



**The Fisher Center**  
For Business Analytics  
Berkeley Haas School of Business

# 2019

## Berkeley Inclusive Intelligence Symposium

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**October 30, 2019**

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**The Fisher Center**  
For Business Analytics  
Berkeley Haas School of Business

Welcome to Berkeley, welcome to Haas,  
welcome to the Institute for Business Innovation and  
welcome to the Fisher Center for Business Analytics!

To ensure sustainable success, organizations are turning to new approaches to lead their transformation in a digital age. Technology and data hoarding alone can't do the trick. It takes a more thoughtful strategy to create durable value from analytics. Humans, ethics, and diversity are a large part of the equation to foster a data-driven culture that delivers business results. They also ensure a model that respects our society and every individual and that unbiasedly tackles tomorrow's challenges.

Many organizations are striving to deliver on this vision. Implementing it may create some upfront challenges but clears many of the roadblocks that would slow them down in the long run.

Join us to learn, share and connect with leaders, faculty, and students about the untapped potential of inclusive and ethical analytics.

Our symposium exemplifies the variety of people and experiences that make analytics relevant to business and that make it one of the most fascinating domain to study.

We wish you all the best on your business analytics journey.

**Zsolt Katona**

Cheryl and Christian Valentine Associate Professor  
Faculty Director, Fisher Center  
for Business Analytics

**Gauthier Vasseur**

Alliance for Inclusive AI Co-President  
Executive Director, Fisher Center  
for Business Analytics

# The Alliance For Inclusive AI

**Beena  
Ammanath**

**Presidents and Co-Founders**

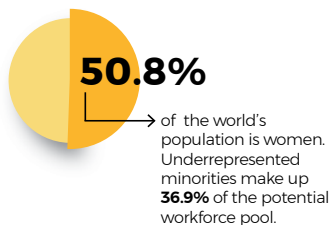
**Gauthier  
Vasseur**



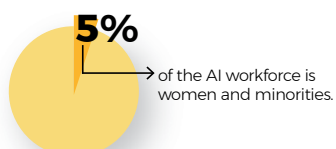
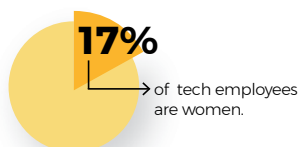




## WHAT THE NUMBERS SAY



## YET, ONLY



# INCLUSION IS THE FUTURE OF AI

## It's no secret that ...

the data economy is here—and biased data and algorithms will represent a global risk for organizations and society.

## Our purpose...

is to create a holistic ecosystem that supports the inclusion of more women and underrepresented minorities in the fields of analytics and AI to keep the fields balanced, unbiased and ethical.

## Why Women and Underrepresented Minorities?

There is a shortage of women and underrepresented minorities in STEM. Today's challenges are too complex and multifaceted for non-diverse teams. More inclusive groups deliver creative and low-biased AI algorithms. Passing up more than 50% of human brainpower is not only unfair, it's also counterproductive.

## Why Build an Educational Ecosystem?

Our society needs structured educational and networking programs that evolve with rapid AI developments. Building a professional AI educational ecosystem will ensure women and underrepresented minorities are continuously engaged in the future of work and society.



# AIAI, THE ALLIANCE FOR INCLUSIVE AI

nurtures a holistic AI ecosystem for unbiased, ethical, and impactful data science. We accelerate the inclusion of women and underrepresented minorities in the fields of AI and analytics.

**WE...**run research, create awareness, provide education, offer mentoring, facilitate internships, and connect people with job opportunities.

**FOSTER...**the inclusion of women and underrepresented minorities in analytics and AI by developing ecosystems and communities to integrate learning, networking, and career development.

**INCLUSIVE...**connections with world-class organizations and the vibrant UC Berkeley ecosystem.

**AI...**that is powered by diverse teams leads to a balanced, humane, and ethical society.

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## OUR FACE PROGRAM

### Funding

- > Raise funding for scholarships and educational activities
- > Recruit world-class AI researchers, industry professionals, and academic laureates
- > Provide all-inclusive access to conferences, training, internships, research projects, and job placement

### Awareness

- > Develop programs that drive awareness and inclusion
- > Connect aiai partners with fellows associated with the UC Berkeley-Fisher Center for Business Analytics (FCBA) and the UC Berkeley network (alumni, centers, students, and faculty)
- > Host AI and analytics events

### Competence

- > Offer educational courses in AI and analytics
- > Provide access to hands-on learning within AI research projects
- > Extend professional training and career coaching

### Engagement

- > Connect to distinguished leaders, fellows, and companies in the AI field
- > Facilitate internships, speaking engagements, and job placement
- > Provide ongoing mentorship from AI experts



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# INCLUSION IS A TWO-WAY STREET

## Support Inclusive AI and Become AI Inclusive

Your donation supports **the AI development journeys of women and underrepresented minorities**. Trainees receive education, access to events, mentorship, and career support.

Your donation supports **your teams' AI development journeys and helps them embody inclusion**. Your teams receive access to events and training and will be directly involved in inclusive workshops.



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## WHO WE ARE

**aiai incorporates AI thought leadership from two stellar organizations**

### The Fisher Center for Business Analytics

**The center advances the creation of business value from data science.**

The center pursues its vision through research, education, and by accelerating the diffusion and adoption of analytics throughout all aspects of business and management.

Its missions are to explore and design new data science applications, support data democratization, and establish the grounds for reasoned, wise, and inspired data governance.

Based on UC Berkeley's values, which foster thought-leading excellence, the center collaborates with organizations around the world to push new frontiers.



Gauthier G. Vasseur  
Executive Director

### Humans For AI

**Inclusive + Diverse + Balanced**

Our purpose is to facilitate the equal representation of women in AI.

We empower domain experts with AI skills, literacy, awareness, community, and advocacy.

We believe that gender parity and greater diversity among AI domain experts will lead to increased social alignment, humanization, and a broadening of the AI field.

We recognize AI's emerging importance for business and society and the clear lack of women in the field.

We believe the next wave of growth and value will be driven by domain experts in the field of AI.



Beena Ammanath  
Founder and CEO  
Humans For AI

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## AIAI CORE TEAM

### ALLIANCE PRESIDENTS

Beena Ammanath and Gauthier Vasseur

### MARKETING

Adriana Macias

Taline Felix

Joy Jacob

Clarissa Wu

Arvin Villadelgado

Lena Ringwald

Diane Schiller

Berkeley Haas Grad Team  
Institute for Business Innovation

### TECHNOLOGY & OPERATIONS

Madelyn Montilla

### INTERNATIONAL REPRESENTATION

India

Australia

UK

France

## PARTNERS



BerkeleyHaas



DATAWISE  
ACADEMY



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# “New Tech, New Challenges, New CIO?”

## Wendy Pfeiffer

CIO,  
Nutanix

**“CIO of the Year”**



Wendy’s focus on enterprise adoption of modern technologies fuels the company’s global mission. Wendy also serves on the boards of Qualys, Inc. and Girls In Tech. A consumer tech enthusiast, Wendy has led technology and operational functions for Robert Half, GoPro, Yahoo! and Cisco. She was also ranked first on Enterprise Management 360’s list of Top 10 Tech CIO’s, named one of Silicon Valley Business Journal’s Women of Influence and listed as one of the National Diversity Council’s Top 50 Most Powerful Women in Technology.



# Inclusive AI

Wendy M. Pfeiffer, CIO Nutanix

NUTANIX

## Silicon Valley Powers AI

- According to The Guardian, at \$128,308 per capita in annual gross domestic product (GDP), Silicon Valley out-produces every nation except Qatar.
- The valley's output, pegged at \$275bn by the federal Bureau of Economic Analysis, is higher than Finland's.
- Home to nearly 2 million, the San Jose metro area includes Stanford University in Palo Alto, Google's headquarters in Mountain View and Apple HQ in Cupertino.
- More than half of the world's tech billionaires live in Silicon Valley.

NUTANIX



## But It's Kind of a Bro Culture

2019 State of Women in Tech Survey:

- 12 percent of engineers at Silicon Valley startups are women.
- Only 11 percent of executive positions at Silicon Valley companies are held by women.
- Only 5 percent of leadership positions in the tech sector are held by women
- Women make up only 7 percent of partners at top 100 venture capital firms.
- More than 30 percent of women over the age of 35 are still in junior positions.



NUTANIX

## And Youth Rules

According to a 2019 research study by Visier: "Ageism is an important issue organizations across industries should be aware of and take steps to monitor and improve.

Here's what they found for tech:

- Generation X-ers (aged 34 to 51) in tech are being hired 33% less than their workforce representation
- Millennials (aged 20 to 33) working in tech are being hired almost 50% more than their workforce representation
- Baby boomers (aged 52 to 70) are 60% less likely to be hired than their workforce representation in tech and non-tech fields



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## Our Robot Overlords

<https://www.youtube.com/watch?v=J3lYLphzAnw>

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## In My Dystopian Nightmares...

- My self-driving car can't understand me
- My smart home locks me out
- My skills and perspective are so devalued that I can't support my family

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## In My Utopian Daydreams...

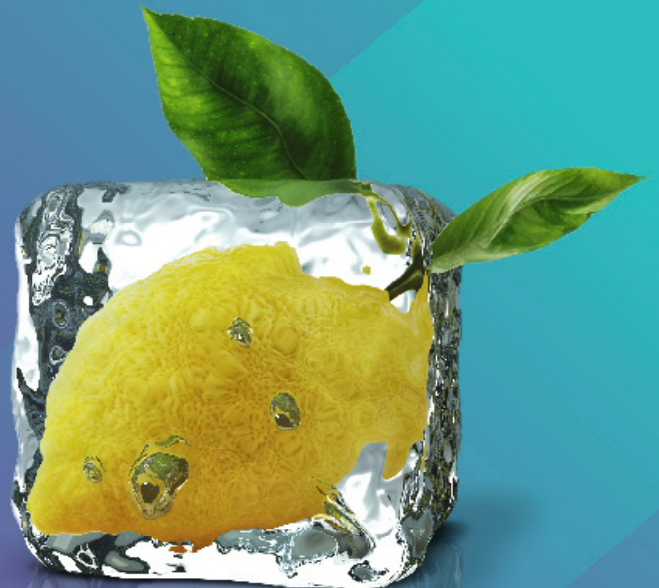
- My son and daughter have rewarding, compelling work and rich personal lives, enhanced by technology
- Siri can understand me
- There is no more tech job shortage




## It's Always Now

I am inspired for this presentation by the lyrics to The RebelS "It's Always Now"

"The human race is about to fall  
'Cause the machine is taking control  
You think you know but they know you more  
We gotta fight, please don't get me wrong!  
And everybody knows  
That the past is gone  
And never will return  
And the future's false  
They don't want you to know  
That it's always now!"







“What you see is all there is.  
When people think they’re  
being creative or thinking  
‘outside the box,’ in reality,  
your box is defined by what  
you’ve heard about.”

Nobel Prize-winning  
economist Daniel Kahneman

NUTANIX

## Learning

James Clear, author of Atomic Habits, says:

- “While it’s important to know as much as possible before you start, real learning comes from experience. From trial and error and trying different methods to see what works best for you.”
- So, how do we build this mental picture of ourselves? James Clear says it happens through doing.
- Every action you take becomes a “vote” for the type of person you want to become. So for example, if you study Spanish every Tuesday night for 20 minutes, every session is a little vote for being a ‘studious’ person.
- “You end up viewing your habits as evidence for the type of person you want to become.”

Interesting...that’s exactly how we  
train the machine!



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## Knowing

"Artificial intelligence will reflect the value of its creators," says Kate Crawford of the AI Now Research Institute. "So inclusivity matters — from who designs it to who sits on the company boards and which ethical perspectives are included. Otherwise, we risk constructing machine intelligence that mirrors a narrow and privileged vision of society, with its old, familiar biases and stereotypes."

But what if Silicon Valley's AI reflected the values of "these" engineers?

- **Workaround:** WorkAround is a training data annotation platform that takes your data from incomplete to AI-ready. Refine your data and build datasets alongside top universities and companies. WorkAround connects refugees with human intelligence tasks such as translation, image tagging or research.
- **Andela:** Andela invests in Africa's most talented software engineers to help companies solve the technical talent shortage and build high-performing distributed engineering. Over the past four years, Andela has identified and hired the top <1% of over 130,000 applicants to work as full-time distributed team members from their tech campuses in Lagos, Nairobi, and Kampala.



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## Teaching

- Give time to Mozilla's Common Voice: <https://voice.mozilla.org/en>
- Ask your ML/AI/NLP suppliers about how they've trained their systems. Where do they get their data?
- Insist on diverse sources for training data, and build this into contracts, project plans, budgets, timelines.



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The Future of AI is in Your Hands



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# “Automated Machine Learning - Empowering Data Scientists and Businesses”

## Sarah Aerni

Director of Data Science,  
Salesforce.com

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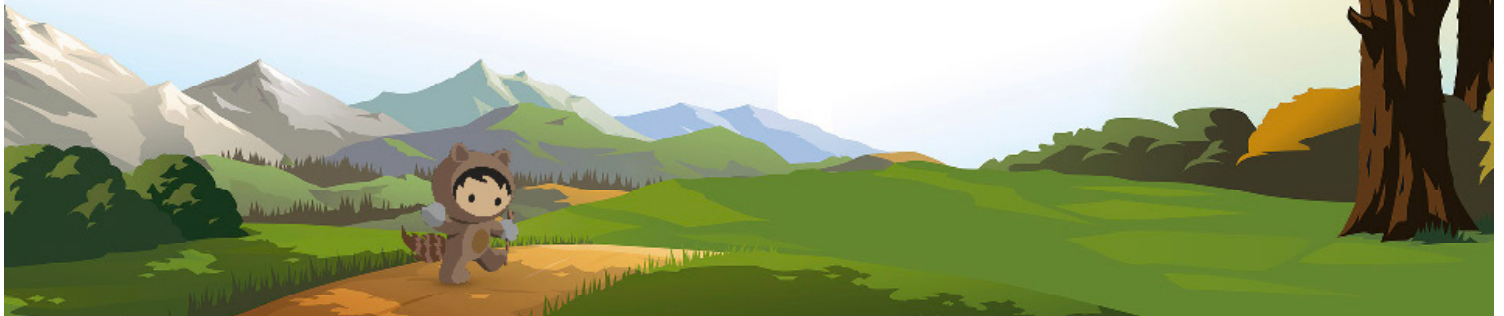
Sarah is a leader with technical expertise in building and deploying machine learning models in production. She is currently obsessed with agility in data science, monitoring and alerting, refreshing models in production with zero downtime and helping customers address challenges around data bias. Sarah also has Salesforce experience in leading hybrid engineering and data science teams and shipping products producing billions of predictions daily across thousands of models using a fully automated machine learning pipeline.



# Automated Machine Learning Empowering Data Scientists and Businesses

Sarah Aerni, PhD  
Director of Data Science, Einstein Platform

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@tweetsarah



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The risks and uncertainties referred to above include – but are not limited to – risks associated with developing and delivering new functionality for our service, new products and services, our new business model, our past operating losses, possible fluctuations in our operating results and rate of growth, interruptions or delays in our Web hosting, breach of our security measures, the outcome of any litigation, risks associated with completed and any possible mergers and acquisitions, the immature market in which we operate, our relatively limited operating history, our ability to expand, retain, and motivate our employees and manage our growth, new releases of our service and successful customer deployment, our limited history reselling non-salesforce.com products, and utilization and selling to larger enterprise customers. Further information on potential factors that could affect the financial results of salesforce.com, inc. is included in our annual report on Form 10-K for the most recent fiscal year and in our quarterly report on Form 10-Q for the most recent fiscal quarter. These documents and others containing important disclosures are available on the SEC Filings section of the Investor Information section of our Web site.

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## About Me

2003-2012

RESEARCH IN DATA + MACHINE LEARNING

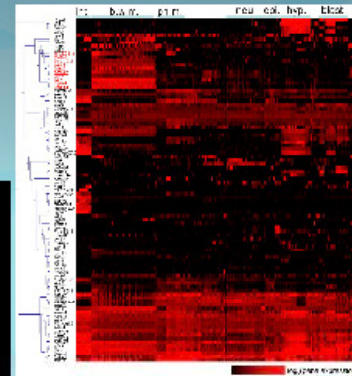
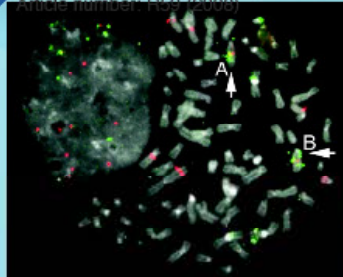


BROWN

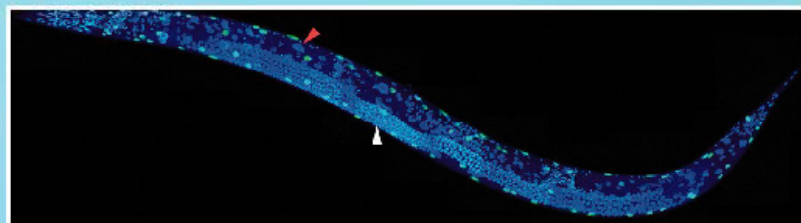


UC San Diego

BJ Raphael, et al, A sequence-based survey of the complex structural organization of tumor genomes, *Genome Biology* 9, Article number: R58 (2008)



X Liu, et al, Analysis of Cell Fate from Single-Cell Gene Expression Profiles in *C. elegans*, *Cell*, Volume 139, Issue 3, 30 October 2009, Pages 623-633



SJ Aerni, et al, Automated cellular annotation for high-resolution images of adult *Caenorhabditis elegans*, *Bioinformatics*, Volume 29, Issue 13, 1 July 2013, Pages i18-i26

## About Me

2003-2012

RESEARCH IN DATA + MACHINE LEARNING

2010+

DATA SCIENCE

voyurl

Pivotal®

DELL EMC

## About Me

2003-2012

RESEARCH IN DATA + MACHINE LEARNING

2010+

DATA SCIENCE

2014+

AGILITY IN AI

# Pivotal®

## About Me

2003-2012

RESEARCH IN DATA + MACHINE LEARNING

2010+

DATA SCIENCE

2014+

AGILITY IN AI

2016+

AUTOMATED MACHINE LEARNING

TEST-DRIVEN DEVELOPMENT FOR MACHINE LEARNING

2019+

# salesforce



## Adoption of AI is Considered Critical to Stay Competitive!



FIGURE 2

### AI helps organizations keep up with the (Dow) Joneses

Relative to competitors, respondents say their company's adoption of AI has allowed them to . . .



