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## Using data analytics to revolutionise underwriting

Alastair Gerrard – Gen Re  
Gwilym Morrison – Royal London

Expertise  
Sponsorship  
Thought leadership  
Progress  
Community  
Sessional Meetings  
Education  
Working parties  
Volunteering  
Research  
Shaping the future  
Networking  
Professional support  
Enterprise and risk  
Learned society  
Opportunity  
International profile  
Journals  
Supporting

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## Use of predictive analytics in life insurance

For which of these applications are you currently using or developing a use (next two years) for Predictive Analytics?



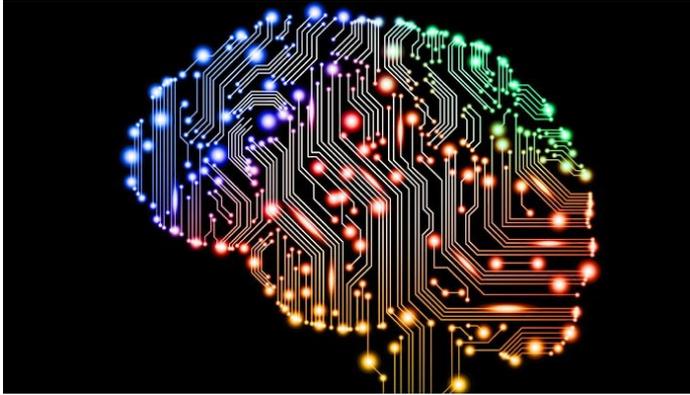
Source: Gen Re Predictive Analytics Survey 2016



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## Machine learning



Machine Learning is a sub-field of Computer Science that allows computers to learn from data without being explicitly programmed.



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## Two traditions



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## Methods compared

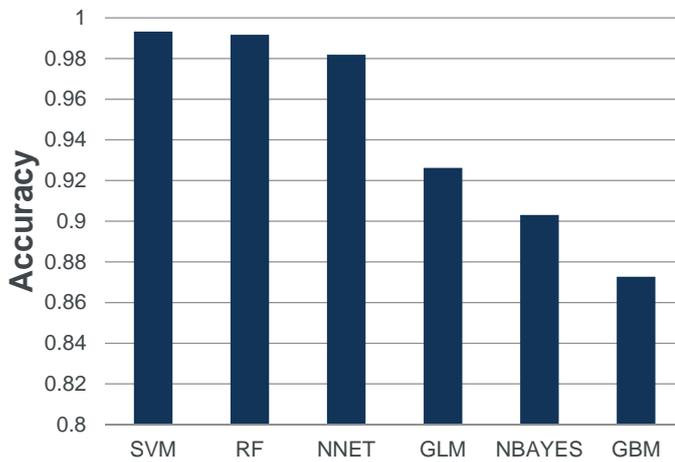
Linear regression & Generalised Linear Models	Machine Learning
Requires less computational power	Requires a lot of computational power
Easy to understand and explain	Tend to be “black boxes”
Tend to be limited to linear relationships	Can natively model non-linearity
Lends itself to smaller datasets	Usually requires a lot of data
Tend to give moderately accurate models	Can give very accurate models
Parametric: need to watch assumptions	Non-parametric: few/no assumptions



## Machine learning Google trends



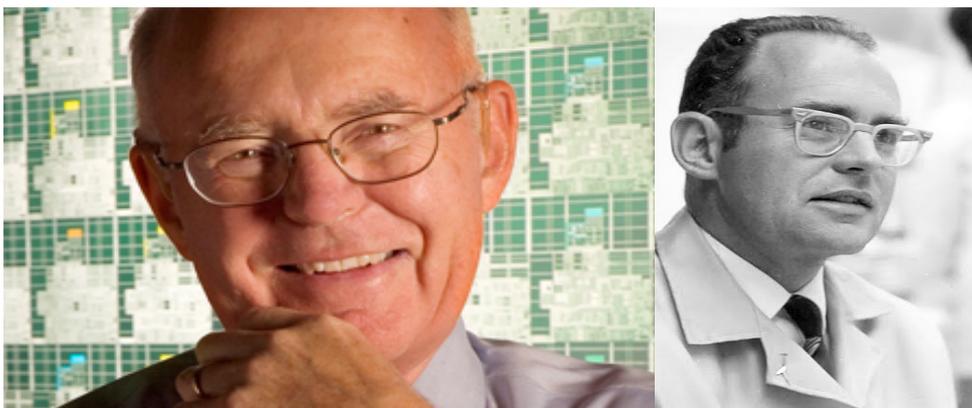
## Comparison of Learning Algorithm Performance



