Questions to Ask
  - How can Bots help?
  - What data/rules do Bots need to be helpful?
  - How much can this reduce human effort?
  - How do you calculate the business benefit?
- Classifying data access entities as:
  - Controllers
  - Processors
- Classifying data objects
  - Defining rules for Personal vs. Business Confidential
  - Cataloging sensitive data at the right granularity
  - Automated classification and human validation
- Applying distinct access controls or GCD

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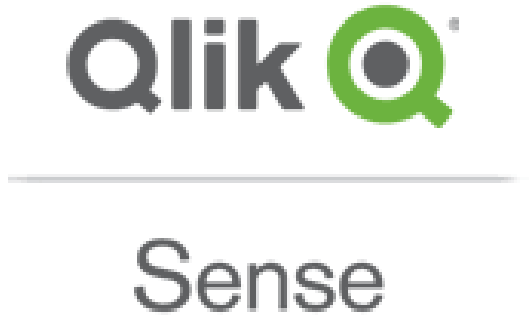
Self-Service BI Use Case



- Self-Service BI definitions are inconsistent
- Empowering ordinary users means
  - Guiding them to the information they need (Bots Build EIM)
  - Guiding them through the complex setup process
  - Helping them select appropriate visualizations based on the data
  - Helping them tweak and adapt the model

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Data Stewardship / Governance

- Enterprise Information Model
- Data Quality and Consistency
- Data Aggregation and KPIs
- Data Location and Warehousing
- Data Archiving and Destruction
- Data Loss Prevention
- Data Risk and Security
- Data Utilization Management and Monitoring
- Archiving and Deletion Policy

- Automated Model Construction / Inference
- MDM Augmented
- Automated Lineage
- Monitoring and Fine-tuning with ML
- Rule-Based Execution
- Monitoring and Fine-tuning with ML
- Security Intelligence and Countermeasures
- Monitoring and Fine-tuning with ML
- Rule-Based Execution

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What Does it Take to Implement

- Watson Chatbot Implementation

- Watson Analytics Implementation

"If Watson has not, as of yet, accomplished a great deal along those lines, one big reason is that it needs certain types of data to be "trained." And in many cases such data is in very short supply or difficult to access. That's not a problem unique to Watson. It's a catch-22 facing the entire field of machine learning"

MIT Technology Review (June 2017)

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Narrow vs. Broad AI Tools' Implementation Scope

Einstein Implementation

1. Access the Sales Cloud Einstein Setup Assistant
2. Select Who Can Use Sales Cloud Einstein
3. Enable Einstein Activity Capture for Sales Cloud Einstein
4. Enable Einstein Lead Scoring
5. Enable Einstein Opportunity Insights
6. Enable Einstein Account Insights
7. Enable Einstein Automated Contacts
8. Give Users Access to Sales Cloud Einstein Dashboards

Tensorflow Implementation

1. Study the CIFAR-10 Model
2. Define the model inputs
3. Validate the model inputs
4. Deliver the model inputs
5. Configure the Model Prediction Inference Rules
6. Configure the model training (loss, gradients…)
7. Evaluate the results and refine the model
8. Apply the outputs to real business needs

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Upshot for Watson, Einstein and Tensorflow

- Extremely powerful tools
  - That require much care and feeding
  - That require trained experts
  - But that may be needed and justified by the business case

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Workflow as AI Solution Component

- Super easy to use workflow tools such as Microsoft O365 "Flow" are not agnostic enough to operate outside their limited sphere, but the $5.00 per month is fantastic
- Pega and Appian are super agnostic and easy to use, but they cost an arm and a leg to build and license
- Boomi "Flow" for integration is agnostic and powerful in the integration sphere, but quite expensive
- Ayehu Eyeshare is agnostic, and more affordable but largely limited to the ITSM space
- Open source tools (such as Bonita and Alfresco Activiti) are agnostic and cheap, but lack some of the user friendliness and, due to lack of support, end up requiring expensive "Enterprise" contracts
- None of them have cognitive capabilities that bring significant business value

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Conclusions

- As server, storage, network, cloud and low-code development commoditize
  - Smarter (Cognitive/AI), cheaper and easier to deploy services will be the differentiators
- The Architecture discipline is as important as ever in:
  - Aligning solution selection options with Tech standards
  - Narrowing the universe of suitable options
  - Differentiating glossy brochure compatibility from reality
  - Defining the technical considerations for the business case
- Don't be afraid to try AI options, but go in eyes wide open
- Remember the key promises of AI are to:
  - Reduce the time to complete brain tasks such as analysis and decisioning
  - Discover gems of information and behaviors that humans would miss

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