Source: Deloitte State of AI in the Enterprise, 2nd Edition, 2018.

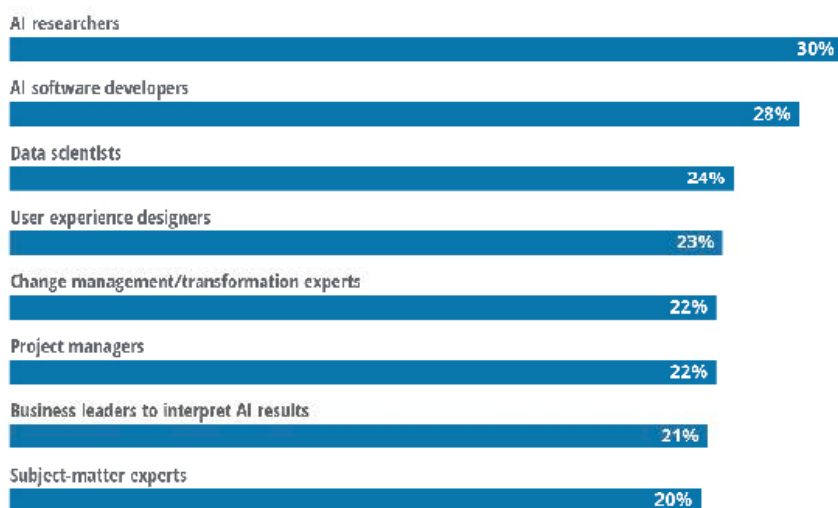
Deloitte Insights | [deloitte.com/insights](https://deloitte.com/insights)



FIGURE 8

### Companies need a broad range of skills for their AI initiatives

Respondents rating each a top-2 needed skill to fill their company's AI skills gap



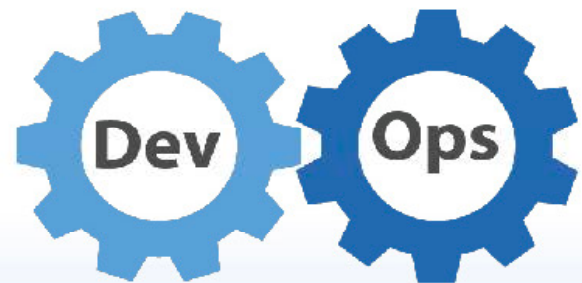
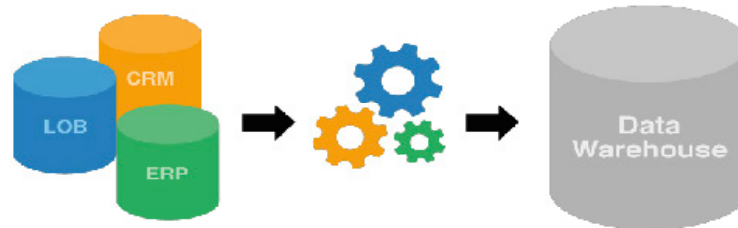
Note: Base – those who said that their company has moderate/major/extreme skills gap in meeting the needs of AI/cognitive projects. Sample size = 252.

Source: Deloitte State of AI in the Enterprise, 2nd Edition, 2018.

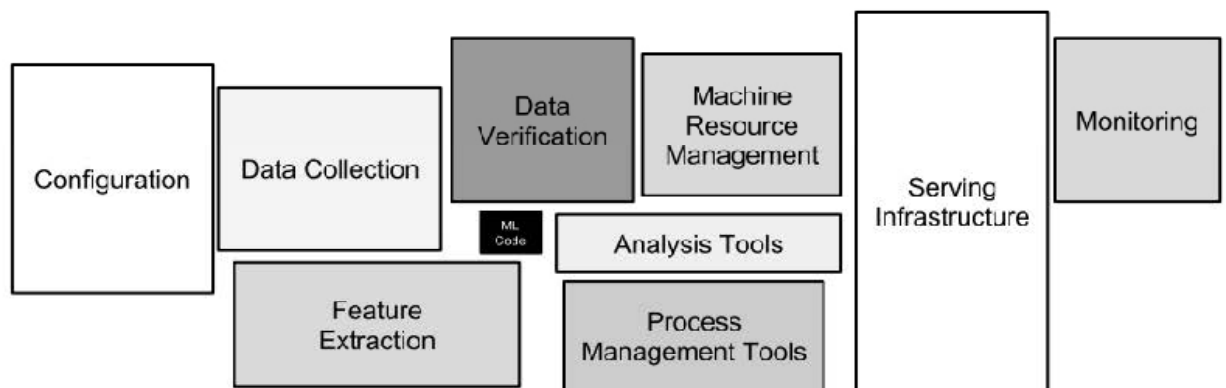
Deloitte Insights | [deloitte.com/insights](https://deloitte.com/insights)



## For the Majority of Businesses, Data Science is Out of Reach



## Supporting a Model in Production is Complex



Only a small fraction of real-world ML systems is composed of ML code, as shown by the small black box in the middle. The required surrounding infrastructure is fast and complex.

D. Sculley, et al. Hidden technical debt in machine learning systems. In Neural Information Processing Systems (NIPS). 2015

# How Automated Machine Learning Drives Agility



## Examining how Salesforce Multiplies our Data Scientists

Sharing our journey to Salesforce-scale agile AI

## Understanding your Data Scientists

Bridging the communication gap between data scientists and software developers to find common ground and get to production and agility

## Enabling your Data Scientists

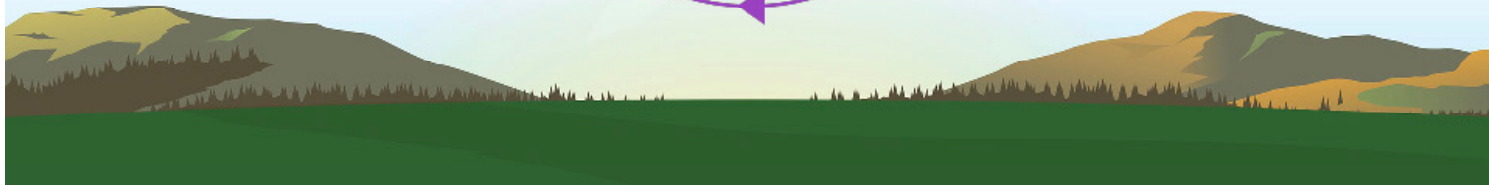
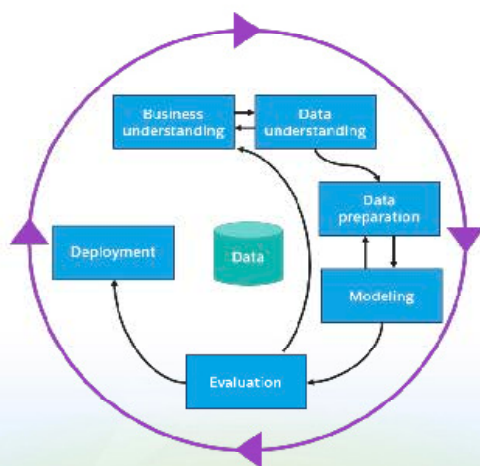
Building a platform to support agile data science with the tools they need to iterate on their models

## Empowering your Data Scientists

Adding process to help your data scientist and organizations make progress at every step



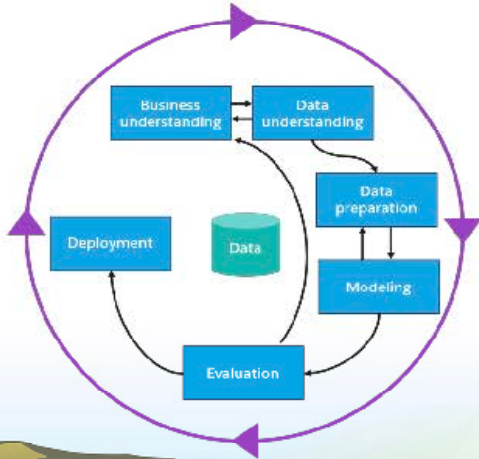
# How Companies Build ML Apps



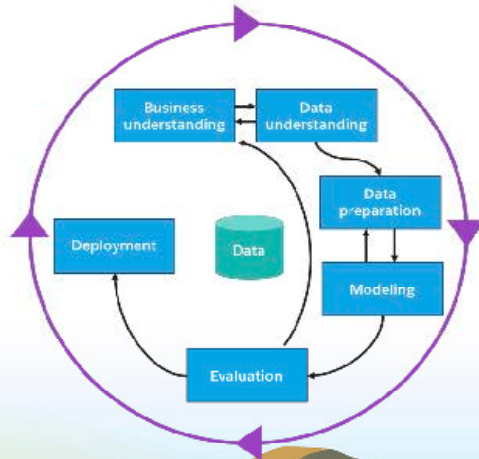


# How Companies Build ML Apps

Data Scientists on App #1

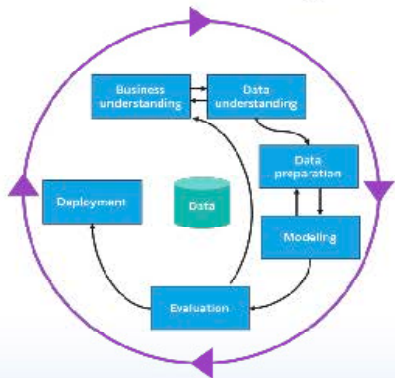


Data Scientists on App #2

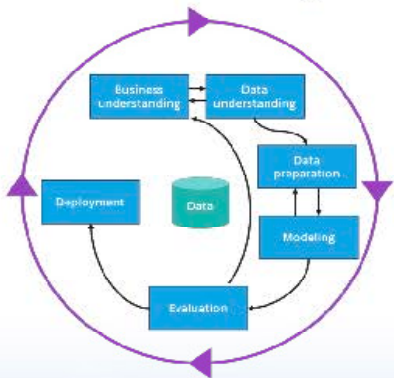


# Let's Add a Third App

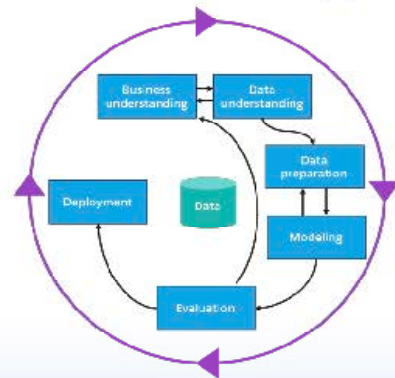
Data Scientists on App #1



Data Scientists on App #2



Data Scientists on App #3

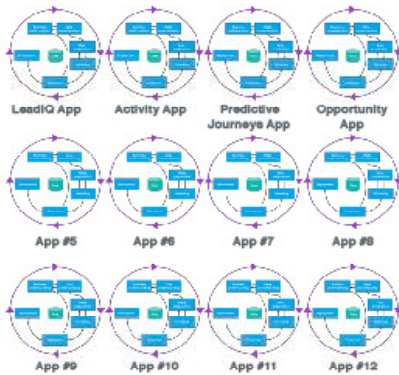




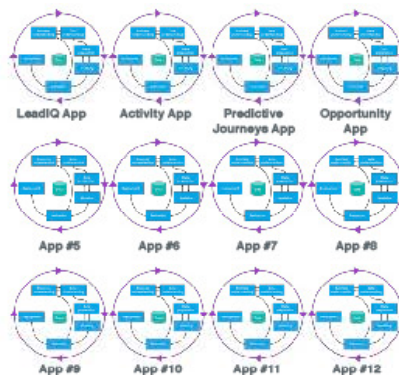
## How This Process Would Look in Salesforce



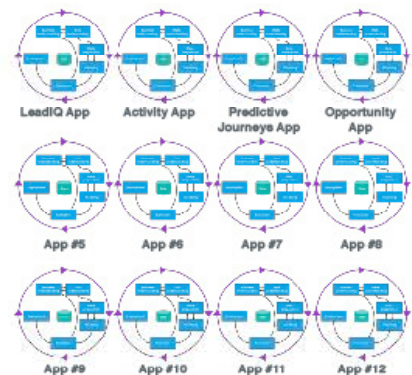
Customer #1



Customer #2



Customer #3



150,000 customers

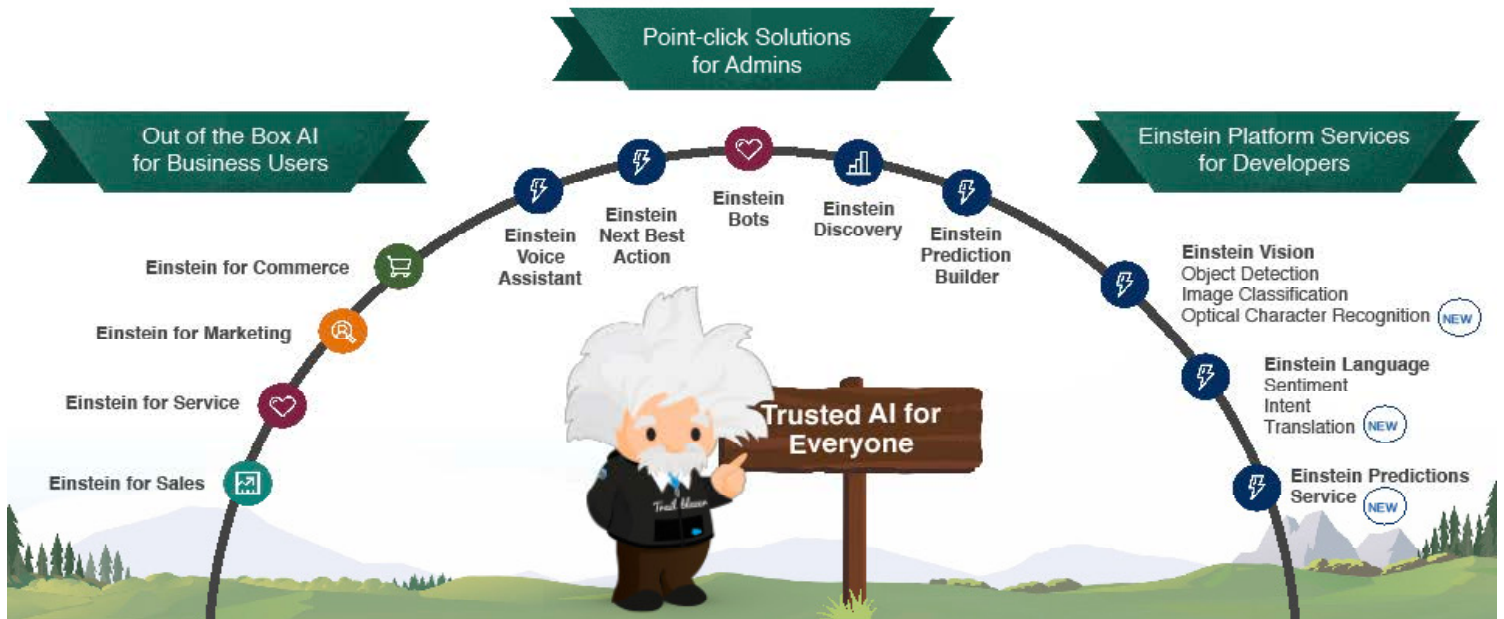
**“MAKE EVERYTHING AS SIMPLE AS POSSIBLE,  
BUT NOT SIMPLER.”**

**ALBERT EINSTEIN**

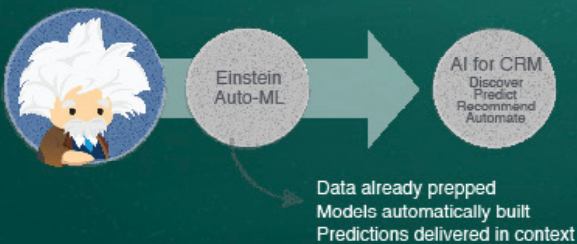
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# Empowering Every Admin & Developer with AI

