How Artificial Intelligence is Transforming Insurance

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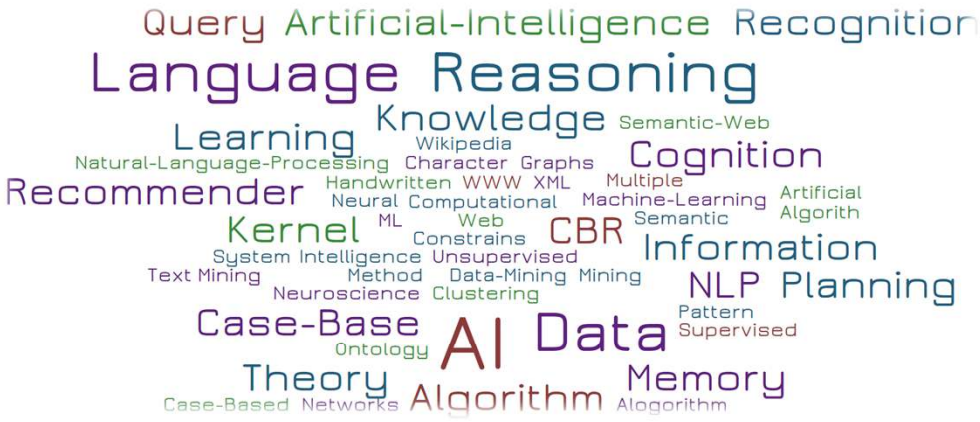
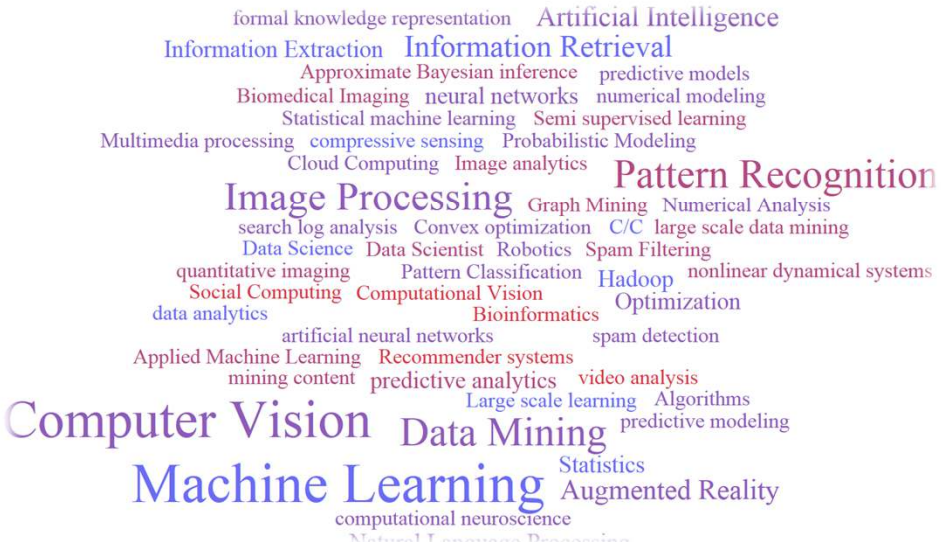
Outline

- Machine Intelligence @Swiss Re
- Use Cases
- Platforms
- Challenges and next steps

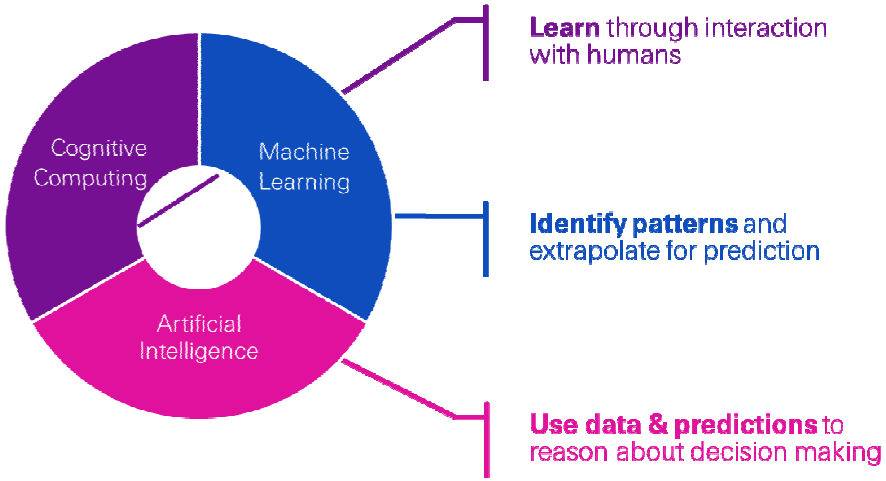
Machine Intelligence @Swiss Re (1/3)





Machine Intelligence @Swiss Re (2/3)

