

IBM Watson in the Cognitive Era

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**World of
Watson
2016**

IBM

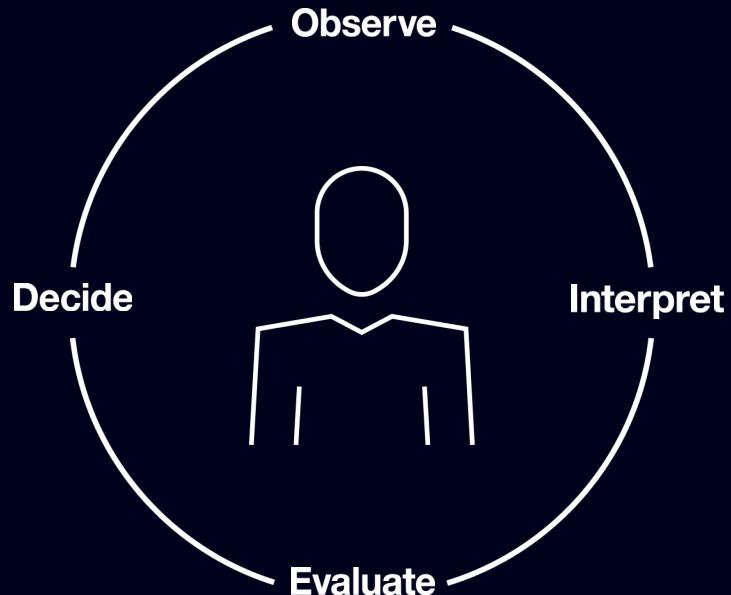
January 2011: IBM Watson and Jeopardy!



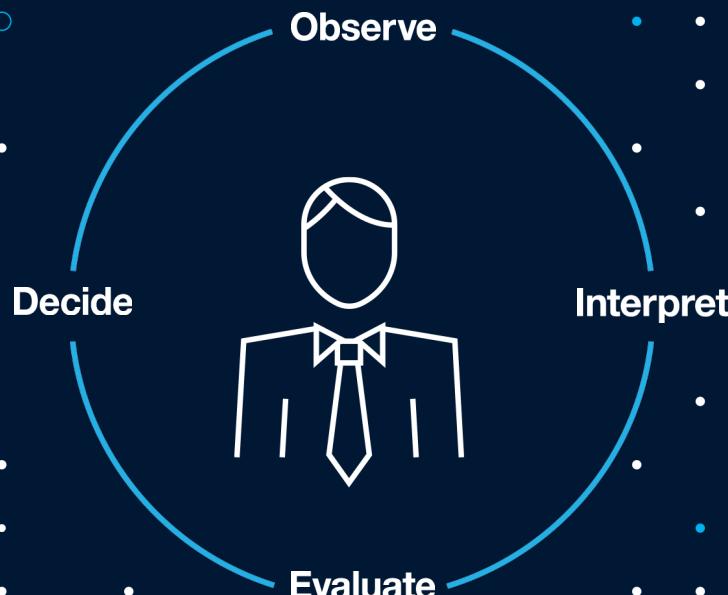
The Data Landscape is Changing



This is how cognition works.



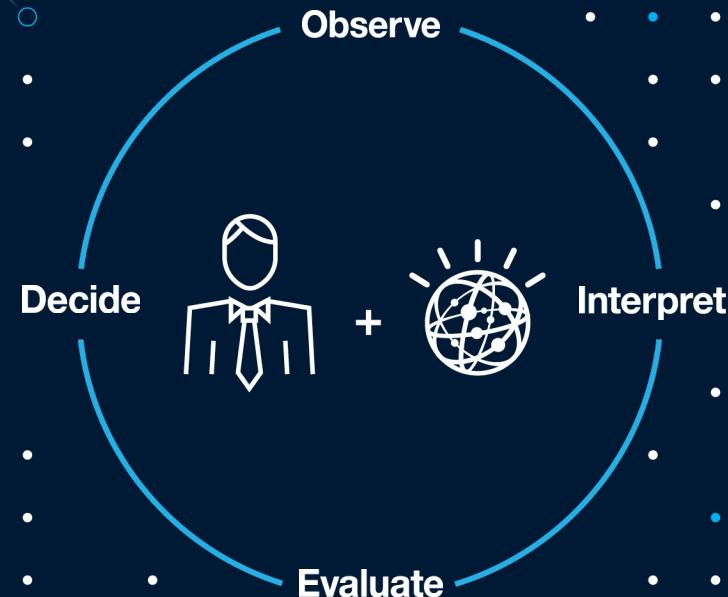
The making of an expert.