The Einstein platform



## Einstein's New Approach to AI Democratizing AI for Everyone



# How Automated Machine Learning Drives Agility



## Examining how Salesforce Multiplies our Data Scientists

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### Understanding your Data Scientists

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### Enabling your Data Scientists

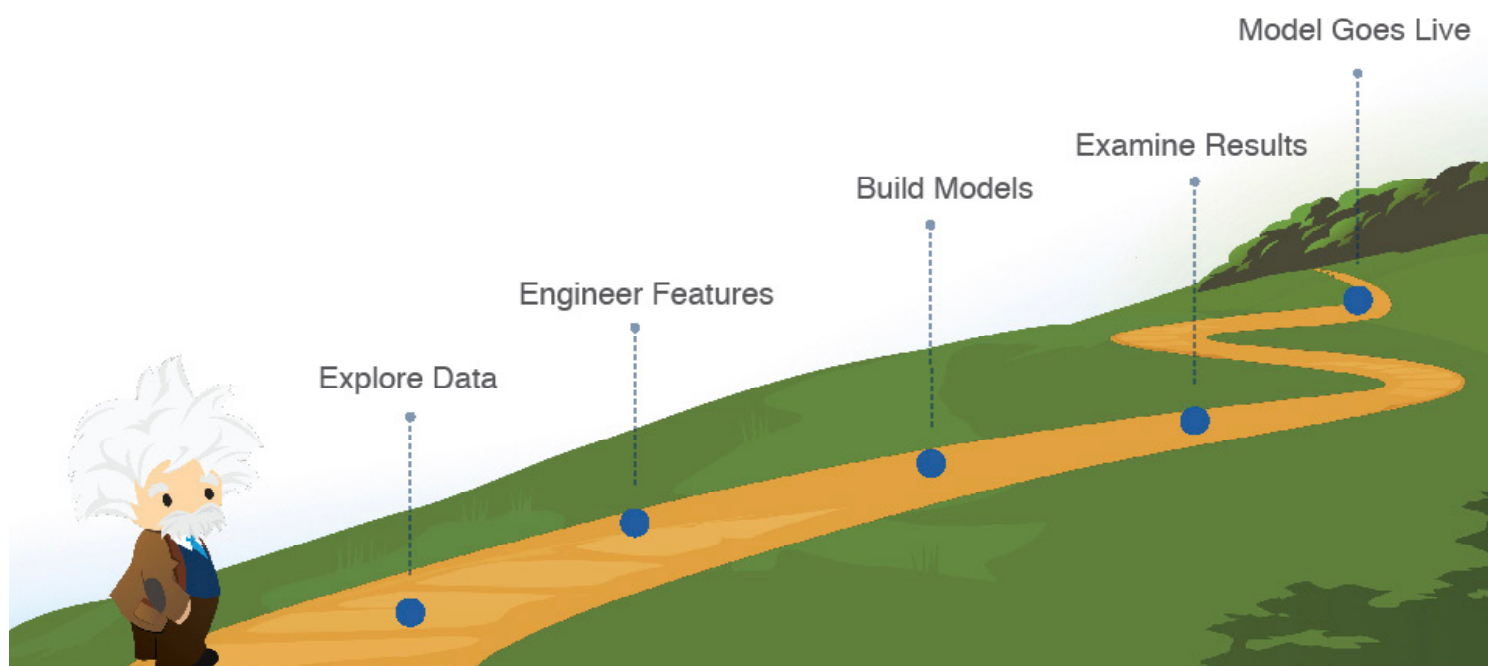
Building a platform to support agile data science with the tools they need to iterate on their models

### Empowering your Data Scientists

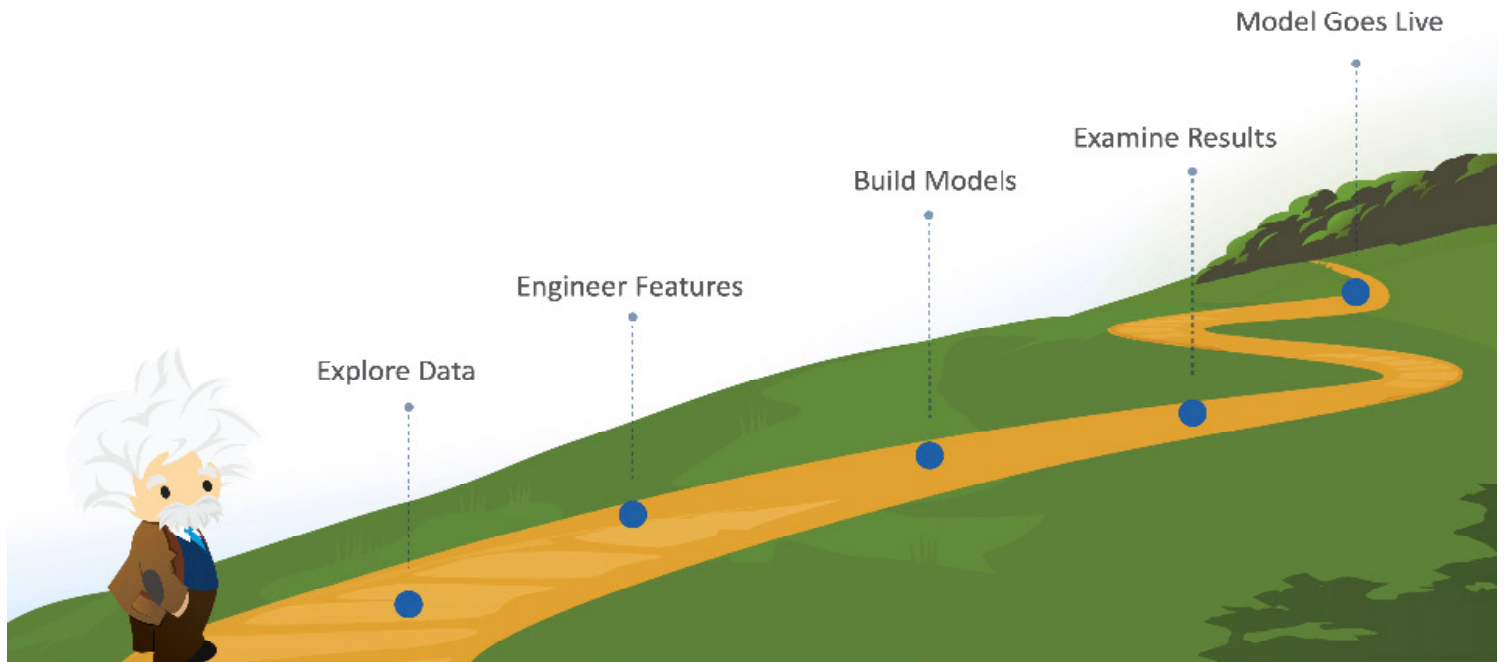
Adding process to help your data scientist and organizations make progress at every step



## A data scientist's view of the journey to building models







“The single biggest problem in communication is the illusion that it has taken place.”

- George Bernard Shaw





## What are critical components to shipping your app!

**APPLICATION** to reach customers

**PIPELINES** to deliver data to **modeling** and **scoring services**

**MONITORS** to know the health of models

**EXPERIMENTATION** frameworks and **AGILE PROCESS** to iteratively improve

**WAY TO DEPLOY** new models



## Bringing a Model to Production Requires a Team

### Data Scientists

- Continue evaluating models
- Monitor for anomalies and degradation
- Iteratively improve models in production

### Data Engineers

- Provide data access and management capabilities for data scientists
- Set up and monitor data pipelines
- Improve performance of data processing pipelines

### Front-End Developers

- Build customer-facing UI
- Application instrumentation and logging

### Product Managers

- Gather requirements & feedback
- Provide business context

### Platform Engineers

- Machine resource management
- Alerting and monitoring



## How different are data scientist and software developers?



### Data Scientists

- Monitor the performance of their models
- Identify opportunities to improve models
- Want to explore new data/algorithms
- Need processes to test new models
- Need a way to redeploy new models
- Find opportunities for reuse

### Software Developers

- Monitor the performance of their apps
- Identify opportunities to add features
- Want to explore new technology
- Need processes to test new features
- Need a way to redeploy their app
- Find opportunities for reuse



**Give your team the tools they need!**





## How the Salesforce Einstein Platform Enables Data Scientists

Deploy, monitor and iterate on models in one location

**6B+**  
predictions  
per day

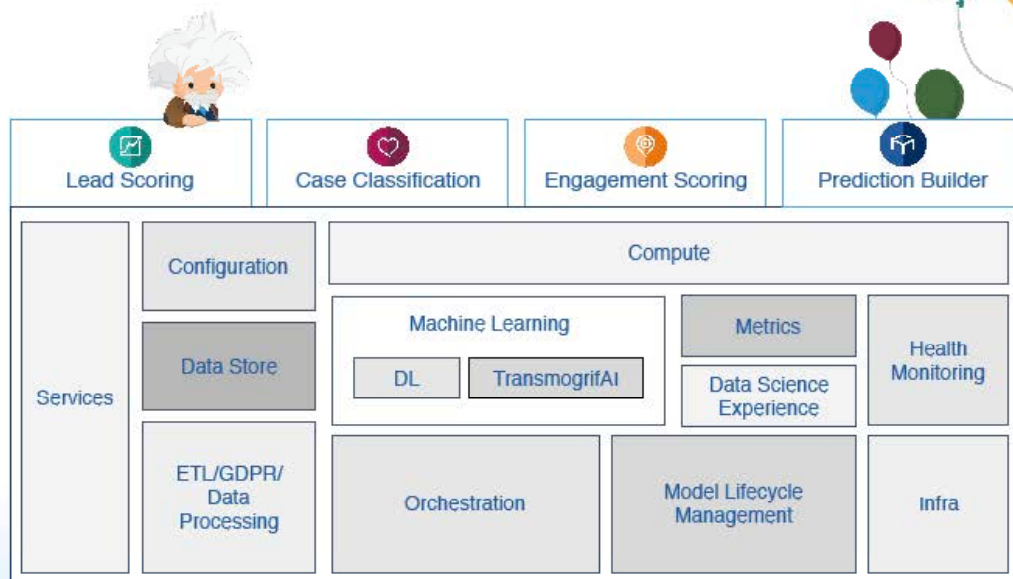
Microservice architecture

Shared feature engineering and modeling services

Customizable model-evaluation & monitoring dashboards

In-platform secured experimentation and exploration

**Data Scientists focus their efforts on engineering new features, trying new models and evaluating results**



## How Automated Machine Learning Drives Agility



### Examining how Salesforce Multiplies our Data Scientists

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Bridging the communication gap between data scientists and software developers to find common ground and get to production and agility

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Building a platform to support agile data science with the tools they need to iterate on their models

### Empowering your Data Scientists

Adding process to help your data scientist and organizations make progress at every step



## How do we build models? evaluate? reuse?



```
>>> from sklearn import svm
>>> from numpy import loadtxt as l, random as r
>>> clf = svm.SVC()
>>> pls = numpy.loadtxt("features.data", delimiter=",")
>>> testSet = r.choice(len(pls), int(len(pls)*.7), replace=False)
>>> X, y = pls[testSet, :-1], pls[testSet, -1]
>>> clf.fit(X, y)
SVC(C=1.0, cache_size=200, class_weight=None,
coef0=0.0, decision_function_shape=None, degree=3,
gamma='auto', kernel='rbf', max_iter=-1,
probability=False, random_state=None, shrinking=True,
tol=0.001, verbose=False)
>>> clf.score(pls[testSet, :-1], pls[testSet, -1])
0.88571428571428568
```

Should we try other model forms?  
Features?  
Kernels or hyperparameters?

How do we make the best  
decisions for every model in  
production?

Learn from the  
mistakes of others.  
You can't live long  
enough to make them  
all yourself

Eleanor Roosevelt



# Introducing TransmogrifAI

Open Sourcing Auto-ML for Structured Data

Automated feature engineering,  
feature selection & model selection

ML abstractions that improve  
developer productivity &  
collaboration

Model explainability to improve  
debuggability and transparency



```
// Read the Deal data
val dealData = DataReaders.Simple.csvCase[Deal](path = pathToData).readDataset().toDF()

// Extract response and predictor features
val (isClosed, predictors) = FeatureBuilder.fromDataFrame[RealMM](dealData, response = "isClosed")

// Automated feature engineering
val featureVector = predictors.transmogrify()

// Automated feature selection
val cleanFeatures = survived.sanityCheck(featureVector, removeBadFeatures = true)

// Automated model selection
val (pred, raw, prob) = BinaryClassificationModelSelector()
  .setInput(isClosed, cleanFeatures).getOutput()

val model = new OpWorkflow().setInputDataset(dealData).setResultFeatures(pred).train()
```

## Repeatable Elements in Machine Learning Pipelines

AutoML for feature engineering

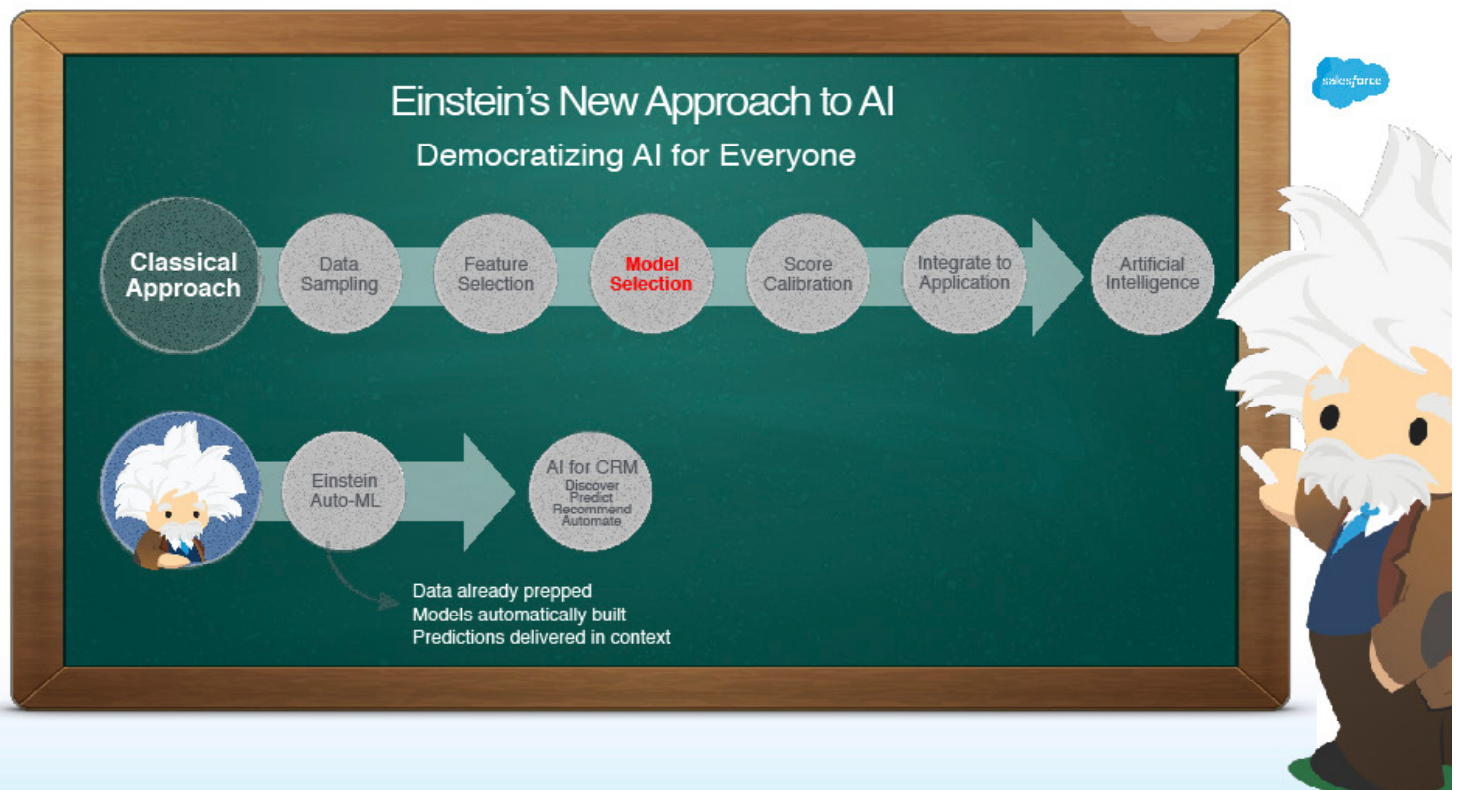


Categorical Variables		Text Fields	Numerical Buckets
NAME	TITLE	DESCRIPTION	number of employees
Jim Steele	Senior VP	A blessing in disguise	90
John Gardner	Senior VP	Time flies when you're having fun	16
Andy Smith	Vice President	Alles hat ein Ende, nur die Wurst hat zwei	224
Test User	Vice President	um den heißen Brei herumreden	192
Test User	CEO	We'll cross that bridge when we come to it	335
Test User	Vice President	You can say that again	12
Test User	Chairperson	Your guess is as good as mine	621
Test User	CEO		72
			560
			80
			24
			0
			208