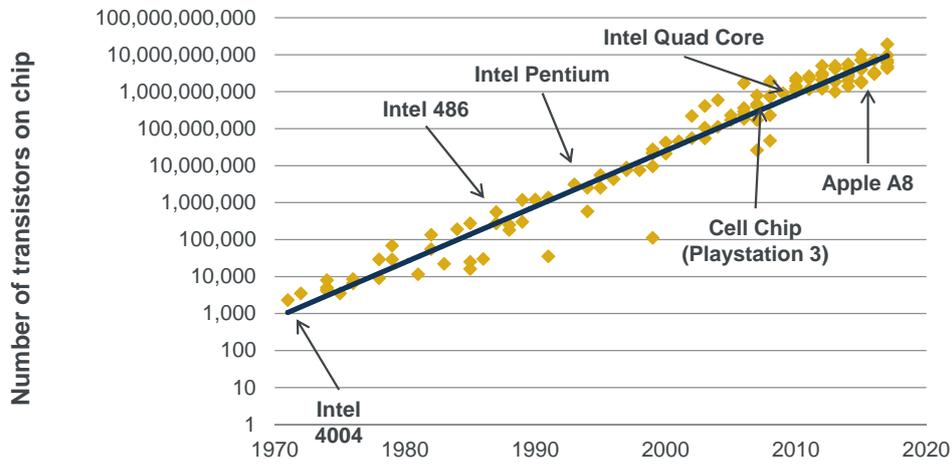
[https://rpubs.com/m3cinc/Benchmarking\\_20\\_Machine\\_Learning\\_Models\\_Accuracy\\_and\\_Speed](https://rpubs.com/m3cinc/Benchmarking_20_Machine_Learning_Models_Accuracy_and_Speed)



## Gordon Moore



## Moore's Law



## Battle of the "supercomputers"

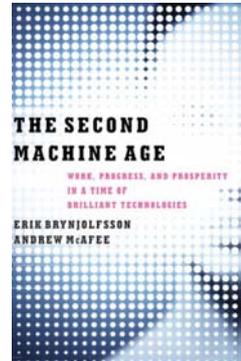
1996



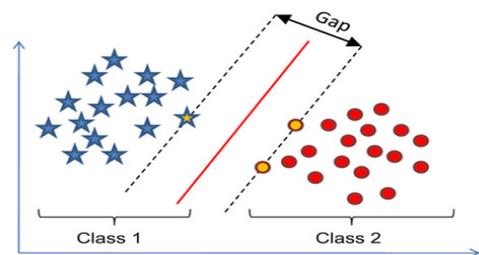
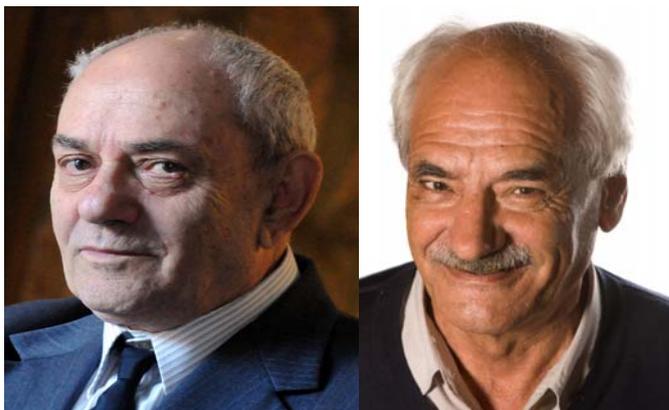
2006