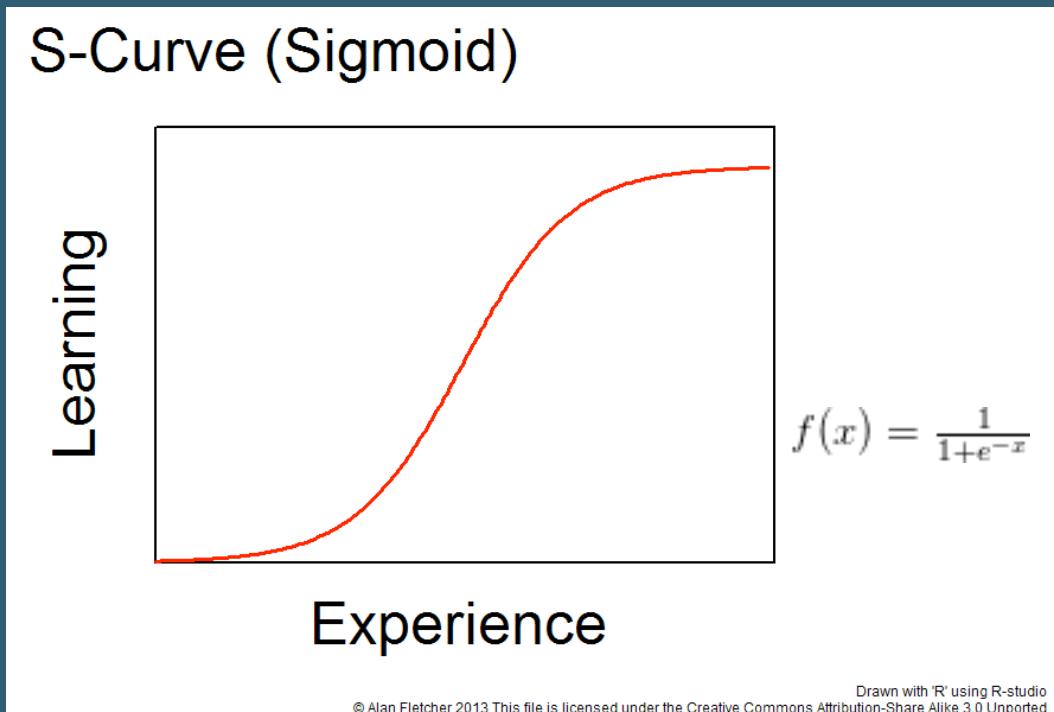


But even experts face challenges
in our current environment.

Watson scales expertise to expand what's possible.



Everywhere you look there is an S-curve



Drawn with 'R' using R-studio

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If you had to choose what machine learning
problems to solve....