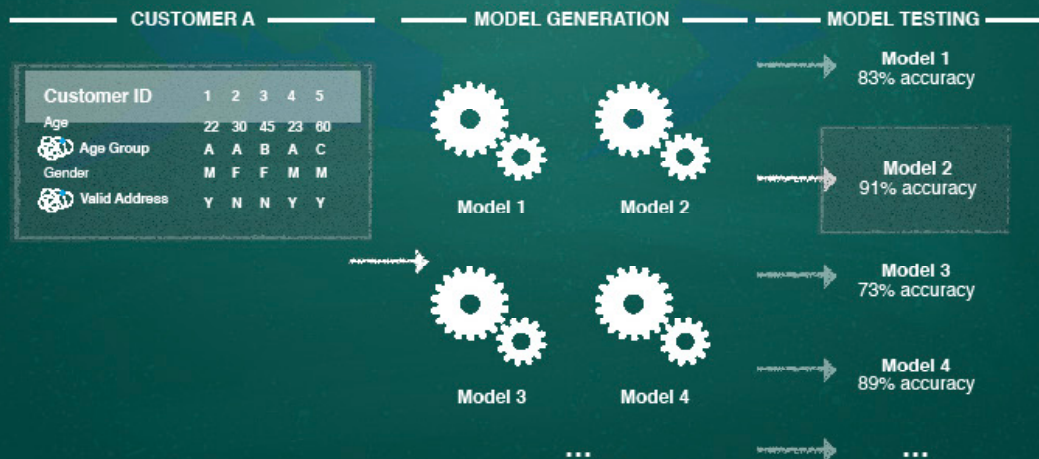
# Repeatable Elements in Machine Learning Pipelines

AutoML for feature engineering

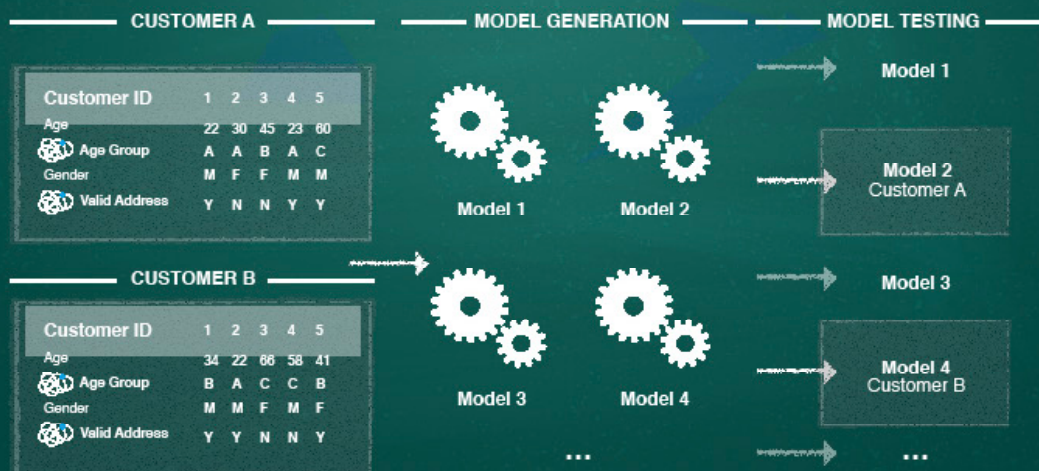
Text Fields	Word Count	Word Count (no stop words)	Is English	Sentiment
	4	2	1	1
	6	3	1	1
	9	4	0	0
	6	4	0	-1
	7	3	1	0
	5	1	1	0
	7	3	1	0



# A tournament of models!



# A tournament of models!





## How the Salesforce Einstein Platform Enables Data Scientists

Deploy, monitor and iterate on models in one location

**6B+**  
predictions  
per day

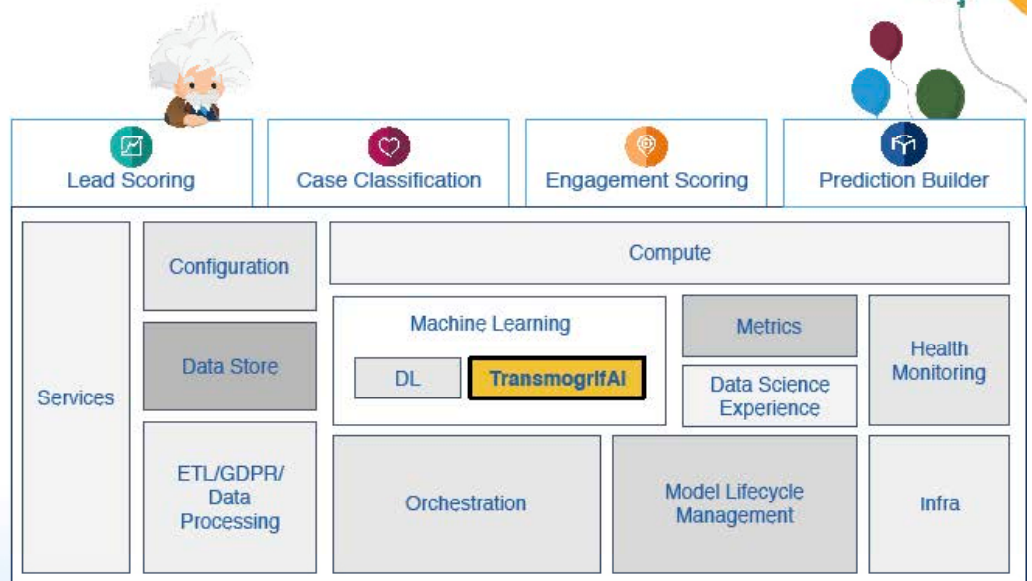
Microservice architecture

Shared feature engineering and modeling services

Customizable model-evaluation & monitoring dashboards

In-platform secured experimentation and exploration

**Data Scientists focus their efforts on engineering new features, trying new models and evaluating results**



## How the Salesforce Einstein Platform Enables Data Scientists

Deploy, monitor and iterate on models in one location

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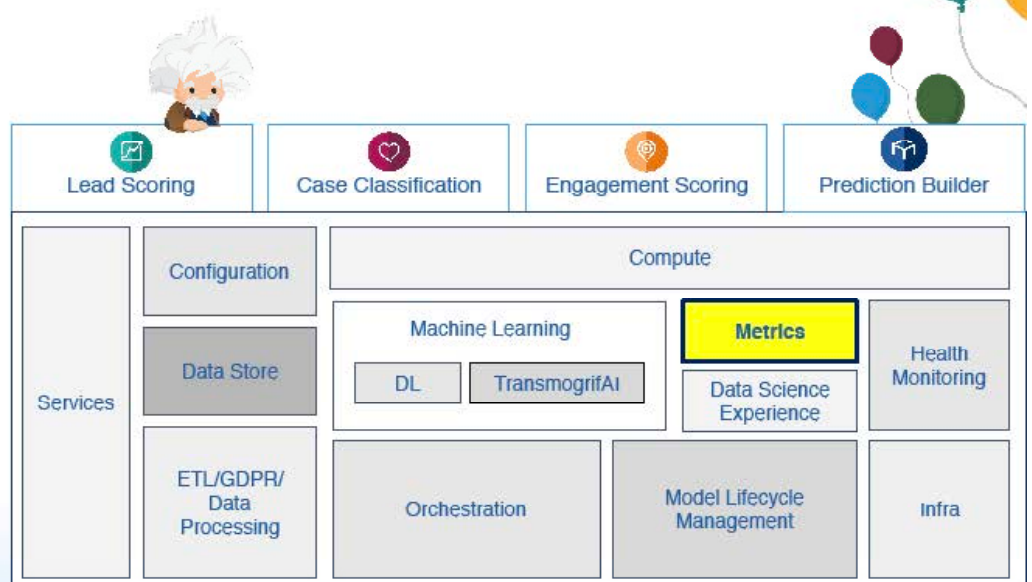
Microservice architecture

Shared feature engineering and modeling services

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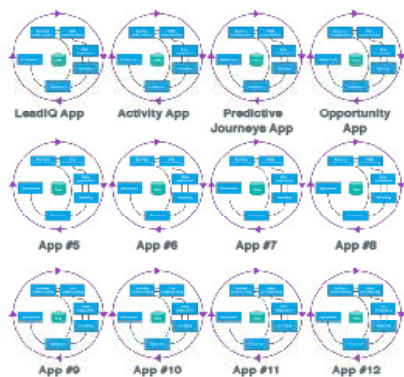




## Remember Our Scale at Salesforce



Customer #1



Customer #2



Customer #3



150,000 customers







## WHERE DO WE SPEND OUR TIME?

### How Automated Machine Learning Drives Agility



#### Examining how Salesforce Multiplies our Data Scientists

Sharing our journey to Salesforce-scale agile AI

#### Understanding your Data Scientists

Bridging the communication gap between data scientists and software developers to find common ground and get to production and agility

#### Enabling your Data Scientists

Building a platform to support agile data science with the tools they need to iterate on their models

#### Empowering your Data Scientists

Adding process to help your data scientist and organizations make progress at every step





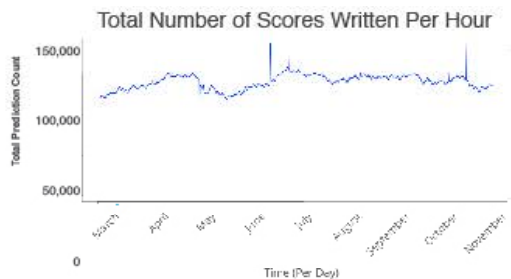


## Monitoring your AI's health like any other app component

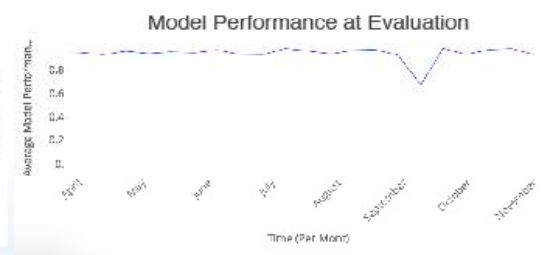
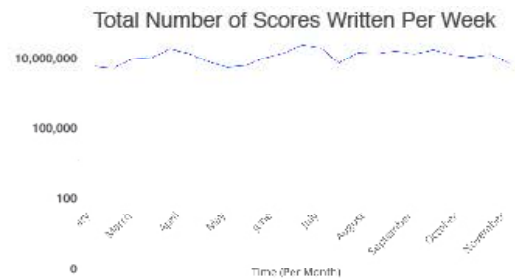
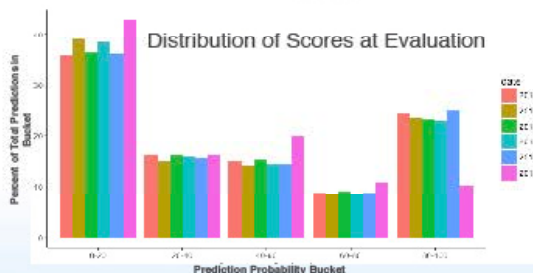


Pipelines, Model Performance, Scores – Invest your time where it is needed!

**105,874**  
Scores Written Per  
Hour (1 day moving  
avg)



**0.86**  
Evaluation auROC

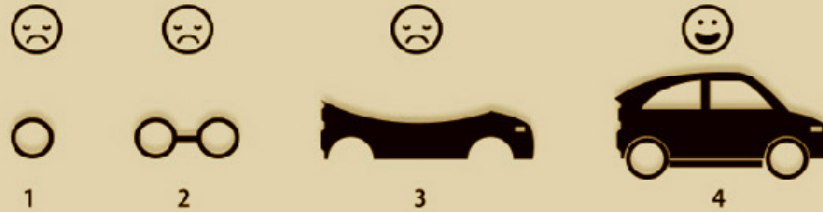


Sample Dashboard on Simulated Data



## HOW TO BUILD A MINIMUM VIABLE PRODUCT

### NOT LIKE THIS



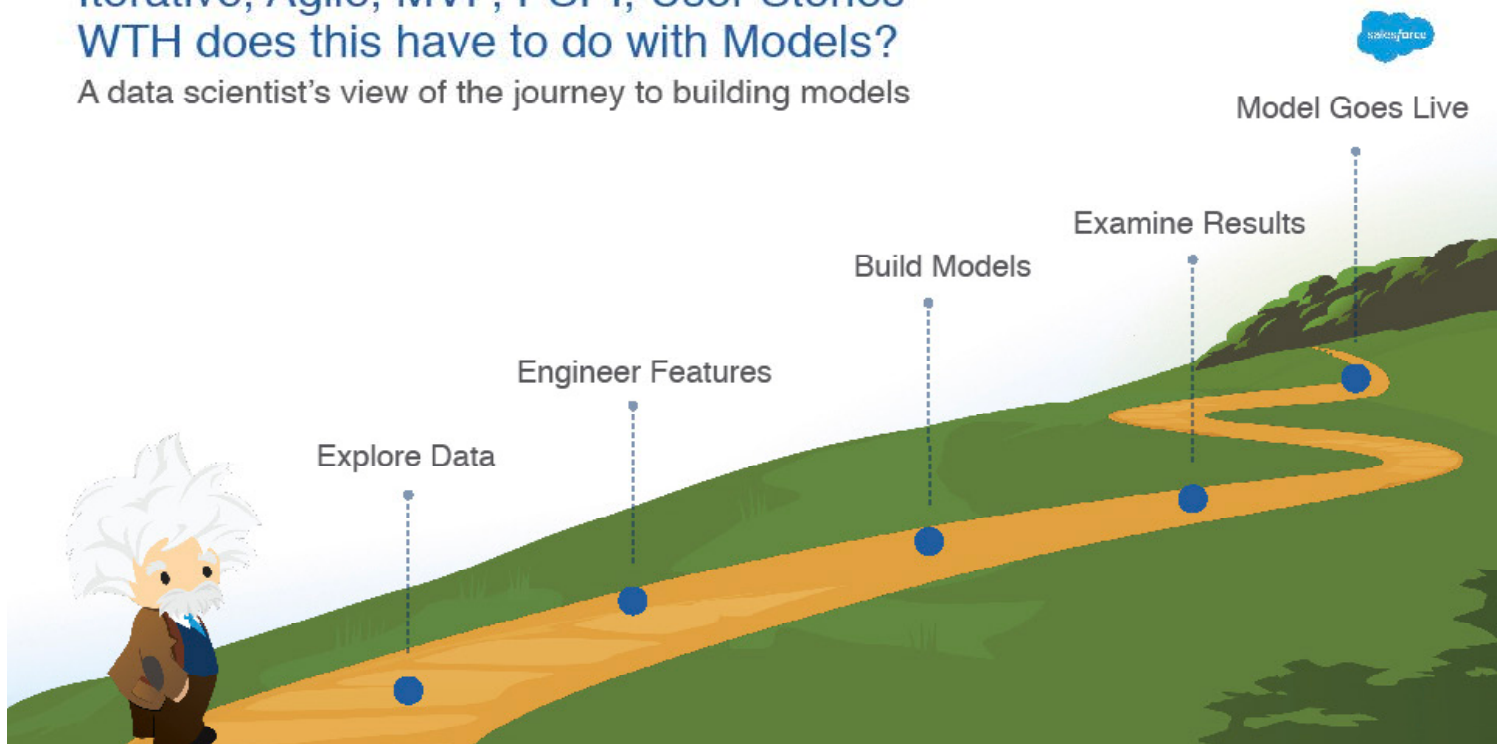
### LIKE THIS



image by [blog.fastmonkeys.com](http://blog.fastmonkeys.com) original idea: spotify product team

## Iterative, Agile, MVP, PSPI, User Stories WTH does this have to do with Models?

A data scientist's view of the journey to building models

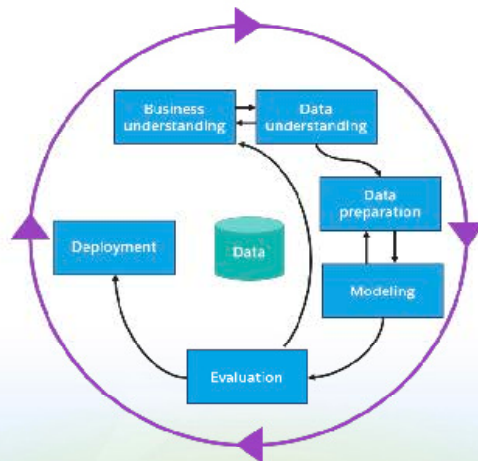


“Le mieux est l'ennemi  
du bien”  
(The best is the  
enemy of the good)

Voltaire



What happens after you deploy?