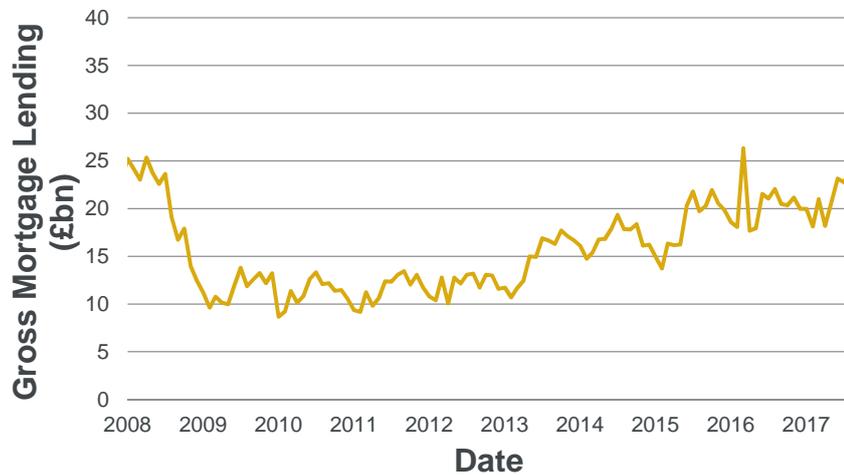
## The Second Half of the Chessboard



## Support Vector Machines



## Mortgage Market Trends



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## Mortgage Broker Market Challenges



**Mortgage Market Review**



**Longer advice process**



**Mortgage market buoyancy**



**Increased broker share of market**



**Less time to sell protection**



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# Insurance



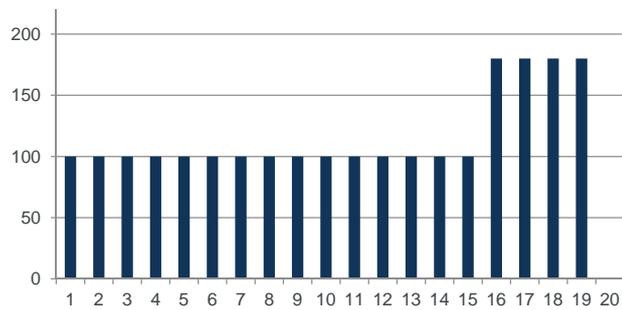
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## Why Underwrite?

- Approach is historic mainly
  - Ask 40+ medical questions
  - Refer for further evidence
- >75% Standard
- 5% Decline
- 20% terms
  - Rate – EM / p.m.
- Costly process
  - UW resources, IT, Medical expenses