Understanding language

or

Understanding vision

Natural language processing – a classification problem

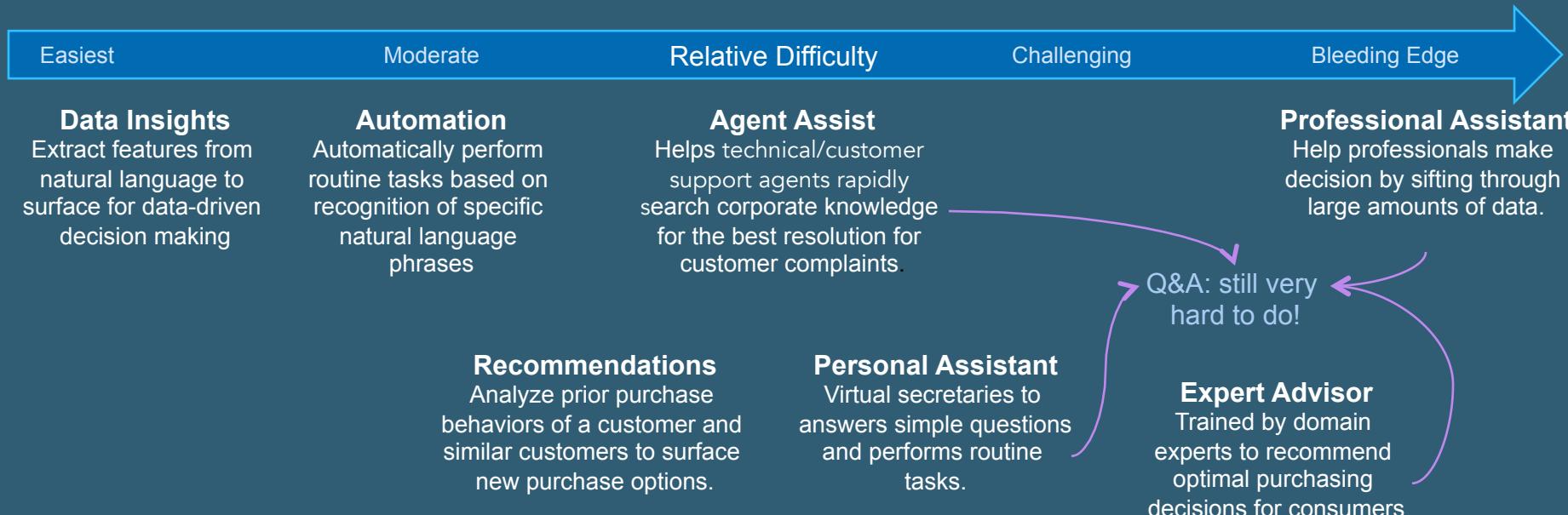
- Difficulty of language: Subtleties, idiosyncrasies, idioms, ambiguities, nuances and gaps

Noses run	but	feet smell
Slim chance	=	Fat chance
Wise man	not	Wise guy
Alarm goes off	while	it goes on
Fill in a form	by	filling it out
House burns up	while	it burns down
Ship by truck	but	send cargo by ship

- It is highly contextual, imprecise and has gaps (context known outside the conversation)

High-Level Cognitive Patterns

Here are common implementation patterns seen for cognitive systems



First there were websites, then apps now bots

One-to-one VS one-to-many

For the first time in advertising/marketing history, brands have the opportunity to reach consumers on a personal level, at a pace of play that they (consumers) dictate. In a conversational world, marketers can no longer rely on the “yell & sell” approach and hope for the best. They need to “chat and listen.”

Small data VS big data

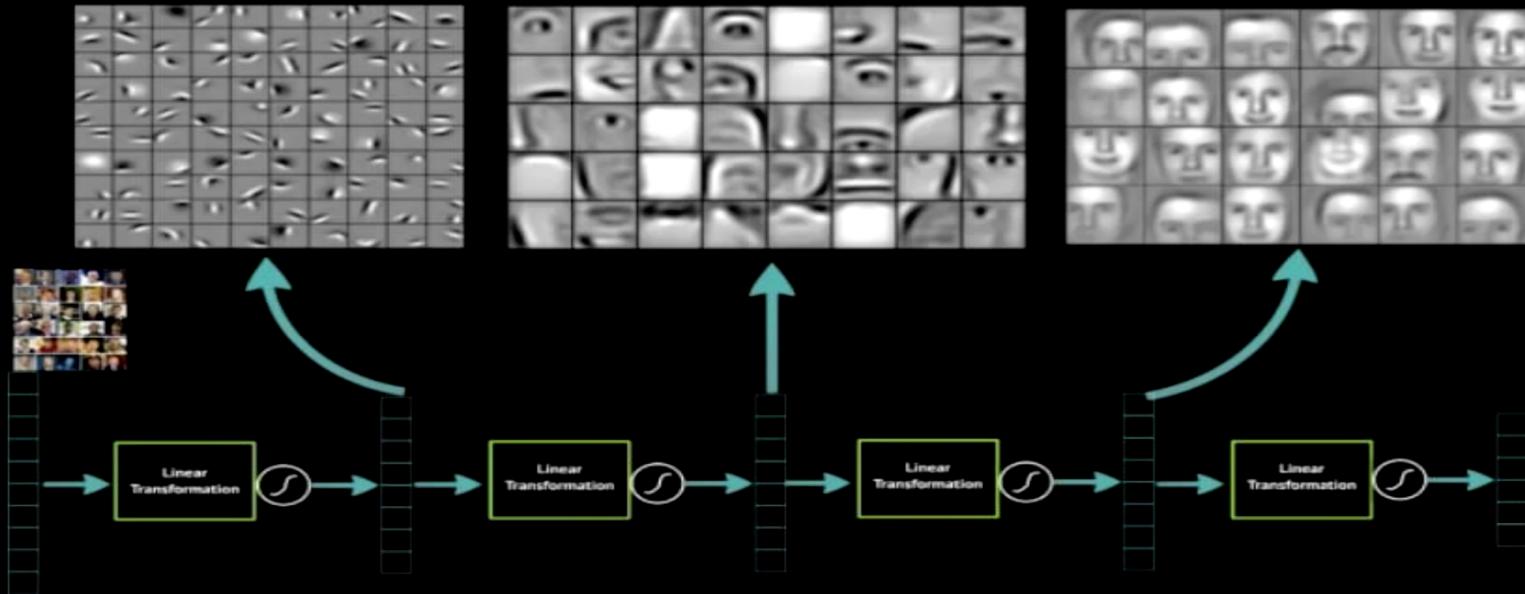
One-to-one communication gives you personal insights and specificity. It gives you snackable data that is actionable. And, for the first time, it creates the perfect platform to sequence messages in a natural, contextual, human way.