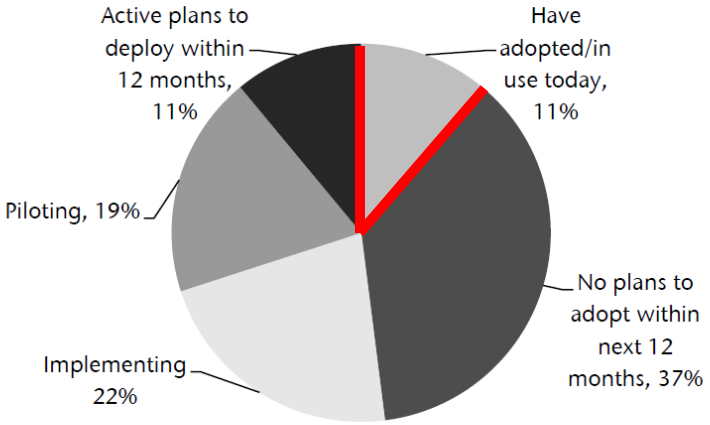
Machine Intelligence refers to the interplay between Artificial Intelligence, Machine Learning and Cognitive Computing



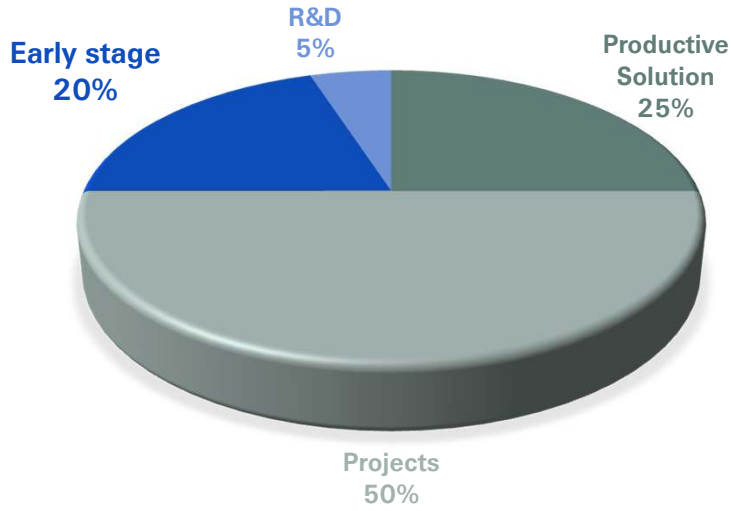
i These three disciplines are very broad and specific capabilities are not interchangeable

Machine Intelligence @Swiss Re (3/3)

Balanced portfolio of projects between productive solutions, PoCs, feasibility checks for new requests and R&D activities

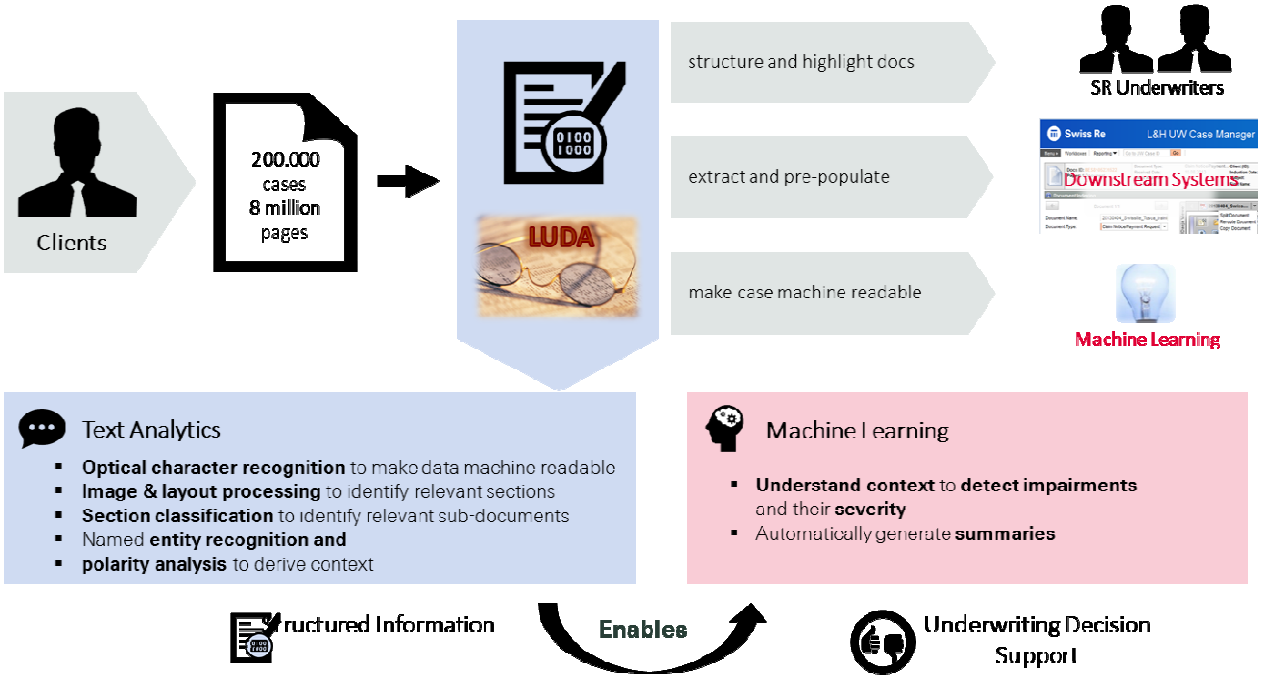


Source: Gartner (March 2017), Jefferies



Use Cases (1/6)