Traditional UW

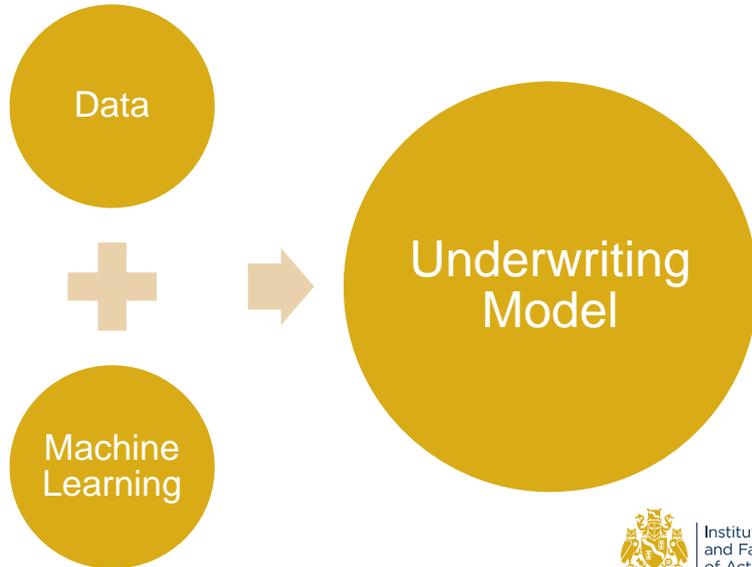


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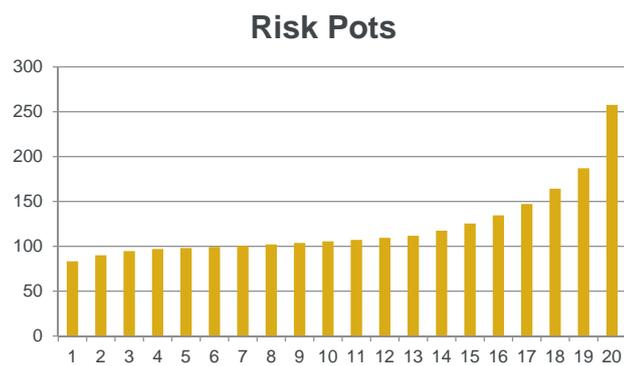
## Inputs to Model

- Data
  - Mortgage-related fields
  - Salary
  - Occupation
  - Age
  - etc



## The Model

- Divides the population into 20 equal vigintiles
- Higher differential the better

