Institute and Faculty of Actuaries

The truth, the whole truth and nothing but the truth

identifying and managing misrepresentation in protection insurance applications

Adele Groyer (Gen Re)
Lynne Young (Royal London)

November 2019

Overview

- Why should we manage misrepresentation?
- What are we currently doing?
- What should we be doing?
- How can we use data analytics to do even more?

Institute and Faculty of Actuaries

Why manage misrepresentation?

- Reputation
- Financial impact

Reason for claim decline	Term	CI	IP
Misrepresentation	91%	23%	54%
Definition not met	0	69%	27%
Condition not met	1%	5%	13%
Other	8%	3%	6%

Source: ABI Protection Claims Paid and Declined 2017

Institute and Faculty of Actuaries

Institute and Faculty of Actuaries

Results of Gen Re's survey of UK insurers

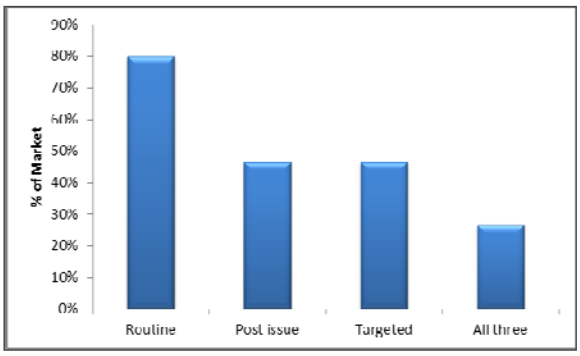
Expertise Sponsorship Thought leadership Progress Community Sessional Meetings Education Working parties Volunteering Research Shaping the future Networking Professional support Enterprise and risk Learned society Opportunity International profile Journals Supportin

Survey background

- Goals of the survey:
  - Establish what companies were doing in the market
  - Estimate misrepresentation levels across all product lines
  - Identify main disclosures associated with misrepresentation
- Questionnaire
  - Separate questionnaire for underwriters and claims assessors
  - Issued in March/April 2018

Institute and Faculty of Actuaries

Monitoring misrepresentation at underwriting



- Routine checking:

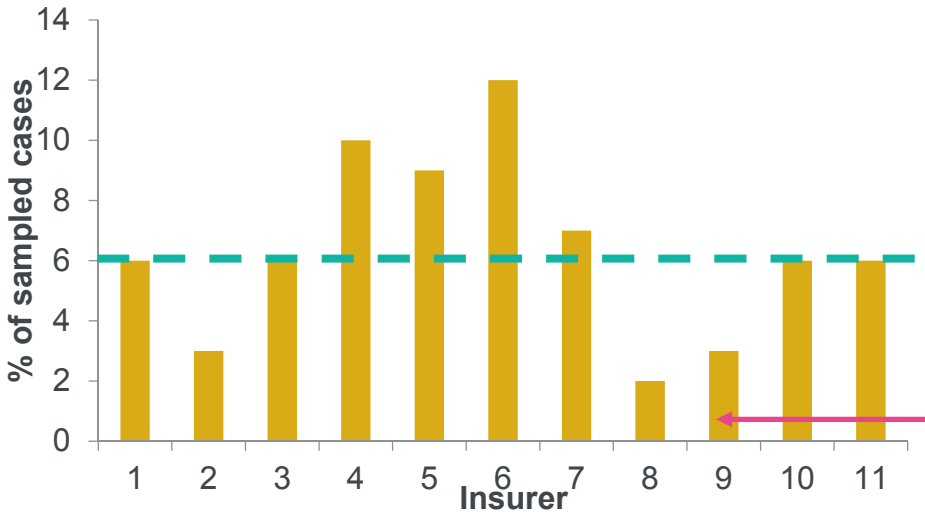
  Most insurers cross-check application form disclosures on cases where they got evidence for another reason.

- Post-issue random sampling and post-issue targeted sampling:

  Random sampling gives the most accurate measure of non-disclosure rates but is less commonly used.

Institute and Faculty of Actuaries

Reported levels of material misrepresentation



Not split by product or sampling method.