- **L&H Underwriting Analytics**

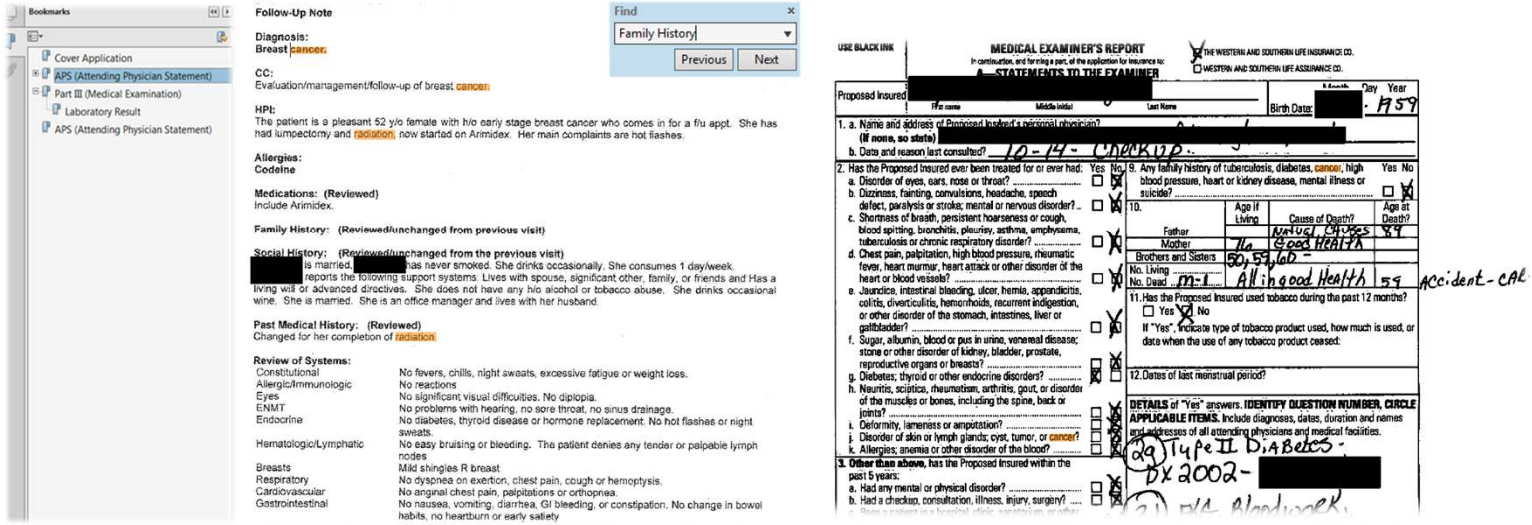


Use Cases (2/6)

- **L&H Underwriting Analytics**

1. What underwriters receive
2. What we can do today
3. What we are developing

Navigation | **Highlighting** | **Search** | **Read Forms** | **Extract Values** | **Understand Tick-Boxes**

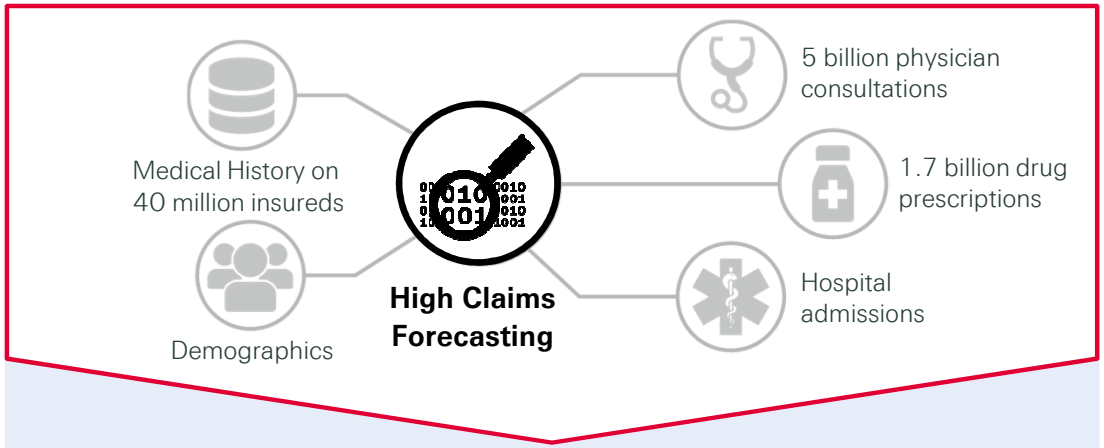


Use Cases (3/6)