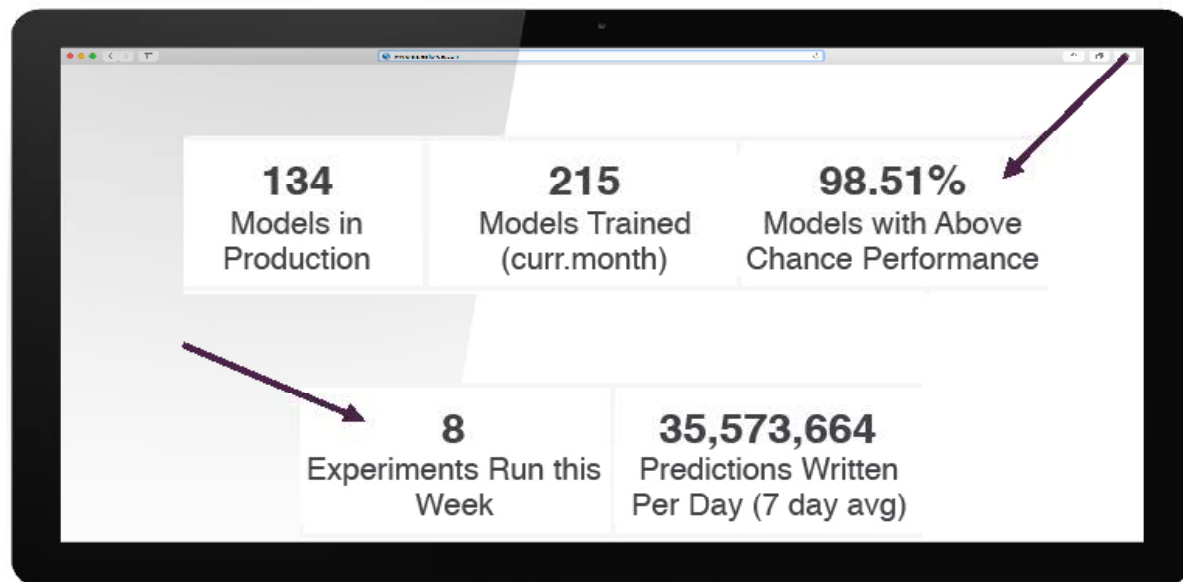
## Iterative, Agile, MVP, PSPI, User Stories WTH does this have to do with Models?



Endless choices for ways to improve!



## Deploy Monitors, Monitor, Repeat!



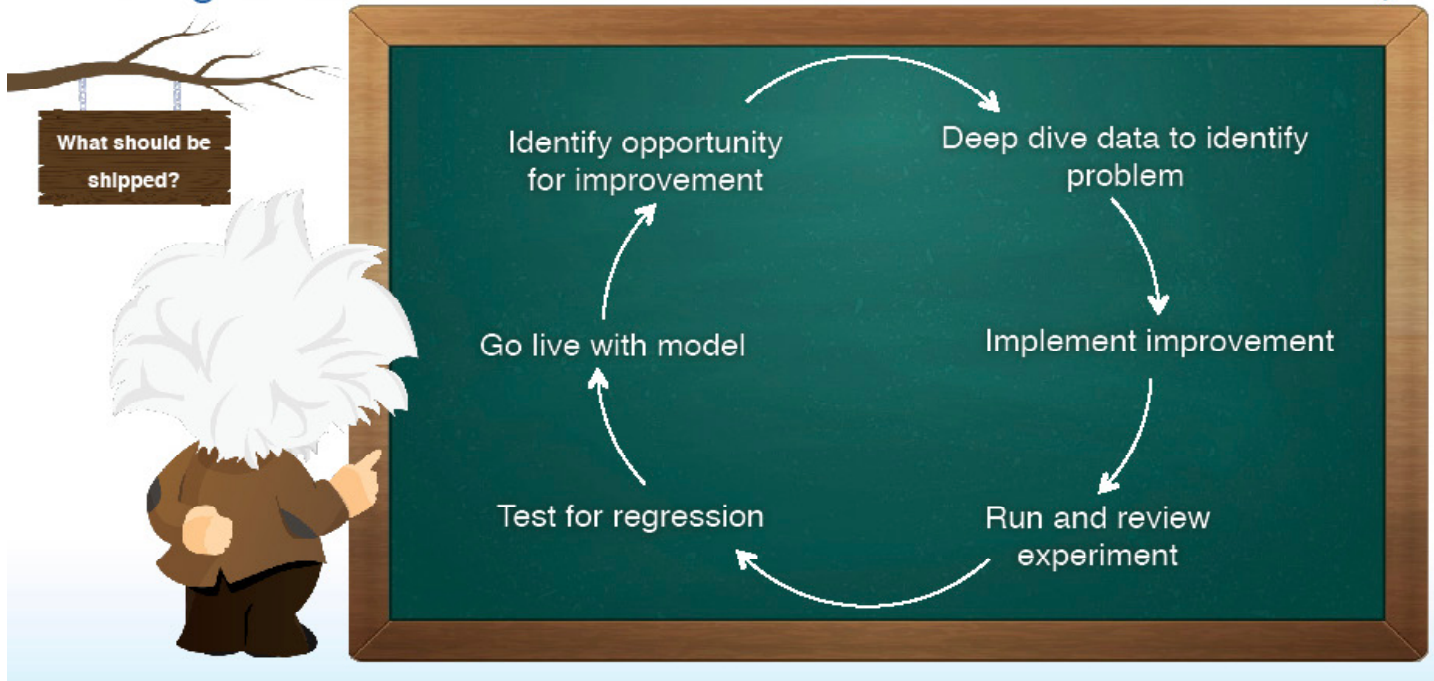
Sample Dashboard on Simulated Data

Invest your time where it is needed!

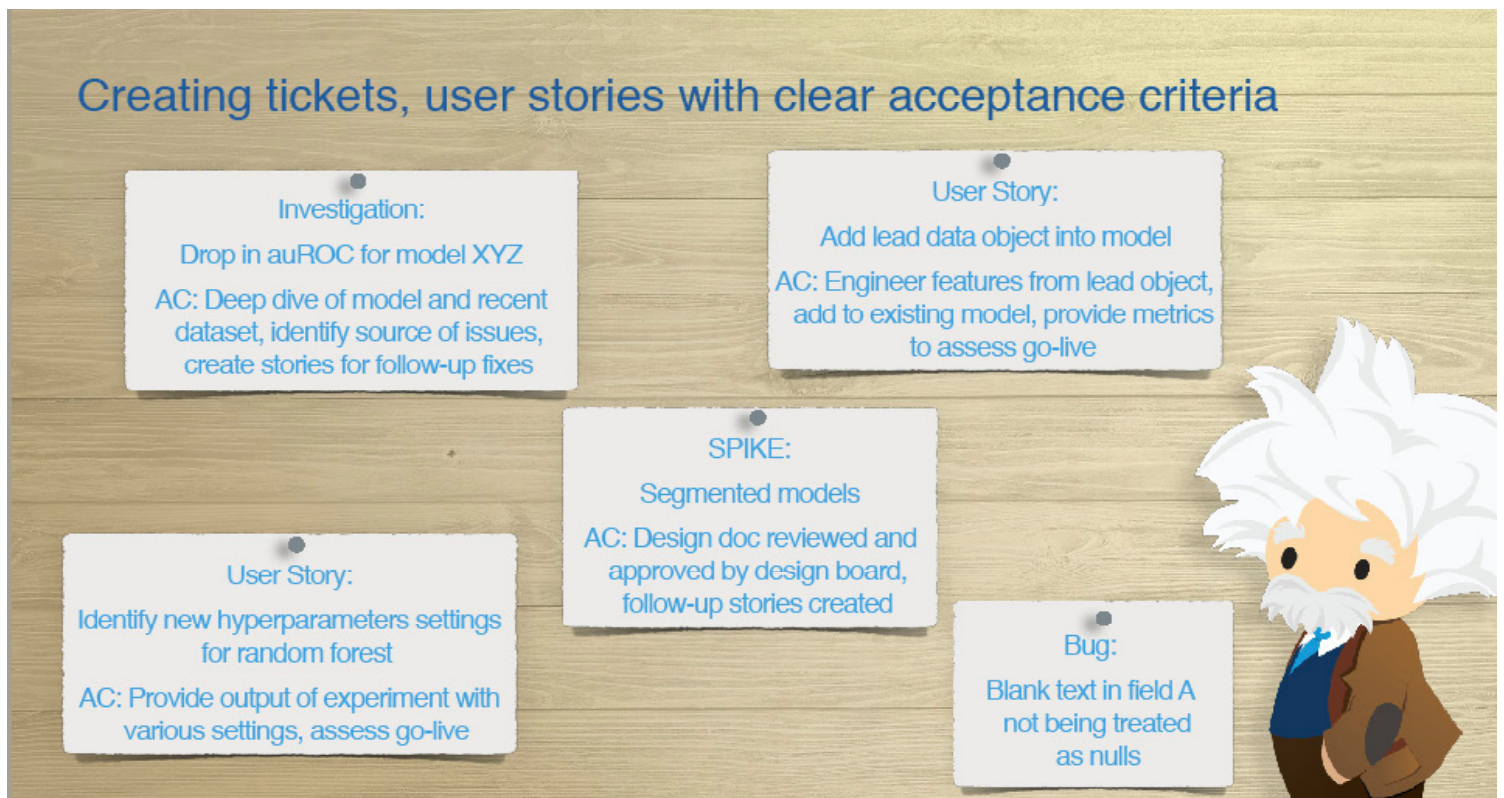


# What is a sprint? What is a story? What is an investigation? How can agile work in Data Science?

datafence

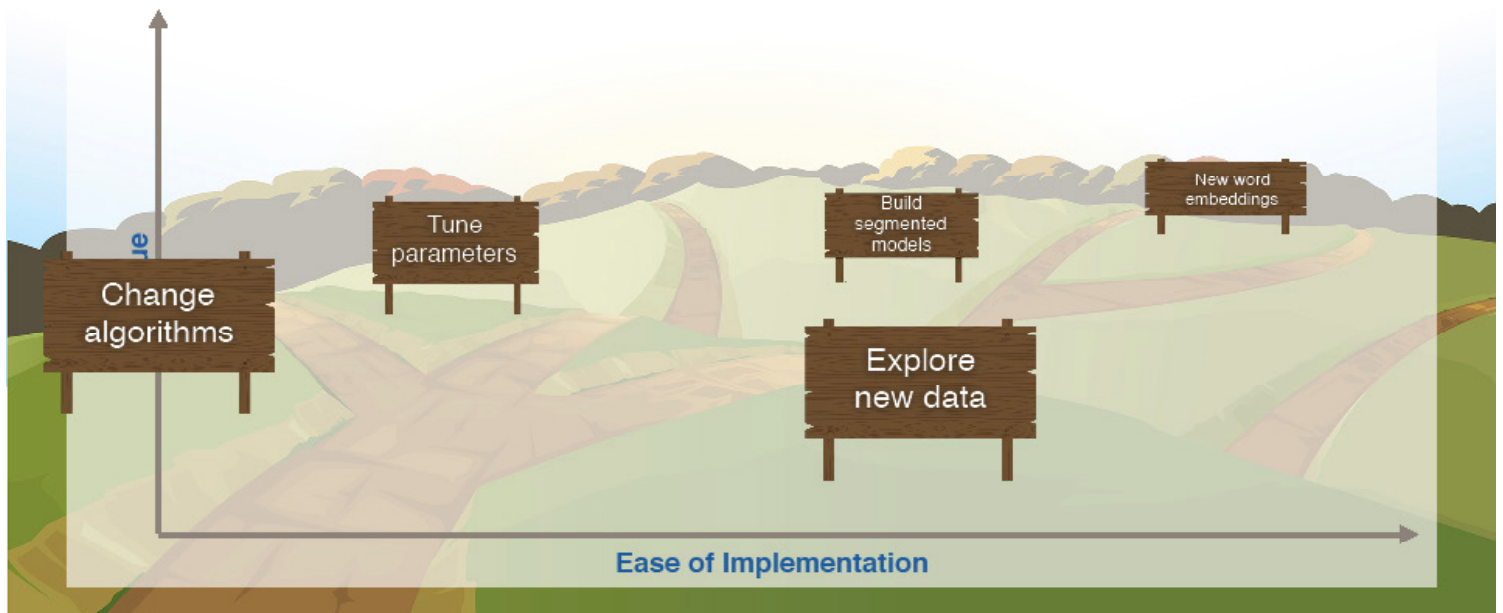


## Creating tickets, user stories with clear acceptance criteria

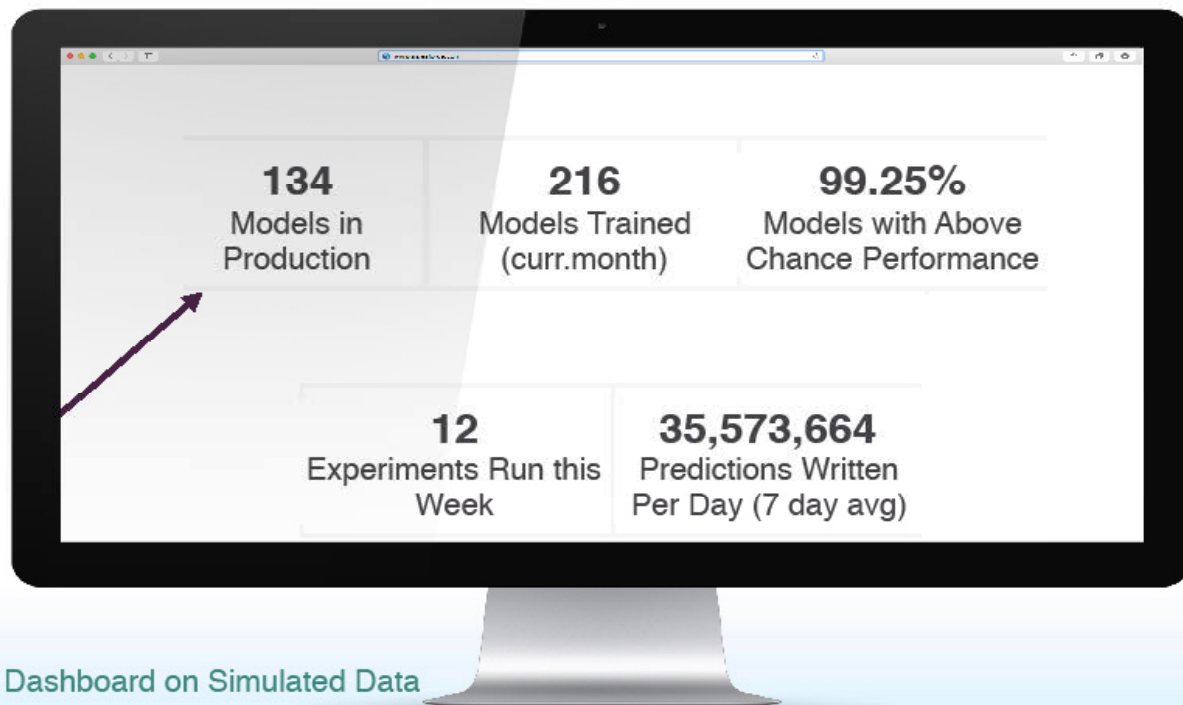


## Creating your prioritized backlog: Value vs Ease of Implementation

Endless choices for ways to improve!



## Deploy Monitors, Monitor, Repeat!





## Key Takeaways



- Plan for multiple apps... **always**  
Identify opportunities for reusability in all aspects, even your machine learning pipelines
- Understand your data scientists  
Build a platform to enable their productivity
- Don't fly blind  
Make sure you can monitor your model health
- Never deploy without a plan for iteration  
How can your data scientist experiment?  
How can your data scientists redeploy?
- Stay tuned for TDDS – test-driven data science



Go to [github.com/salesforce/TransmogrifAI](https://github.com/salesforce/TransmogrifAI)  
to learn more!







# THANK YOU

@itweetsarah

# **“Transformation at Work in a 100-Year-Old Corporation: Making the Best of Humans and Machines”**

## **Rene Saroukhanoff**

Senior Director of Data Analytics,  
Levi Strauss and Co.

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René Saroukhanoff is the Senior Director of Global Reporting and Analytics at Levi Strauss & Co. He has been in retail for more than 15 years and has extensive experience in inventory management, systems implementations, and data analysis. He is currently driving a global transformation of reporting and analytics at LS&Co.