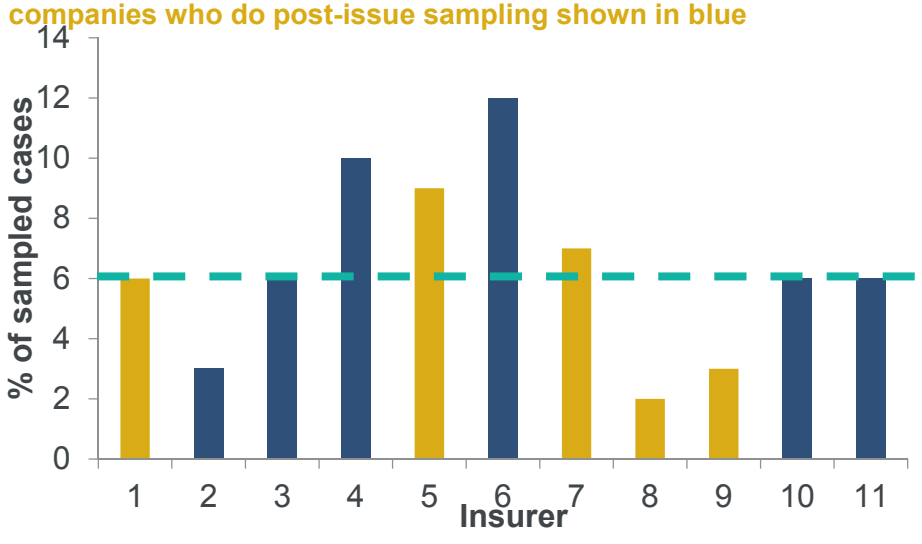
Only some insurers provided this information.

Life Cover only

Institute and Faculty of Actuaries

Reported levels of material misrepresentation

companies who do post-issue sampling shown in blue



Not split by product.

Average material misrep. % similar to all methods average

Institute and Faculty of Actuaries

Summary of top areas of misrepresentation

Life		CI		IP	
Underwriting	**Claim**	**Underwriting**	**Claim**	**Underwriting**	**Claim**
Mental illness	Alcohol / Drugs	Mental illness	Smoking	Mental illness	Musculoskeletal
Heart / blood pressure	Smoking	BMI	Alcohol / Drugs	BMI	Mental illness
BMI	Mental illness	Heart / blood pressure	Family history	Alcohol / Drugs	Previous medical history
Alcohol / Drugs	Previous medical history	Alcohol / Drugs	Previous medical history	Musculoskeletal	BMI
Smoking	BMI	Smoking	Heart / blood pressure		Alcohol / Drugs

Institute and Faculty of Actuaries

Comments on top areas of misrepresentation

- Leading issues across all products:
  - Mental illness
  - Alcohol and drugs
  - BMI
- Some disclosure issues are product-specific
  - Musculoskeletal conditions for IP
  - Family history for CI
- Ranking affected by ease of discovery
  - What is reported to the doctor / correlation with cause of claim

Institute and Faculty of Actuaries

Further comments on mental health disclosures

- How do we make it easier for applicants to disclosure mental health history?
- ABI working party is looking at the mental health question on the application form.

Institute and Faculty of Actuaries

Misrepresentation data recording at claim stage

Misrepresentation at claim stage … √

Misrepresentation by condition ... √

Misrepresentation by outcome/classification … some insurers

Misrepresentation by claim type/product … some insurers

Misrepresentation by region … ?

Misrepresentation by broker … ?

Misrepresentation by occupation … ?

Institute and Faculty of Actuaries

Case study: claims misrepresentation data to the rescue

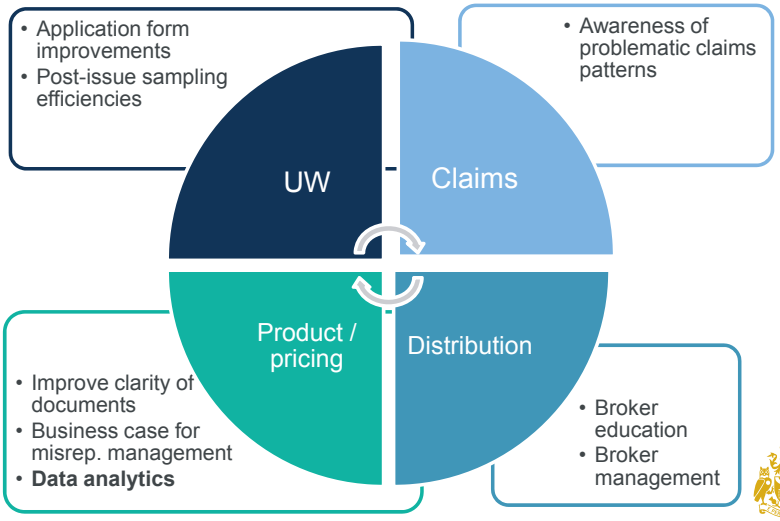
Deteriorating Claims Experience
- Early claims
- High claim rates