❑ **Accident & Health Cost Claims Forecasting**

Rising High Claims Costs

- Strong Medical Inflation
- Increase in the frequency of **catastrophic claims**
- From 2009 to 2013 share of losses caused by the upper 2% of the enrolees rose from **30%** to **38%**
- Main drivers are **specialty drugs** where costs can reach USD 10m per year per individual



Big Data Methods

- Handle **2TB** of data
- 5 years of **full medical records** of **40 million people**

Machine Learning

- Train model on **medical history** and **demographic data**
- Identify **key drivers** of claims

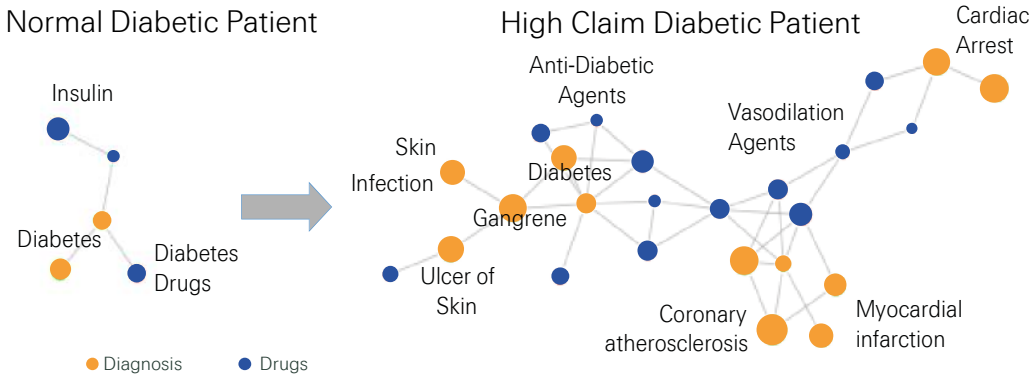
Predictive Modelling

- Predict **medical inflation**
- Predict **high cost claims**

Use Cases (4/6)

❑ **Accident & Health Cost Claims Forecasting**

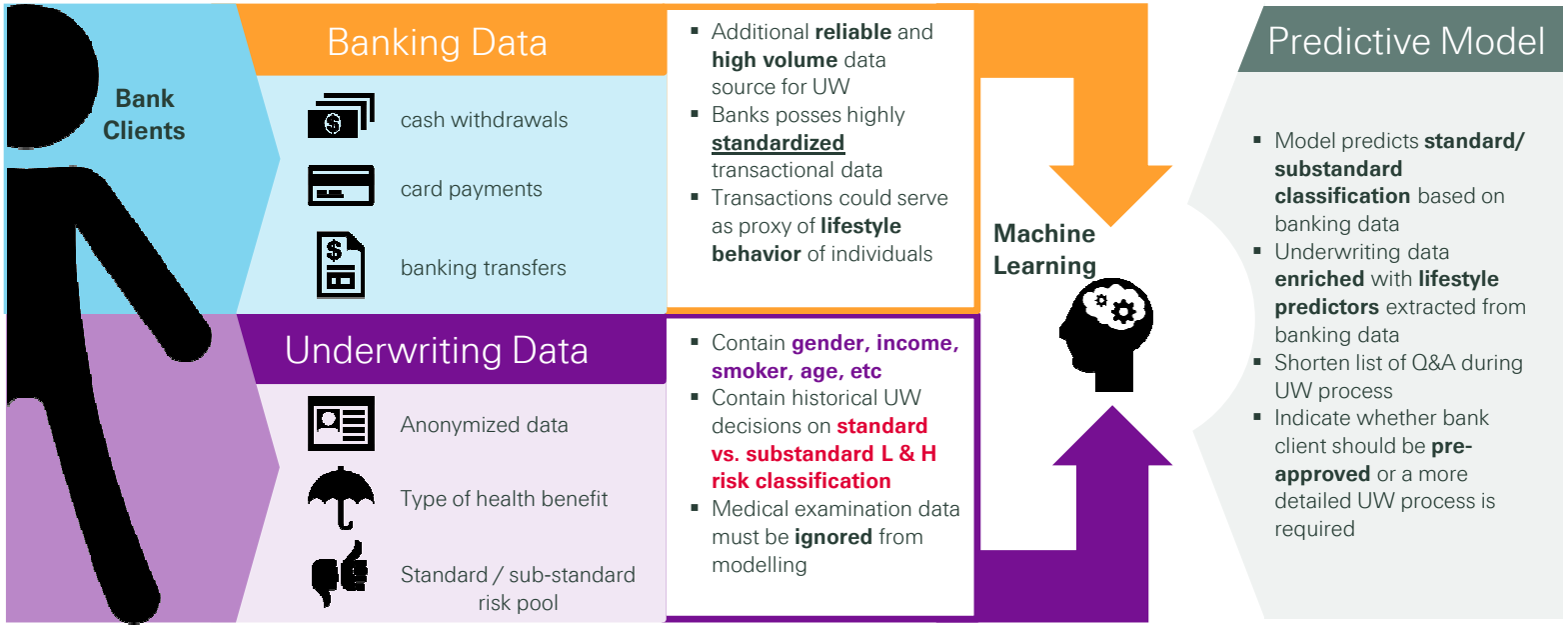
Descriptive Analytics	Predictive Analytics	Business Impact
▪ What is the **medical inflation** for the different **demographics**? ▪ What are **high claims** made of? ▪ How much does a given treatment cost, e.g. **lung cancer**?	▪ Which key features have the **highest forecasting power**? ▪ What will the medical inflation rates be **next year**? ▪ How to get **early warnings** on new high-cost treatments?	▪ Ability to flag **67%** of cases that **will exceed** a certain threshold ▪ **66%** of flagged case **do exceed** the threshold ▪ Leading indicators for catastrophic claims are **cancers** and **kidney diseases**