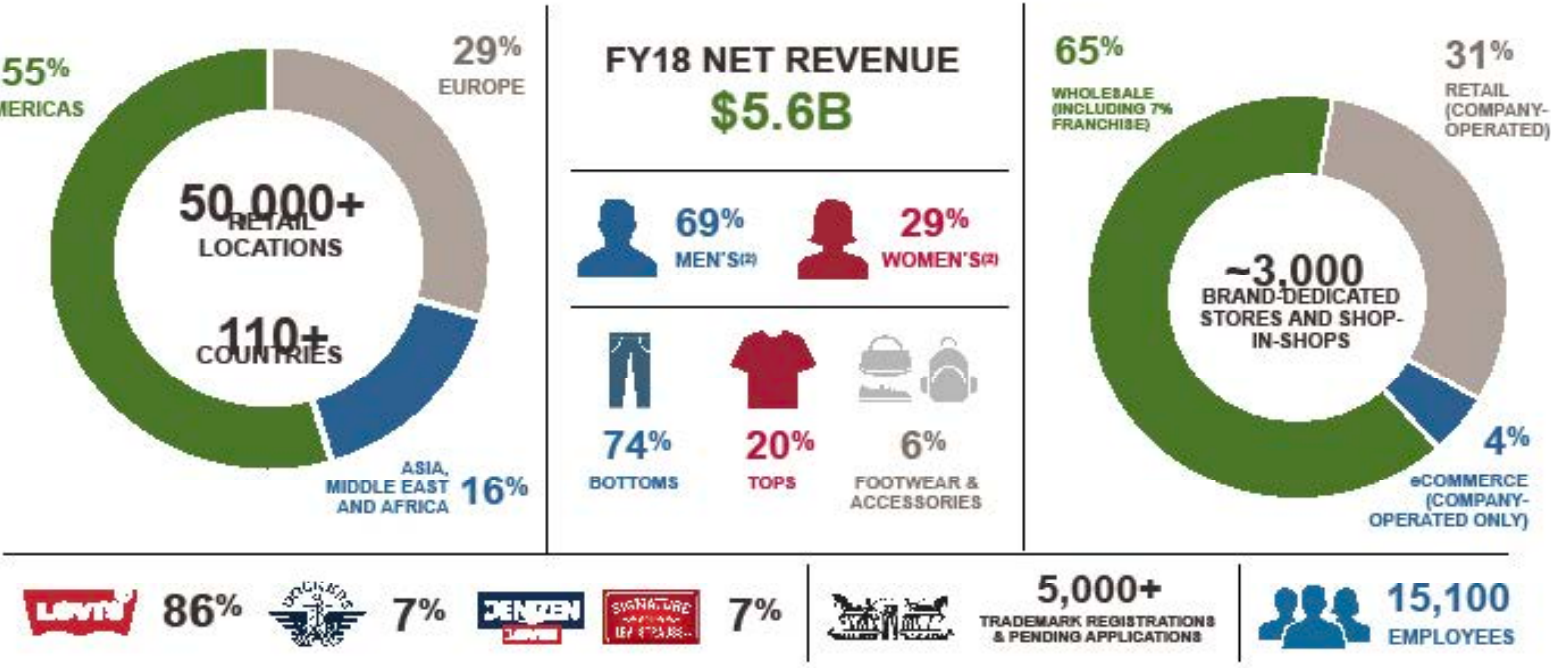
## LS&CO. INVENTED THE BLUE JEAN

“On any given day, in most countries, nearly half of the population is wearing blue jeans.”

*Global Denim*  
by Daniel Miller and Sophie Woodward



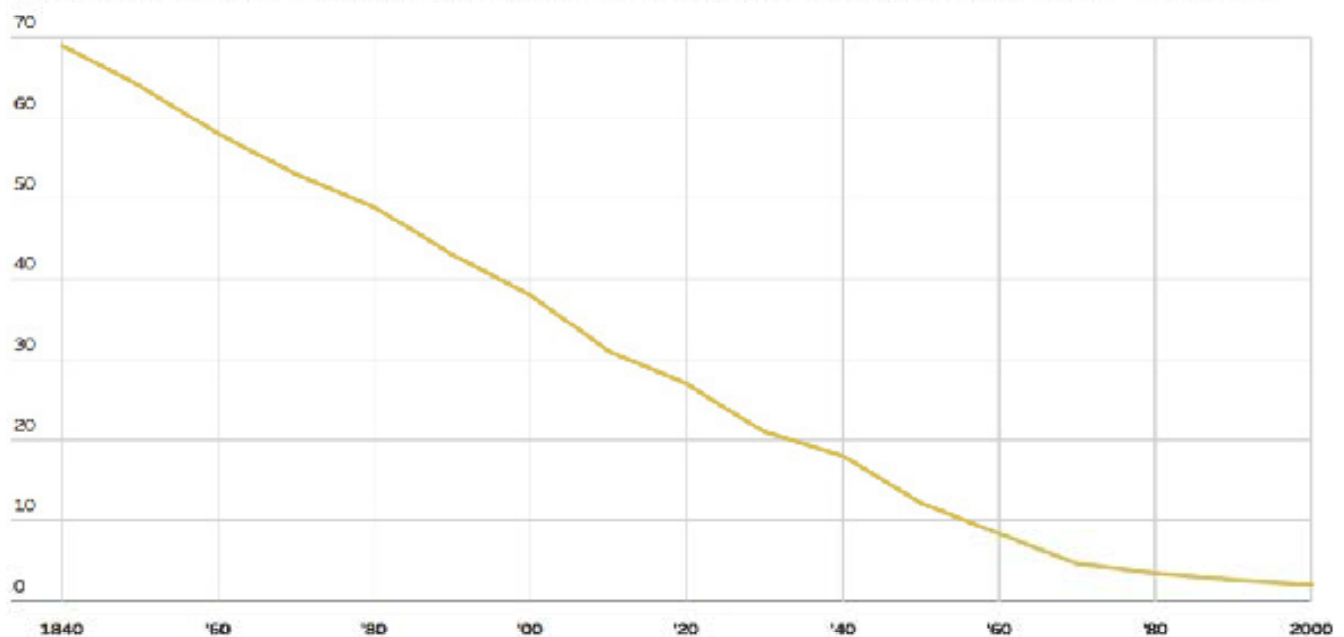
LEVI STRAUSS & CO. IS A TRANSFORMED BUSINESS<sup>(1)</sup>



# IN THE FUTURE, EVERYONE WILL BE DATA SCIENTISTS

---

## % of American workforce in agriculture, 1840-2000



Source: USDA,

**people AND machines > people OR machines**

---

**THE RIGHT PRODUCT  
AT THE RIGHT TIME  
IN THE RIGHT PLACE**

---



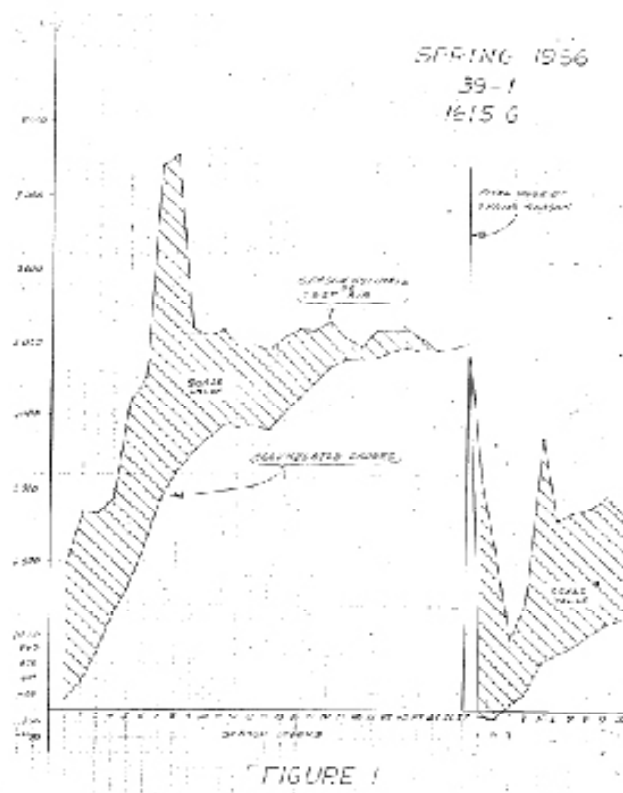
“Last year, you may recall, we ran into a severe problem of running out of 28” lengths in a number of casual lots.... Subsequent analysis revealed that heavy cuttings had been made in the first few weeks of the season, with upwards of 8-12 weeks elapsing before the next cut. During this period a marked shift in the size distribution had occurred, but since we look at a lot only when we are preparing to release a contract, we had no way...of detecting this shift.”

---

SUBJECT: A Method To Detect Size Distribution Changes.

DATE: September 27, 1966

---



## THREE RULES

1. Walk a mile in their shoes
2. Build the container before filling it with analytics
3. Whatever you do, make it easier

## **RULE 1**

### **WALK A MILE IN THEIR SHOES**

---

## **1. WALK A MILE IN THEIR SHOES – EMPATHY**

- Ask lots of questions
  - Share language
  - Get out of the office
-



## **RULE 2**

**BUILD THE CONTAINER BEFORE  
FILLING IT WITH ANALYTICS**

---

**RESPICE FINEM**

---

## **RULE 3**

**WHATEVER YOU DO, MAKE IT EASIER**

---

**PEOPLE AND MACHINES > PEOPLE OR MACHINES**

---

# **“Transformation at Work in a 100-Year-Old Corporation: Making the Best of Humans and Machines”**

## **David Leighton**

President,  
WITI - Women in Technology International

---



Leighton is a strong proponent of a diverse technical workforce. Founded in 1989, WITI is the premier organization for women who consider technology central to their careers, businesses, and personal lives. WITI provides regional conferences, professional development programs, and a range of individual and corporate benefits to an international constituency. Mr. Leighton took over as president of WITI in 2003 and has been the driving force behind WITI's turnaround and expansion into a global enterprise.





INNOVATION. INSPIRATION. INCLUSION.

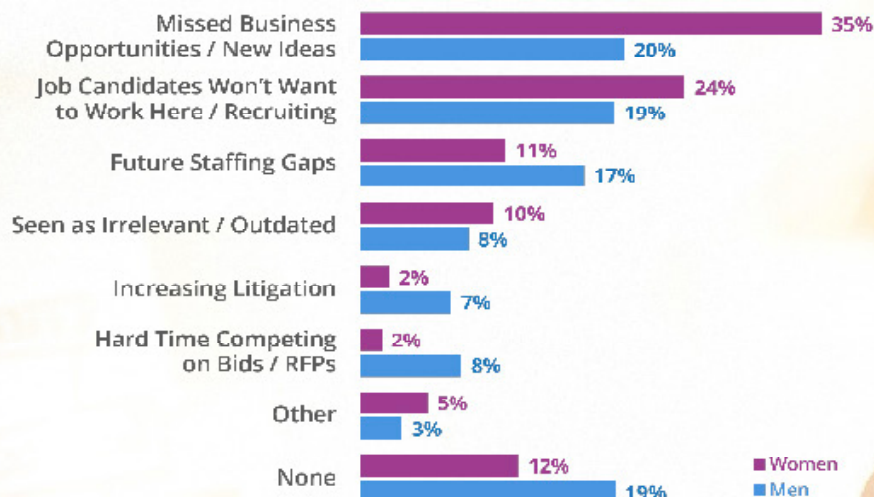
# Business Case for Women in Technology

David Leighton

## Lack of Diversity is a Recognized Business Problem :IDC 86% of Employees Report Business Impacts from a Lack of Diversity

Q: In your opinion, what is the greatest risk of a lack of diversity and inclusion at your organization?

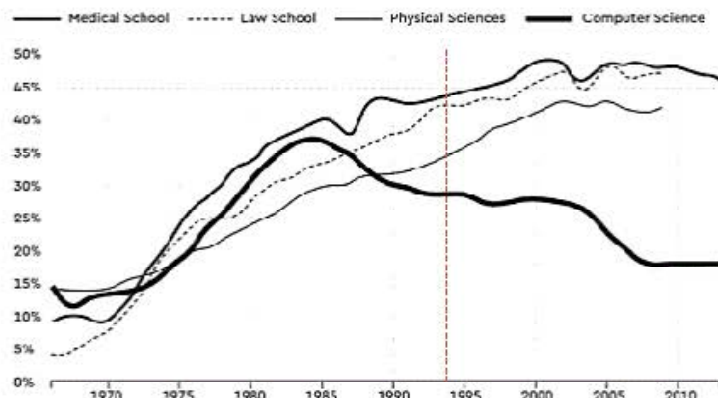
### BUSINESS IMPACTS FROM THE LACK OF DIVERSITY



# 25 Years of Women in Technology

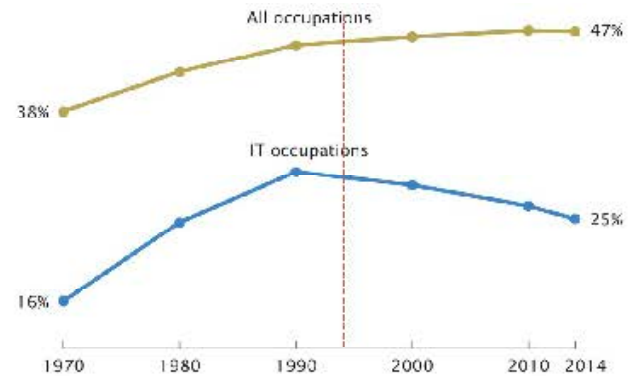
## Percent of Women Majors by Field

Source: National Science Foundation, American Bar Association, American Association of Medical Colleges



## Percent of Women in IT Occupations vs. All Occupations

Source: US Census Bureau, Equal Employment Opportunity Supplementary Reports from 1970, 1990, 2000 census and 2014 American Community Surveys



© IDC 3

## Reality



- Men and women are equally ambitious: IDC.
- Women coexist with men – professionally, personally.



4

# Diverse Enterprises : Business Benefits

---

- Diversity an important topic in >70% of the enterprises worldwide: BCG.
- Highly inclusive organizations are 170% better at innovation: Deloitte.
- 19% higher for innovation revenues and 9% better average EBIT margins: BCG.
- Gender-diverse teams outperformed individuals 73% of the time.
- >60% of women look at the gender diversity of the employer's leadership team when deciding where to work: PWC.

**Diverse enterprises = competitive edge, innovation and profitability.**



5

# Diverse management : Business Benefits

---

- Companies with gender diverse executive teams: 21% greater profitability.
- Diverse management teams report 19% higher revenue due to innovation.
- An organization with more than 20% of women in management positions, sees >10% innovative revenue via new products or services.
- Large-cap companies with at least one woman on the board outperformed peer organizations with no women on the board by 26%: Credit Suisse.



6



# Efforts vs Outcome

---

91% of companies have a gender diversity program in place, yet only 27% of women say they have actually benefited from it. BCG



7

## WITI

---

- leading advocate for innovation, inclusivity and STEAM.
- empowers innovators, inspires students and builds inclusive cultures, globally.
- makes men part of the solution.
- empowers professionals (men & women), bring out the best in them



8

# WITI At a Glance

- 30 years and counting
- 100,000+ members
- 70+ networks worldwide
- 300+ partners, globally

## Values

- No one stands alone
- Inclusion : create opportunities for men and women



9

# WITI Key Programs



- Annual Summit & Hall of Fame
- Regional Summits
- Regional Network Events
- Coaching Circles (inperson- virtual)
  - Mentoring, Innovation, Critical Thinking
- Inclusivity Programs for Partners
- Career Fairs
- miniWITI



10

# WITI Partnerships

- WITI partners with organizations to support and foster innovation and gender inclusivity, globally.
- Build relationship with global community of women and men in tech.







# “What Is the Next Frontier in AI and ML?”

## Dan Feld

Head of Global Enterprise Business,  
Hardware Partnerships, Google

---



Dan Feld is leading business development and sales for Google’s global enterprise hardware business. Before that, Dan served as the head of Enterprise Solutions for Google Cloud Platform and as the country manager, EEMEA for Amazon.com, where he was responsible for helping customers and partners take advantage of cloud technologies. Dan has built and led global sales, business development, and IT teams for publicly traded companies such as Google (GOOG), Amazon.com (AMZN), Clicksoftware (CKSW), Creo (Creo) and Scitex (SCIX).



Dan Feld  
feld.dan@gmail.com  
Instagram: danfeld\_  
Twitter: @dan\_feld

2018 | Confidential and Proprietary Google



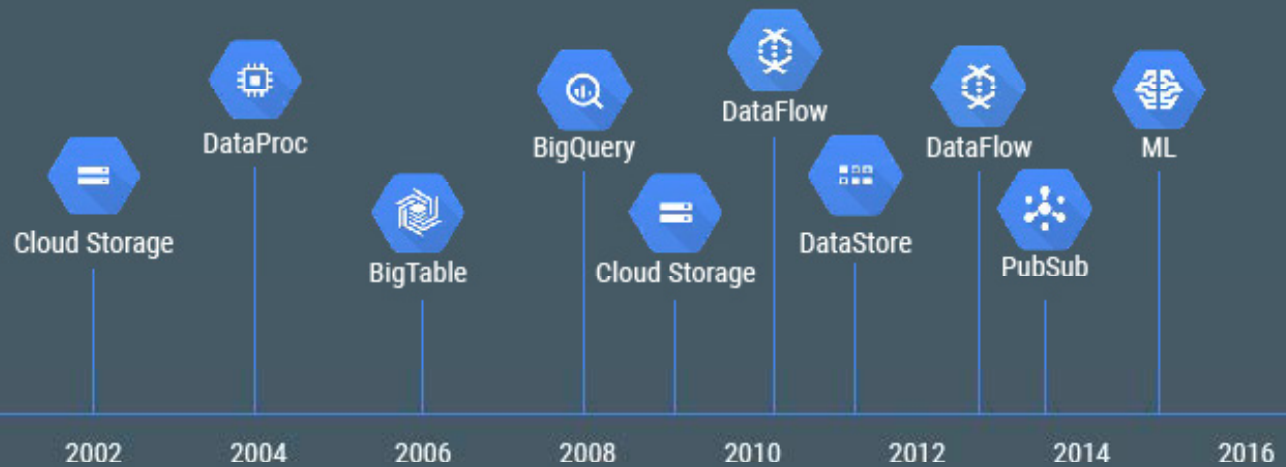




## Google's Data Research



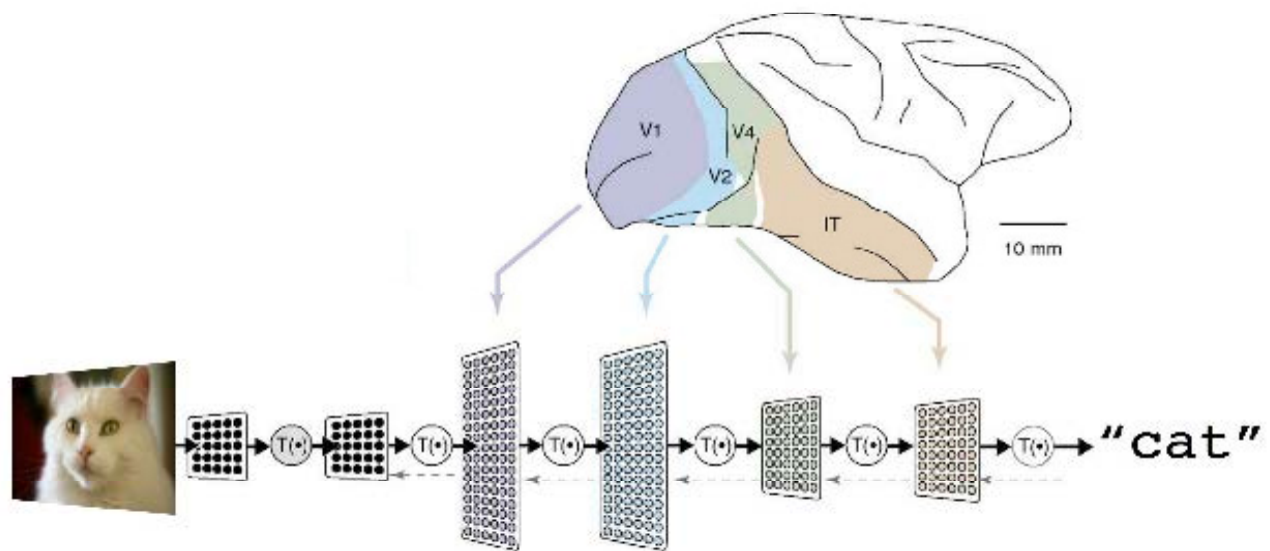
# Google's Data Products





How about this?