Always on VS always perfect

The rise of the “real and raw” thanks to live apps like Periscope or Snapchat stands as the new social currency Millennials and Generation Z teens live by . Being always on and keeping it real becomes therefore much more important for a brand than being picture or pixel perfect (and thus only sporadically on/always late). Every conversation is logged in so you can keep tracking, iterating and improving the quality of your bot over time.

Watson is Deep Learning

Deep Learning learns layers of features



Machine learning camps (*The Master Algorithm* by Pedro Domingo)

Camp	Views on machine learning	Favorite algorithm
Symbolists	...view learning as the inverse of deduction and take ideas from philosophy, psychology and logic.	Inverse deduction
Connectionists	...reverse engineer the brain and are inspired by neuroscience and physics.	Backpropagation
Evolutionaries	...simulate evolution on the computer and draw on genetics and evolutionary biology	Genetic programming
Bayesians	...believe learning is a form of probabilistic inferences and have their roots in statistics.	Bayesian inferences
Analogizers	...learn by extrapolating from similarity judgments and are influenced by psychology and mathematical optimization.	Support vector machine

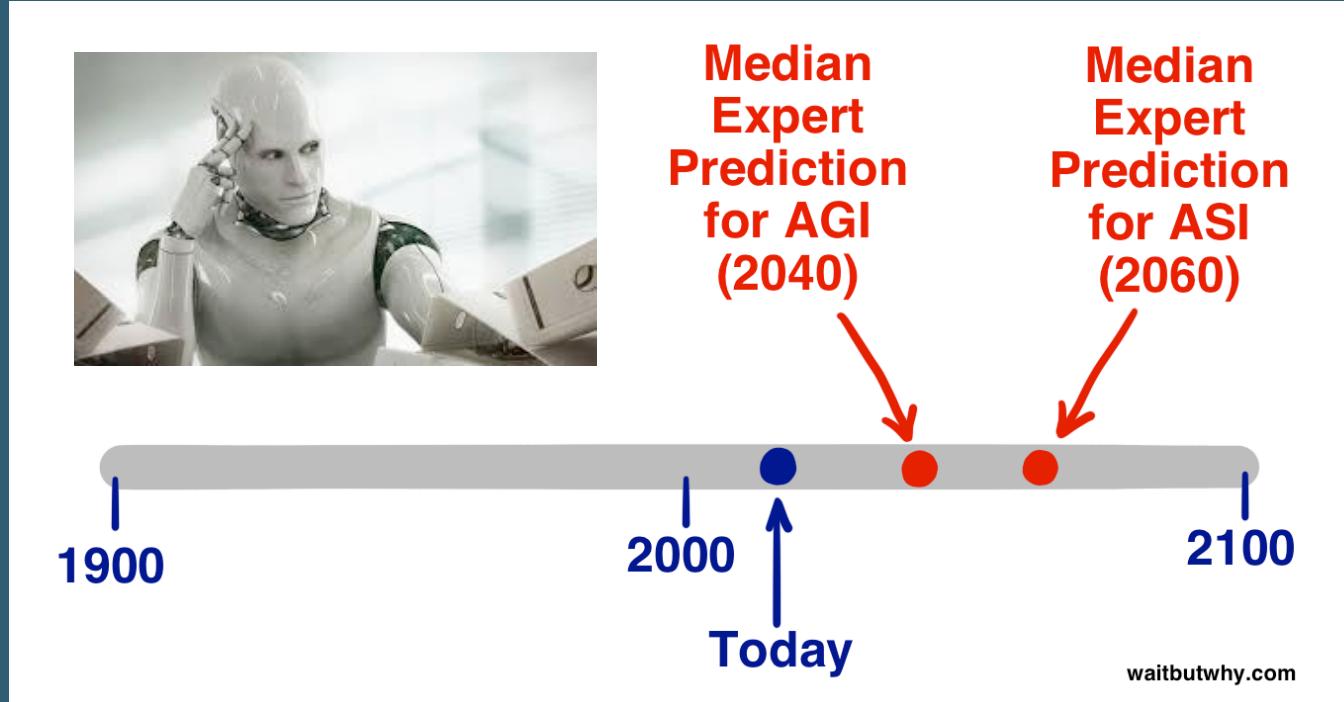
Three major AI caliber categories:

Artificial Narrow Intelligence (ANI): Sometimes referred to as *Weak AI*, Artificial Narrow Intelligence is AI that specializes in *one* area. ANI can beat Jeopardy! World champion. Ask it to figure out a better way to store data on a hard drive, and it'll look at you blankly.

Artificial General Intelligence (AGI): Sometimes referred to as *Strong AI*, or *Human-Level AI*, Artificial General Intelligence refers to a computer that is as smart as a human *across the board*—a machine that can perform any intellectual task that a human being can.

Artificial Superintelligence (ASI): Oxford philosopher and leading AI thinker Nick Bostrom defines superintelligence as “an intellect that is much smarter than the best human brains in practically every field, including scientific creativity, general wisdom and social skills.” Artificial Superintelligence ranges from a computer that’s just a little smarter than a human to one that’s trillions of times smarter—across the board.

When will we see AGI and ASI?

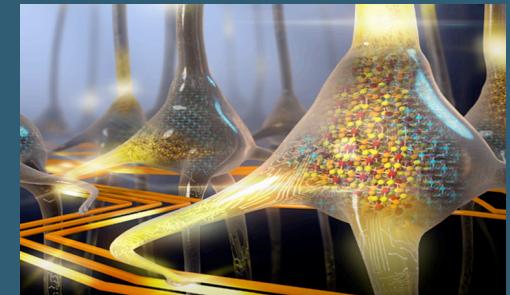


IBM Zurich has built a version of an artificial neuron

Evangelos S Eleftheriou, IBM Fellow

Germanium antimony telluride is a tiny blob sandwiched between two electrodes and has the property of a phase-change material.

It starts off as a disordered blob that lacks any atomic structure and which conducts electricity poorly. If a low voltage electrical jolt is applied, a small portion of the stuff will heat up and rearrange itself into an ordered crystal with much higher conductivity. Apply enough such jolts and most of the blob will become conductive and the neuron fires, just like a neuron. A high voltage current is then applied to melt the crystal and reset the neuron.





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Type to search

Starters

- Boilerplates

Compute

- Runtimes
- Containers

Services

- Watson
- Mobile
- DevOps
- Web and Application
- Network
- Integration
- Data and Analytics
- Security
- Storage
- Business Analytics
- Internet of Things
- APIs

Provider

Services // The building blocks of any great app

Watson

Build cognitive apps that help enhance, scale, and accelerate human expertise

AlchemyAPI
IBMConversation
IBMDialog
IBMDocument Conversion
IBMLanguage Translation
IBMNatural Language
Classifier
IBMPersonality Insights
IBMRetrieve and Rank
IBMSpeech to Text
IBMText to Speech
IBMTone Analyzer
IBMVisual Recognition
IBMCognitive Commerce™
Third PartyCognitive Graph
Third PartyCognitive Insights™
Third Party

“Growth and comfort cannot coexist.”

- Ginni Rometty

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