High cost (>USD 50k per year) diabetic patients are characterized by a high-level of co-morbidities, including skin and cardio-vascular diagnoses.

Use Cases (5/6)

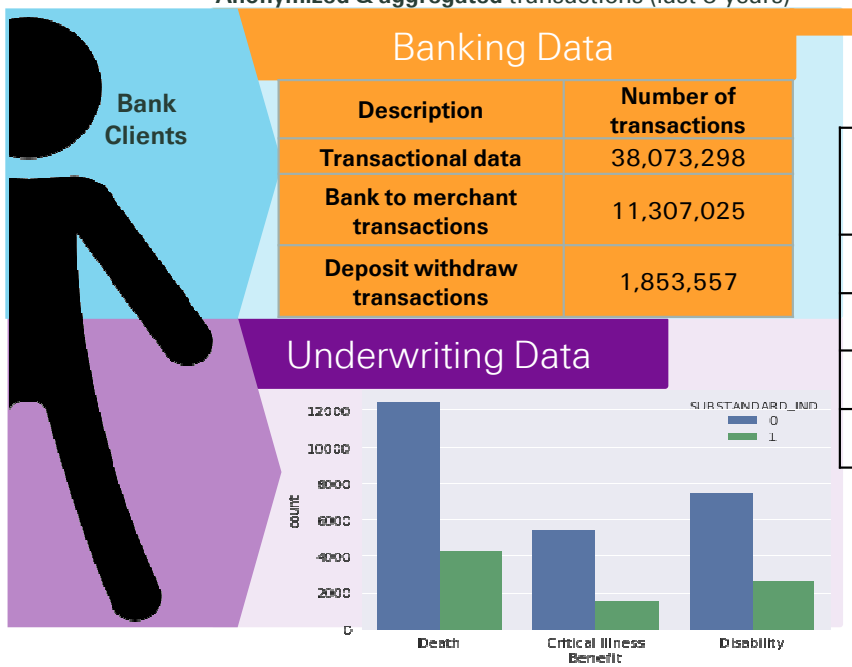
❑ Bank-insurance



Use Cases (6/6)

- **Bank-insurance**

Anonymized & aggregated transactions (last 3 years)



Underwriting Decisions

id	Age	...	Standard ?	Drug Stores (5912)	...	Orthopedic (3842)	Sports (3949)	Health Services (8000)
c12	34	...	Yes	1	...	0	10	0
c23	45	...	No	4	...	2	0	3
c45	56	...	No	X	...	X	X	X
c56	59	...	Yes	X	...	X	X	X

Fully underwritten data (~33,000 cases)
(**standard** vs. **substandard** health risk classification)

Lifestyle behaviour proxy from transactions

Machine Intelligence Platforms @SR

We provide three platforms for our productive solutions

ADAPT is a scalable platform that uses machine learning to **automate** repetitive **document processing** tasks

- Smart automation (claims' processing, contract intelligence, submissions' processing)

Insights Re is a **document enrichment** platform powered by semantic search and AI capabilities

- Document intelligence (classification, summarisation, search)
- Information retrieval

Pythia is a scalable platform which enables to rapidly deploy **models** and **visualizations**

- Predictive modelling using state-of-the-art machine learning (e.g. Data Robot)

Challenges and next steps

A potential cultural clash...