Neural Network is a **function** that can **learn**





# Machine Learning use cases at Google services



Search

machine learning for search engines



RankBrain: a deep neural network for search ranking

**#3**

**signal**

for Search ranking,  
out of hundreds

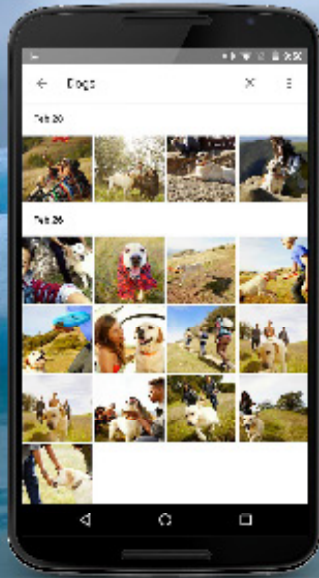
**#1**

**improvement**

to ranking quality  
in 2+ years



Google Photos



[glacier]

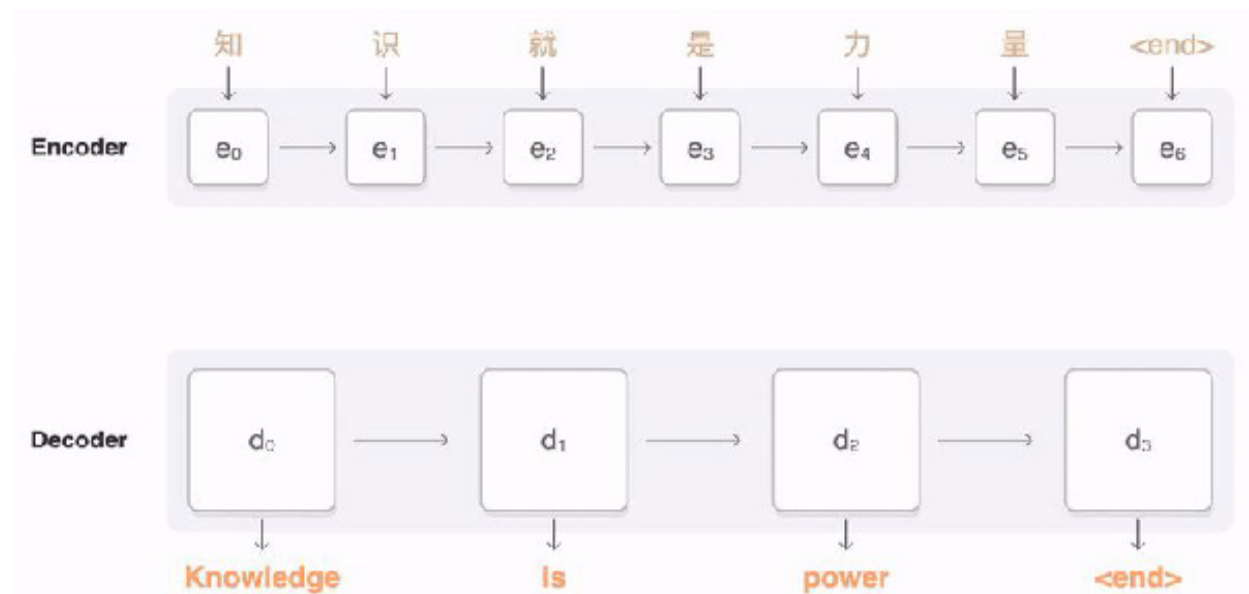
11



Smart reply  
in Inbox by Gmail

**10%**  
of all responses  
sent on mobile

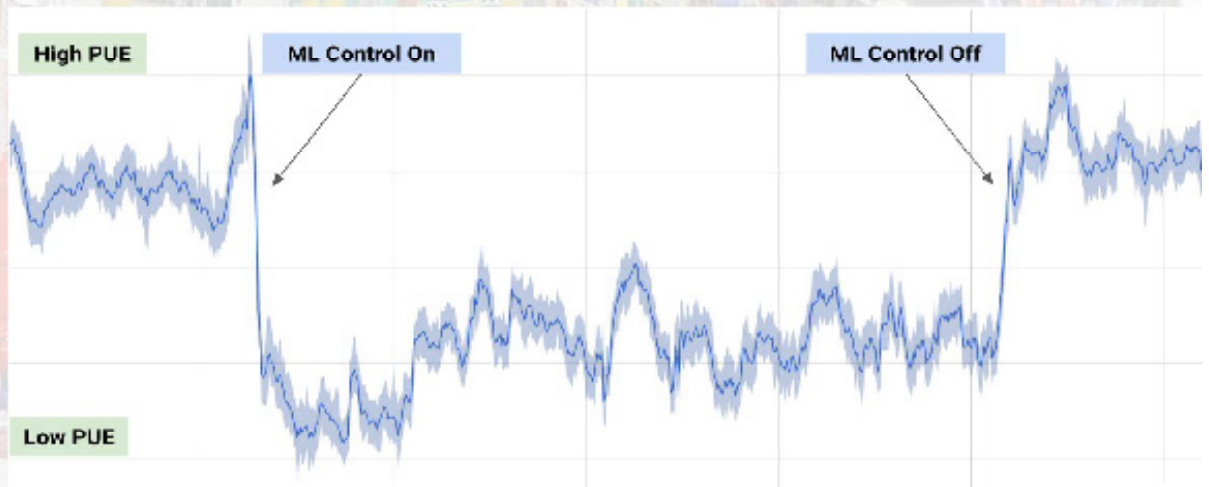
# Google Translate with Neural Machine Translation



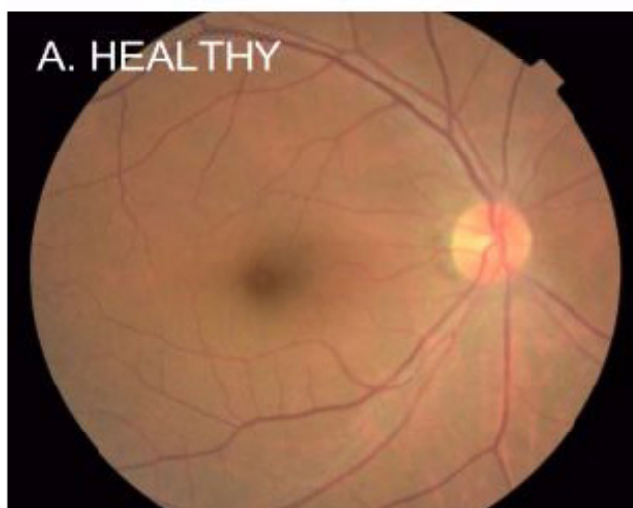
This section features a collage of images related to the AlphaGo breakthrough. On the left, the **AlphaGo** logo is displayed. Below it is a screenshot of a **BBC News** article titled "Google achieves AI 'breakthrough' at Go". The article text includes: "An artificial intelligence program developed by Google has become the first computer player to beat a world champion in the ancient Chinese game of Go, about a decade earlier than expected." and "Go is a strategy board game." To the right of the article is a photograph showing a person's hand placing a black Go stone on a wooden board. On the far right, there is a news snippet titled "Google's AI just cracked the game that supposedly no computer could beat" with a sub-headline "By Mike Murphy | June 10, 2016". Below this title is a photo of two people looking at a Go board, and a short paragraph of text starting with "Computers have slowly started to encroach on activities we previously believed only the brilliantly sophisticated human brain could handle."



Saved Data Center cooling energy for **40%**  
Improved Power Usage Effectiveness (PUE) for **15%**

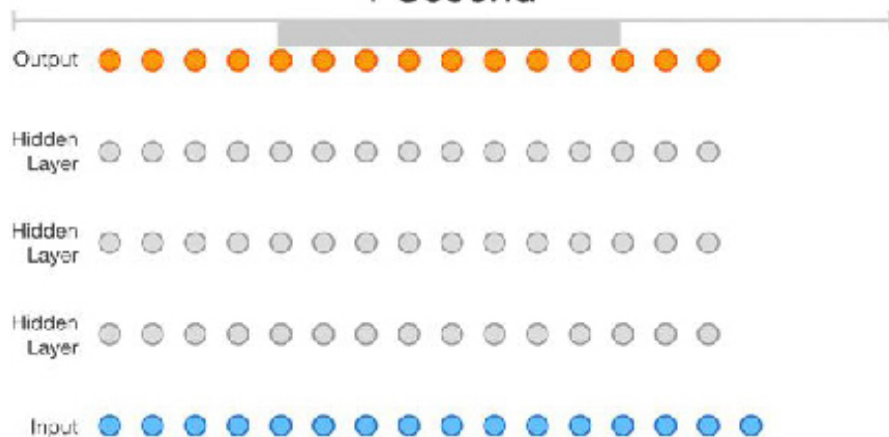


Detection of Diabetic disease:  
better than doctors



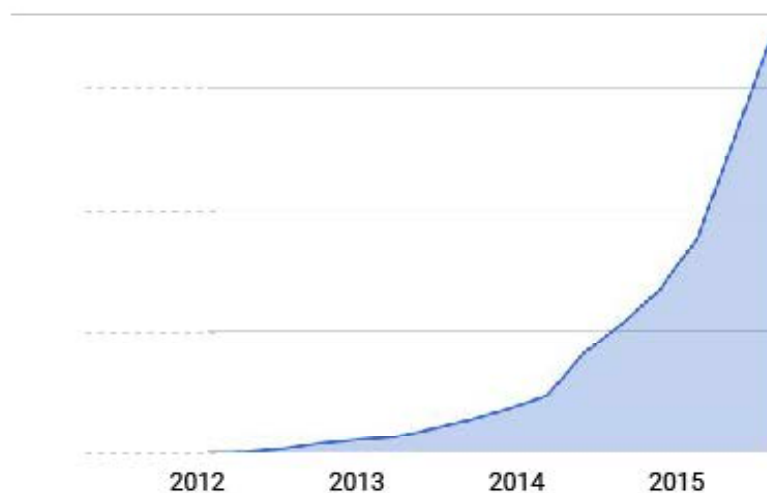


1 Second



## WaveNet by DeepMind

## Deep Learning usage at Google



Used across products:

Android  
 Apps  
 Gmail  
 Maps  
 Photos  
 Speech  
 Search  
 Translation  
 YouTube  
 and many others ...



# DIGITAL TRANSFORMATION





5<sup>th</sup> AVE NYC

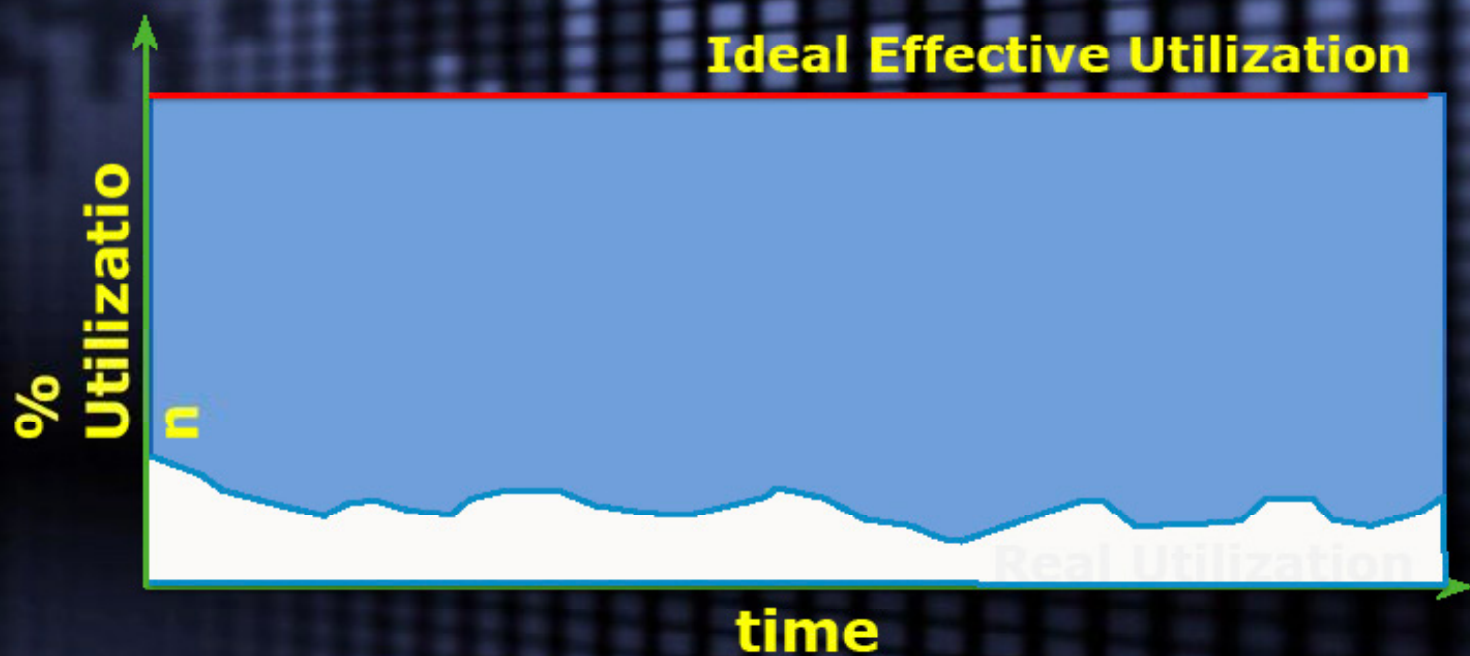
1913

Where is  
the  
horse?