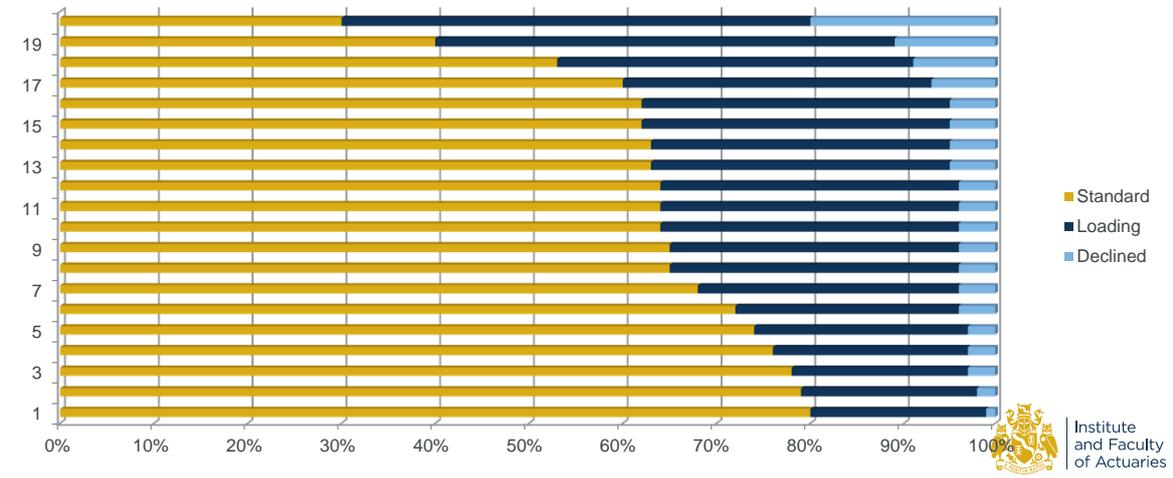


Note: Indicative Numbers



### Vigintiles by decision

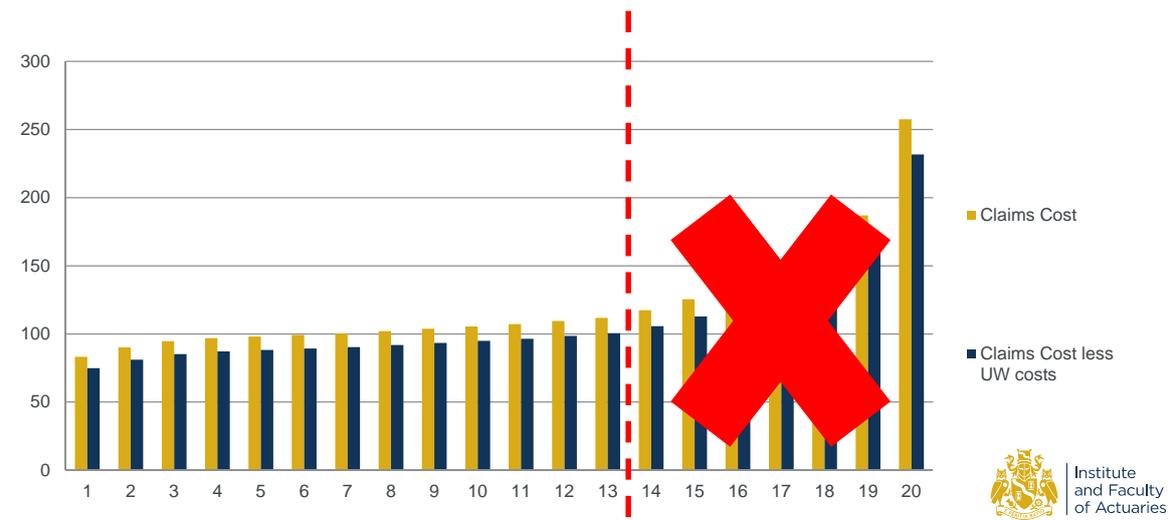
Note: Indicative Numbers



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### The Model - viability



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## What do we (RI) want to understand?

- Insurers can control
  - Underwriting costs
  - Commission paid
  - Application process
  - Broker behaviour?
- Reinsurers- can't!
  
- Can we control Behaviour of the applicant?
  - Anti-selection



## What are we prepared to take?

- What trust do we have in the model?
- How do we test the outcome?
- Who are we willing to take on risk?
- At what price?
- What further controls?



## What a model can't do

- Underwrite!



## MIRAS



### Small number of questions added

- Keep the number of qualifying applicants high
- Keep Price low
- Keep application procedure simple and quick
- Exclude Declines and Heavily Rated



### The Model - Improved



## Anti-selection

- Applicant
  - Knows his own health
  - May know what the application process is elsewhere
- Broker
  - Definitely knows what the process is elsewhere



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## Application Process as Risk Control

- Control of the sales force
  - If meet conditions for Streamlined product must offer this only
  - Don't want the broker picking and choosing cases
  - Belief is however that ease of application will convince broker
- Risk of Anti-selection if free choice between Whole of Market and Streamlined



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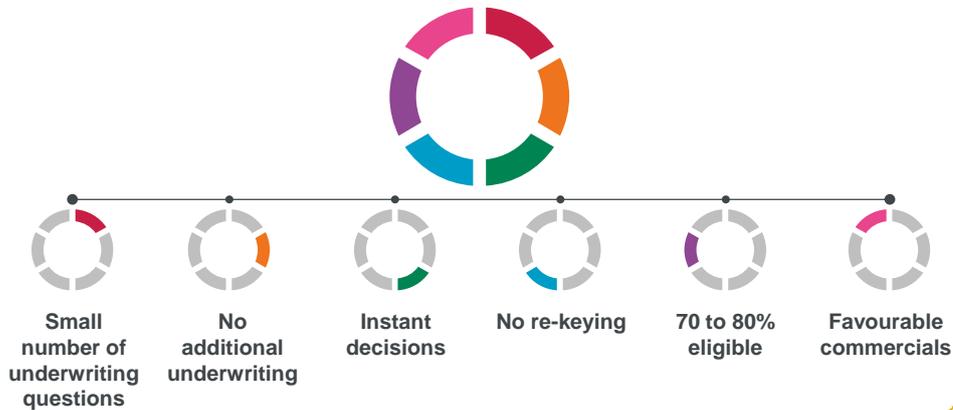
## Next Generation Underwriting



## Streamlined mortgage protection proposition



## Proposition key features



## Results

- Pilot stage so too early to say
  - Positive signs in the mix of business coming through
  - Further evidence being gathered to prove concept is solid
- Press/Broker reception overwhelmingly positive

## Trade Press Coverage



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Questions

Comments

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