Statistical Science
2001, Vol. 16, No. 3, 199–231

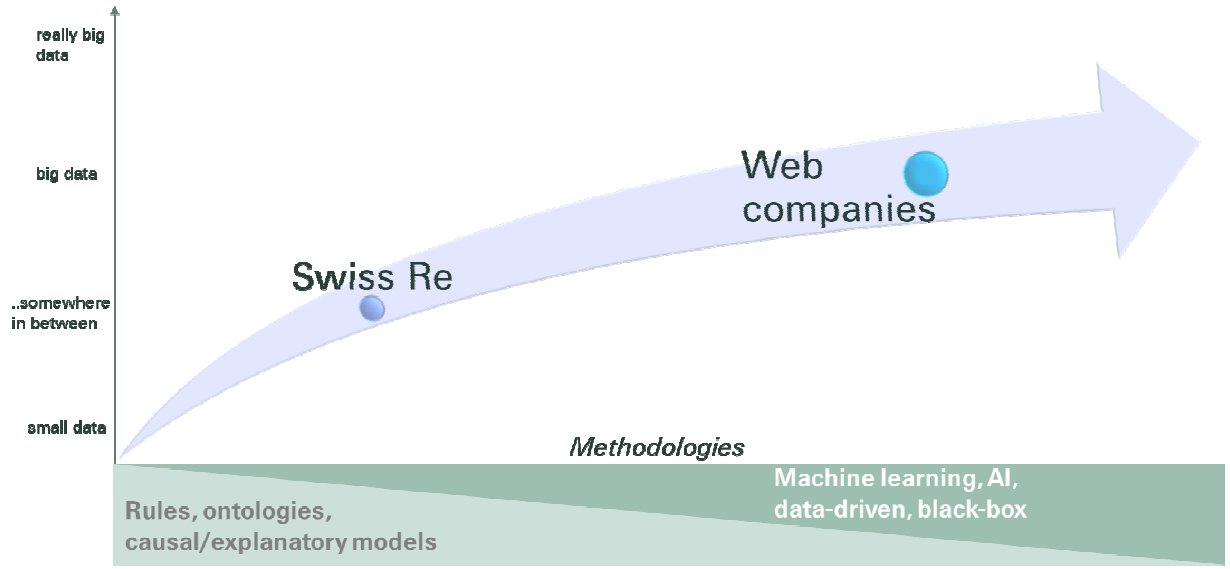
Statistical Modeling: The Two Cultures

Leo Breiman

Abstract. There are two cultures in the use of statistical modeling to reach conclusions from data. One assumes that the data are generated by a given stochastic data model. The other uses algorithmic models and treats the data mechanism as unknown. The statistical community has been committed to the almost exclusive use of data models. This commitment has led to irrelevant theory, questionable conclusions, and has kept statisticians from working on a large range of interesting current problems. Algorithmic modeling, both in theory and practice, has developed rapidly in fields outside statistics. It can be used both on large complex data sets and as a more accurate and informative alternative to data modeling on smaller data sets. If our goal as a field is to use data to solve problems, then we need to move away from exclusive dependence on data models and adopt a more diverse set of tools.

Challenges and next steps

Different Machine Intelligence methods have different relevance depending on the amount and type of data available for analysis



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About Expert System

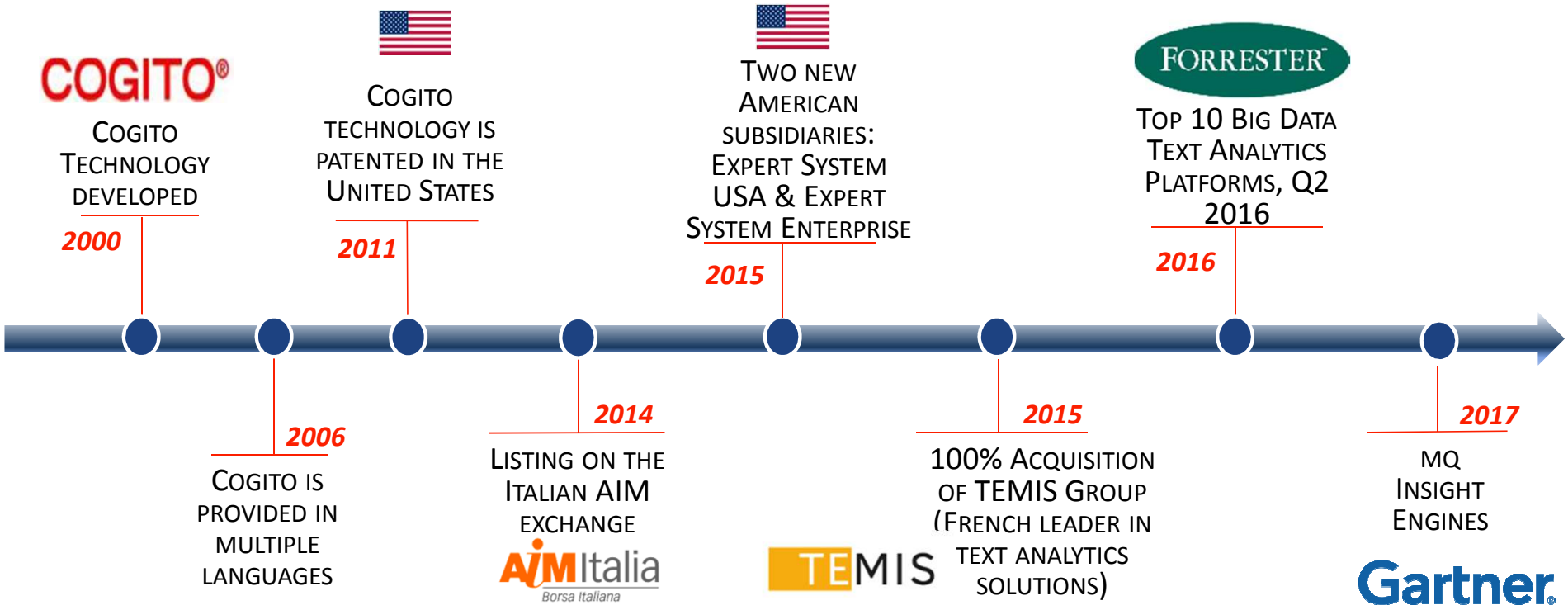
- **LARGEST EUROPEAN VENDOR**
  of Artificial Intelligence for Text Analytics with more than €30 M in turnover