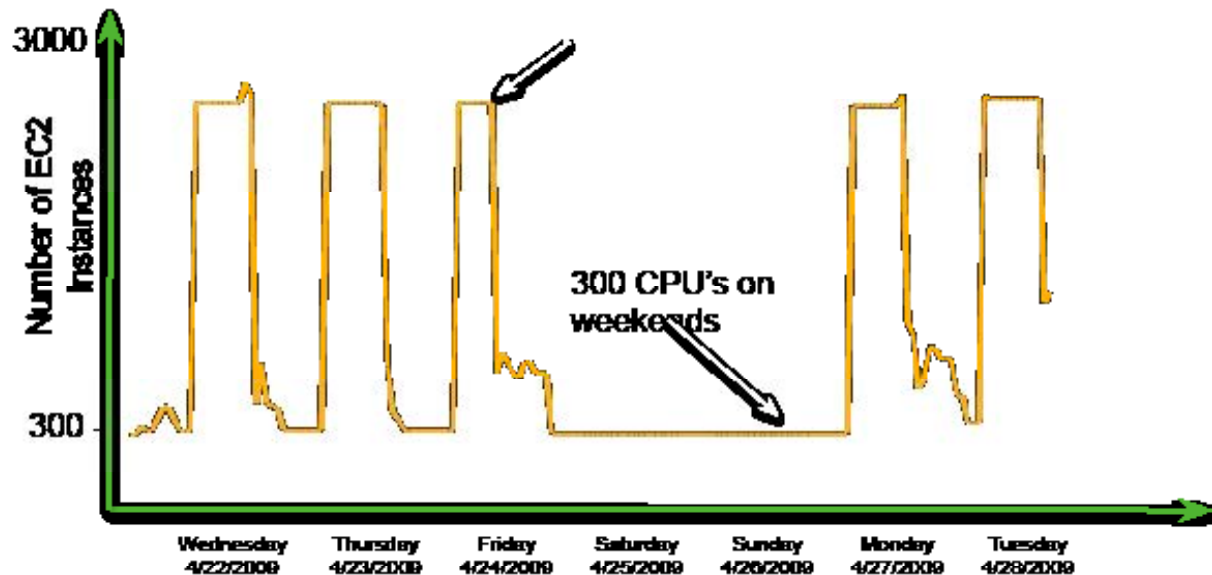


## Economies of Scale in Utilization

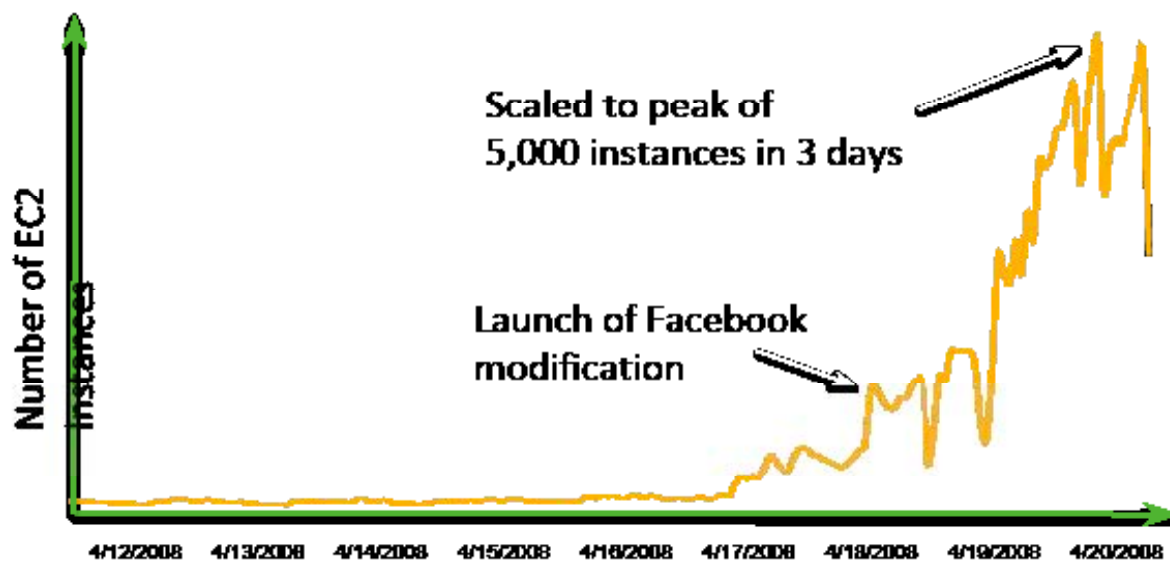
Ideal Effective Utilization



## Example: Wall Street App



## Example: Video App



Use your own data to train models



TensorFlow

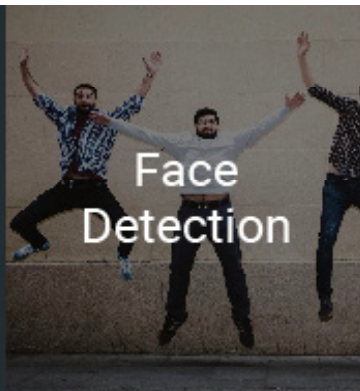
[www.tensorflow.org](http://www.tensorflow.org)



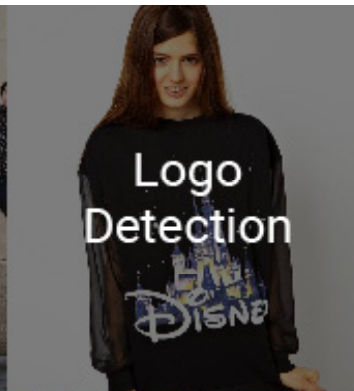
Cloud Machine Learning



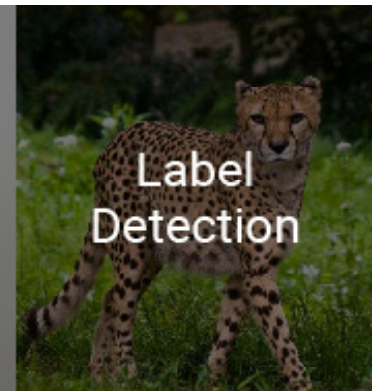
Cloud  
Vision API



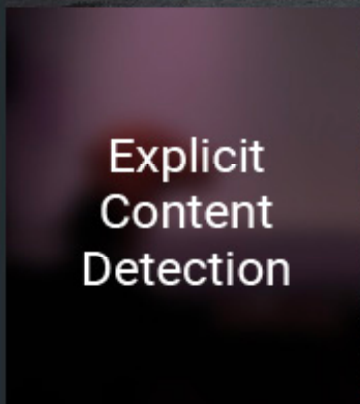
Face  
Detection



Logo  
Detection



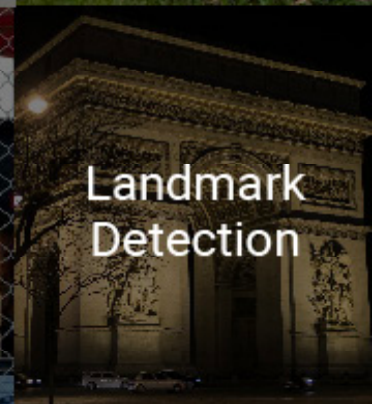
Label  
Detection



Explicit  
Content  
Detection



OCR



Landmark  
Detection



Thank you!

Twitter: dan\_feld



# **“The Real Road to a Successful Data Strategy: Have You Got What It Takes?”**

## **Sabrina Menasria**

Head of Data,  
BI and Governance, Chanel

**“Woman of the Year in Business Analytics”**



Sabrina leads major data programs. Fifteen years in the industry allows her to understand that data, as a transversal asset, can't provide its whole value without an intricate connection to people and processes. Sabrina believes that data is a precious resource produced by technology to enhance business strategy and develop unexpected growth areas. By implementing tailor-made data strategies, that are adapted to the culture and DNA of the organization, she contributes to these fascinating new explorations.



THE REAL ROAD TO SUCCESSFUL  
DATA STRATEGY

Sabrina Menasria

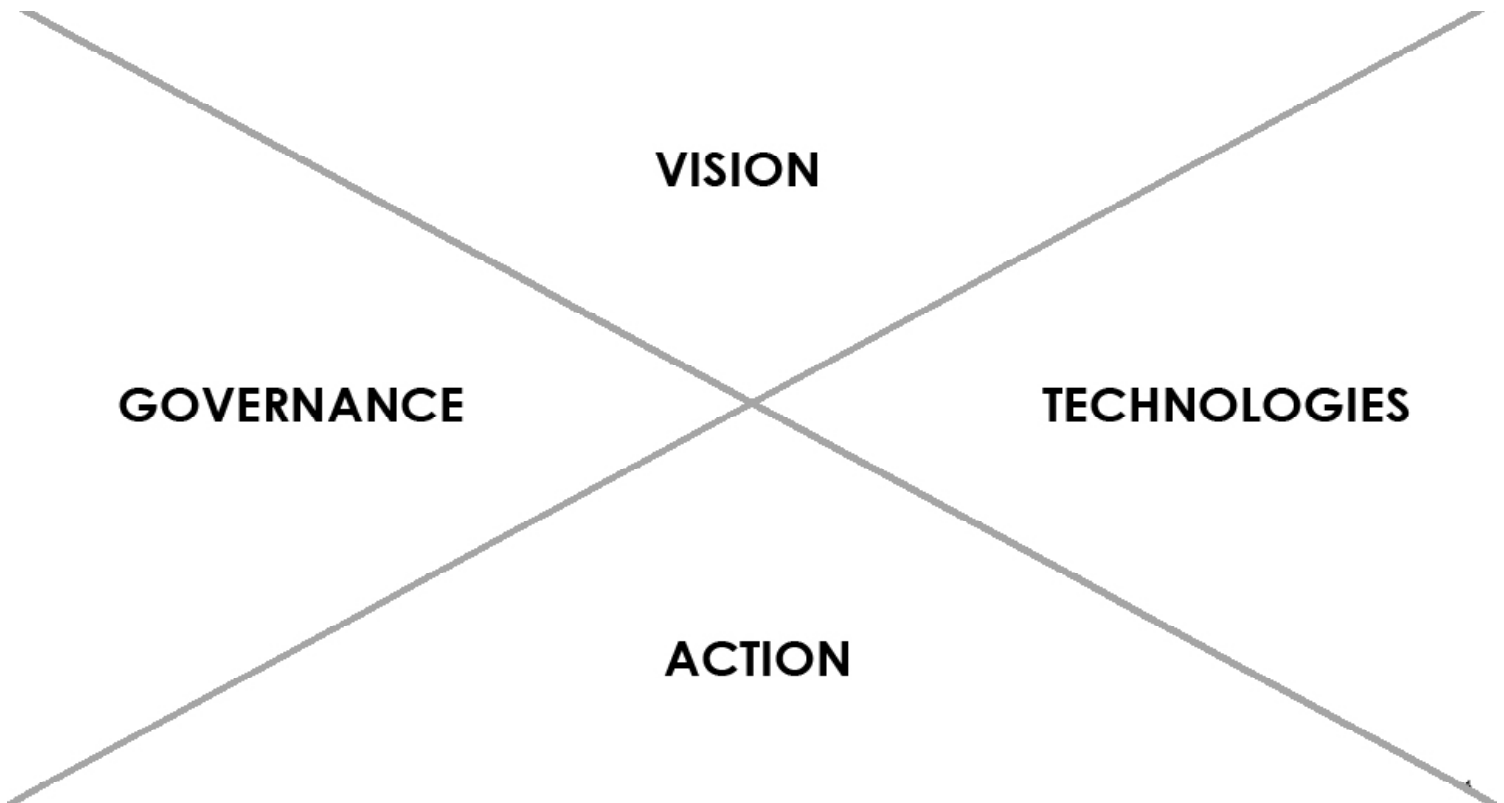
10.2017

1



- More than 15 years in the cosmetic and luxury industry (Unilever, L'Oréal, Shiseido, Bourjois, Chanel...)
- Marketing, sales, finance, operations, IT, technologies
- Leading major international data, transformation and master data program
- Strong connections with processes, people and business strategy
- Founder of Singularity Advisory

SINGULARITY





VISION

*Define your goal*

5

**EVERY 2 DAYS**

Humanity creates as  
much information

As has been created  
in **6000 YEARS**

6



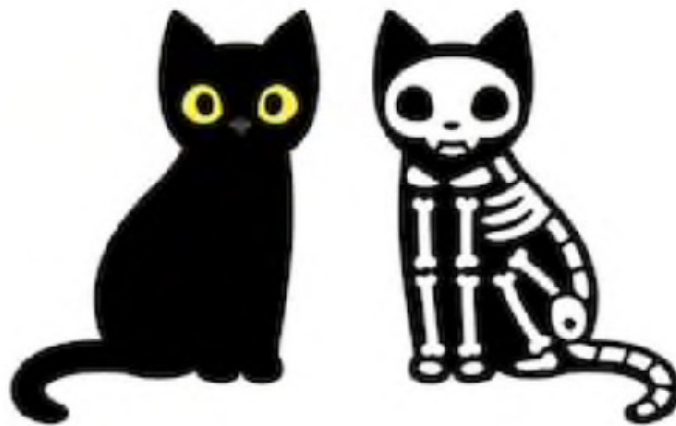
**DATA IS USELESS**

**But yet**

**IT BRINGS VALUE**

@Sabrina Menasria

7



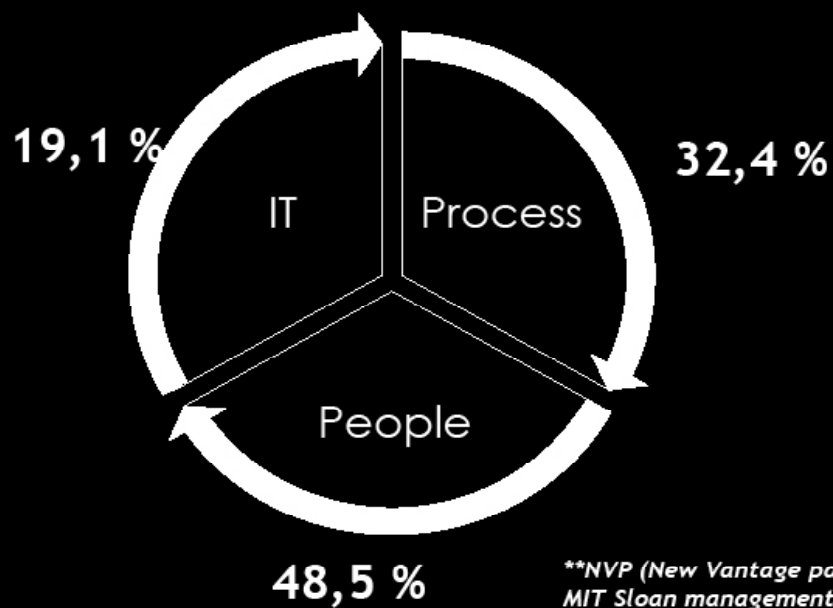
**The Shrödinger Cat**



***\_Make Right Choices***

**TECHNOLOGIES**

## **BIGGEST CHALLENGE TO BECOMING DATA DRIVEN\*\***



**\*\*NVP (New Vantage partner) 2018 Survey  
MIT Sloan management review**

@Sabrina Menasria

12





**The choice of today will be the cost of tomorrow**

13



@Sabrina Menasria

14



# SKILLS

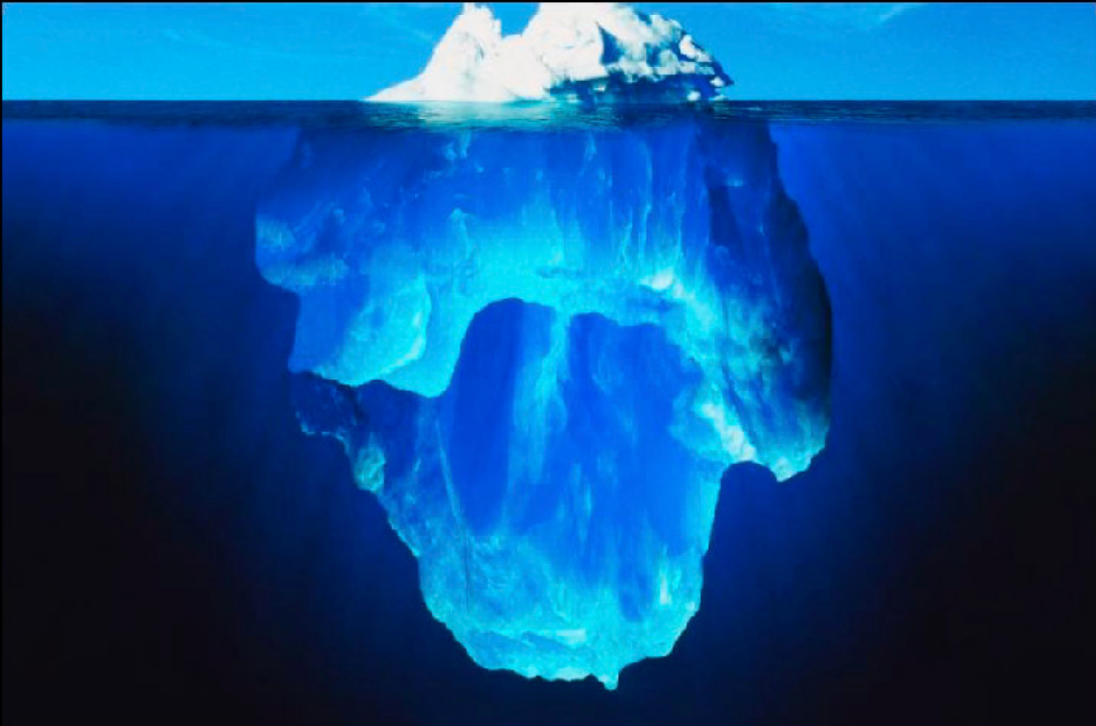
DATA ARCHITECTS  
DATA MANAGERS  
DATA ENGINEERS  
UX DESIGNERS  
DATA SCIENTISTS  
DATA ANALYSTS  
BEHAVIORISTS

.....

**GOVERNANCE**

***\_Empower, structure and align***

17



@Sabrina Menasria

18



**P**RINCIPLES  
**R**OLES  
Instances

19



20

DIGITALISING

**Is NOT**

TRANSFORMING

21



RECONCILIATION

&

EDUCATION

**Knowledge** without experience is  
Philosophy

**Experience** without Knowledge is  
Ignorance

Venasia 23

« Train people enough so  
they can LEAVE

Treat them WELL enough  
so they don't want to »

**\_Richard Branson**

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***Don't loose yourself in thoughts***

**ACTION**



**GO! GO! GO!**

Pocs  
Mvps  
Scalability Index

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In 2013, appointing a CDO was  
« useless, apart from realizing that the  
SNCF was covered with POCs

And it had no interest, except for taking  
ourselves for Bill Gates »

**Guillaume PEPY**  
— *SNCF CEO, French Public railway company  
33 billion euros turnover in 2018*

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**SO...**

## AUGMENTED INTELLIGENCE



@Sabrina Menasria

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Wishing you  
great  
successes!

Thank you

@Sabrina Menasria

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# 2019

## Berkeley Inclusive Intelligence Symposium

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**October 30, 2019**