- **PUBLIC COMPANY (EXSY)**
  with offices and R&D labs in Europe and USA and 235 global employees

- **PATENTED TECHNOLOGY**

- The technology of choice **FOR ENTERPRISES** in all sectors and **FOR GOVERNMENTS**

Expert System group highlights



Customers in Key Verticals

BANKING & INSURANCE

MEDIA & PUBLISHING

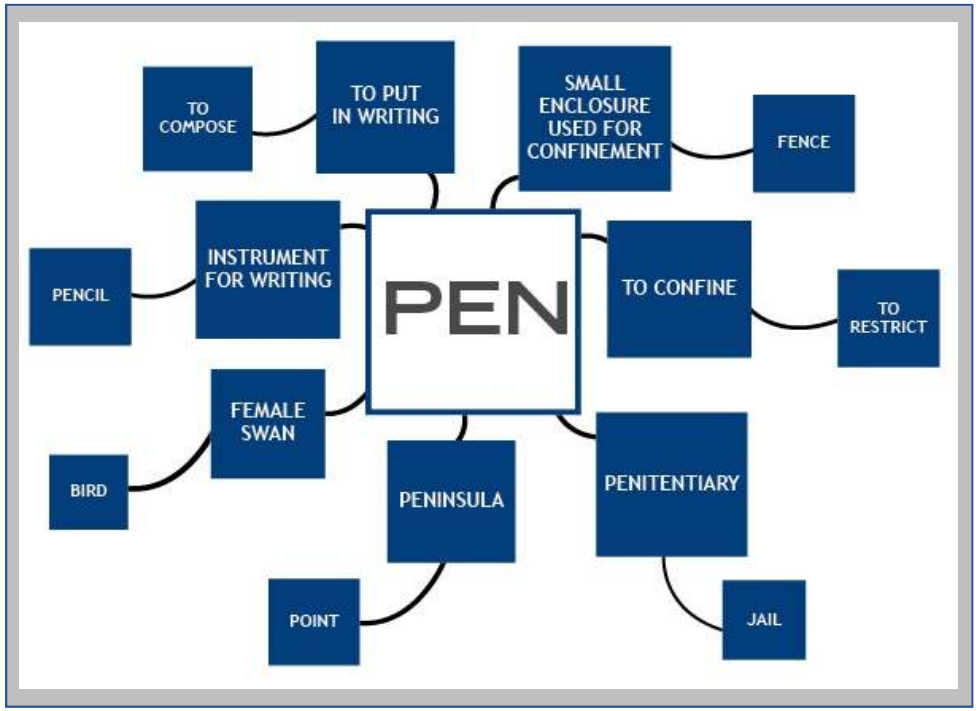
GOVERNMENT

OTHERS

Artificial Intelligence

Which policy?

Artificial Intelligence



Morphological Analysis → ***dog, dog-catcher, and doggy-bag*** are closely related

Part of Speech Analysis → ***«There are 40 rows in the table»*** (rows = noun)
«She rows 5 times a week» (rows = verb)

Logical Analysis → ***«Davey Jones, represented by attorney Daniel Stanley, is married to Rebecca Carter»*** Rebecca is married to Davey and not Daniel

Semantic Analysis → ***«I used chicken broth for my soup stock»*** (stock = food)
«The company keeps lots of stock on hand» (stock = inventory)

How Artificial Intelligence is Transforming Insurance


Pre-quote


Submission Automation


Contract clauses comparison

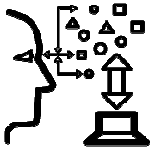

E-Mails Automatic Classification


CALL Analysis


Claims management


Claims Adjudication


Property Risk Screening


Underwriting Cognitive Assistant


Alerting Triage


Due Diligence


Risk analysis


IVR with Open Question


Broker/Agent Interaction


Fraud Detection


Investment Management

Insurance Value Chain

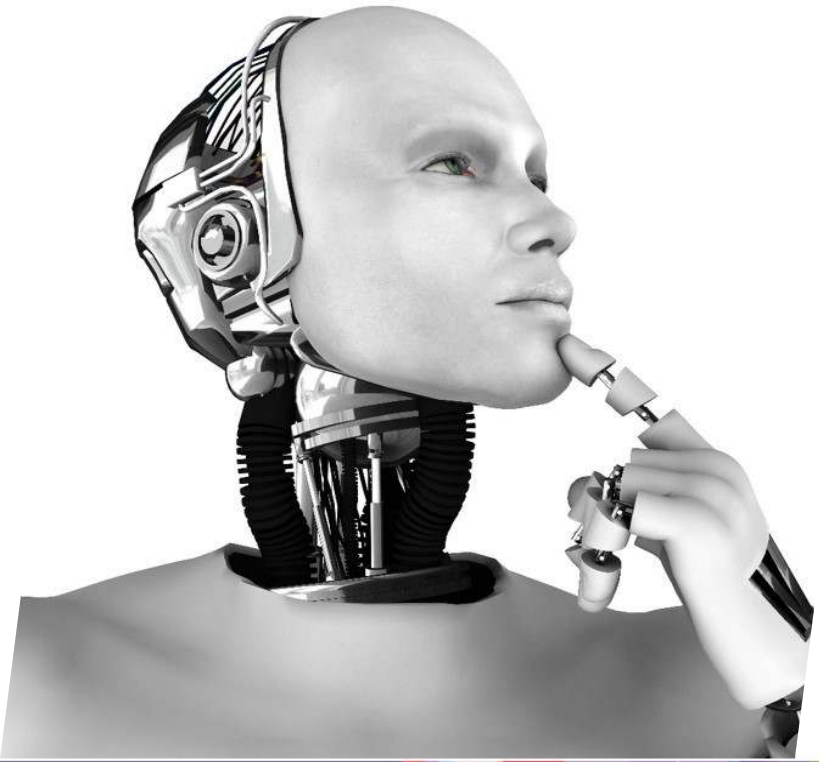
Product Design → Pricing & Underwriting → Distribution → Admin & Claim Mgmt

How Artificial Intelligence is Transforming Insurance

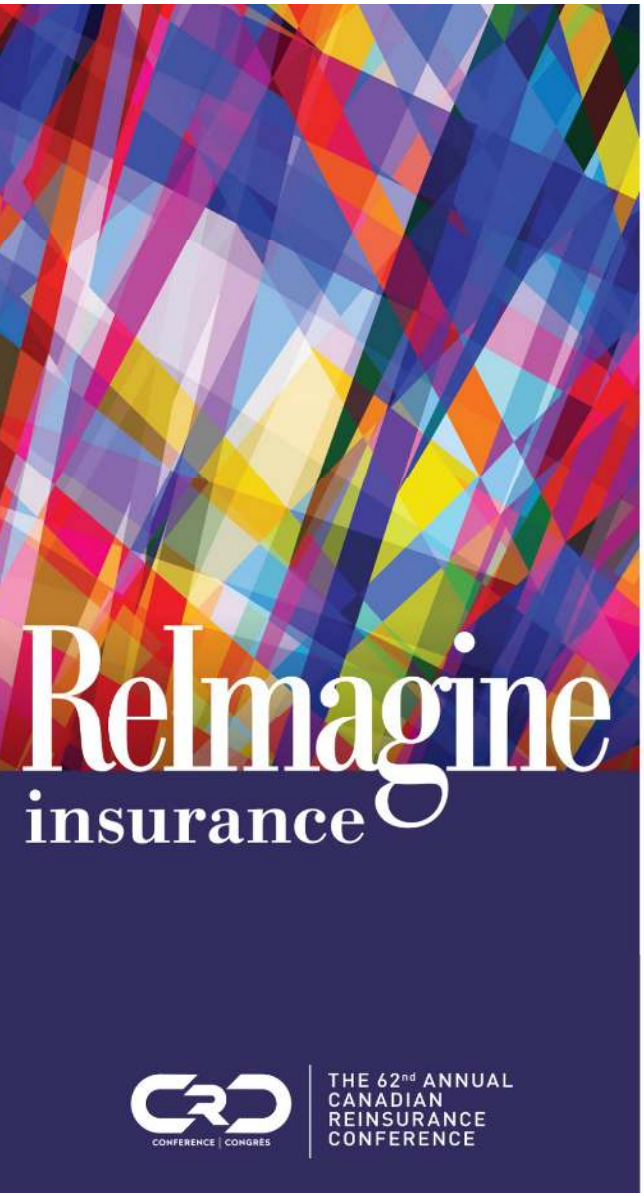
It is not only a matter of efficiency gain, but also of risk exposure reduction:

- Speed
- Free up time
- Accuracy
- Standardization
- Easier audits
- Reduce leakage
- Improve customer satisfaction
- Reduce reserving

Hints for success



- **Have confidence in the value of AI and experience**: sometimes road is long and winding, but at the end the results are real, solid and measurable
- **Prefer a gradual approach**: targeting a step-by-step implementation of AI solutions is often the best recipe for success
- A bit of **healthy skepticism** is always a good start to set the right expectations for AI



Questions

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