Analysis of Claims Data
- Significant levels of misrep. from one distributor
- Similar claim causes
- Similar occupations
- Regional trends

Learning & Remedial Actions
- Increased sampling
- Education of brokers
- Revision of T&C's and sales materials
- Review of application form

Benefits of collecting and sharing misrep information

Identify problem areas quicker and apply targeted remedies



Institute and Faculty of Actuaries

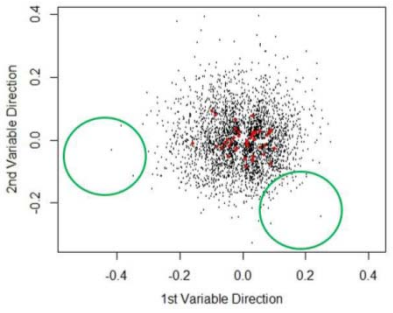
Best practice summary

- A combination of routine and random post-issue and targeted post-issue sampling is ideal, subject to cost constraints
- At underwriting and claims stages record results in as much detail as possible
  - disclosure, reason for non-disclosure, materiality, distributor, region …
- Share data between disciplines to identify and remediate issues quickly

Institute and Faculty of Actuaries

How data analytics can play a part

- Identify cases with high probability of misrepresentation
  - Predictive factors from augmented historic application data
  - Inconsistency within application form (anomaly)
- Remedies for cases identified
  - Target pre-issue evidence requirements
  - Target post-issue sampling
  - Decline to quote?



Institute and Faculty of Actuaries

Royal London

- Largest mutual life, pensions and investment company in the UK.
- Group funds under management of £114 billion.
- Group businesses provide around 9 million policies and have 1.4 million members.
- We employ about 3,500 people.
- Founded as a Friendly Society in a London coffee shop in 1861.
- Started out with the aim to help people avoid the stigma of a pauper's grave

ROYAL LONDON

Institute and Faculty of Actuaries

What is Data Science?

Institute and Faculty of Actuaries

Wald's Aircraft Survival Problem

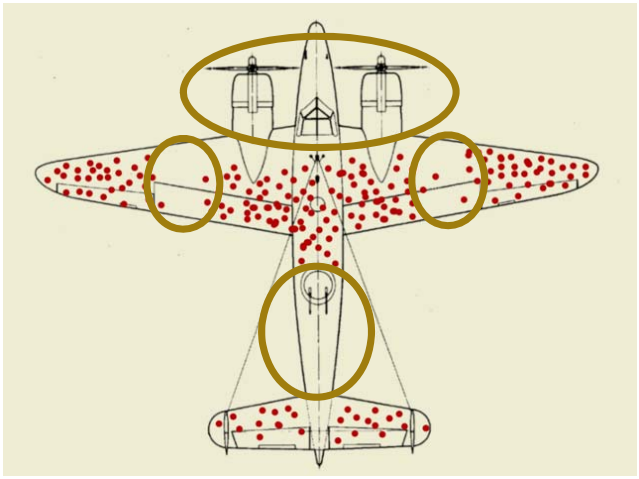
Institute and Faculty of Actuaries

Wald's Aircraft Survival Problem

Institute and Faculty of Actuaries

Wald's Aircraft Survival Problem

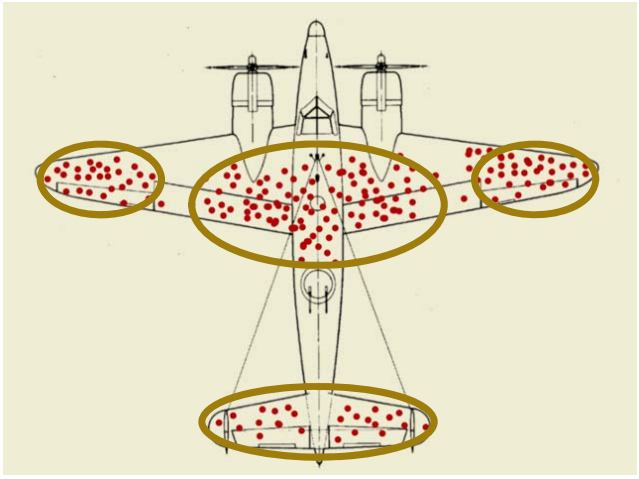
Option A



Institute and Faculty of Actuaries

Wald's Aircraft Survival Problem

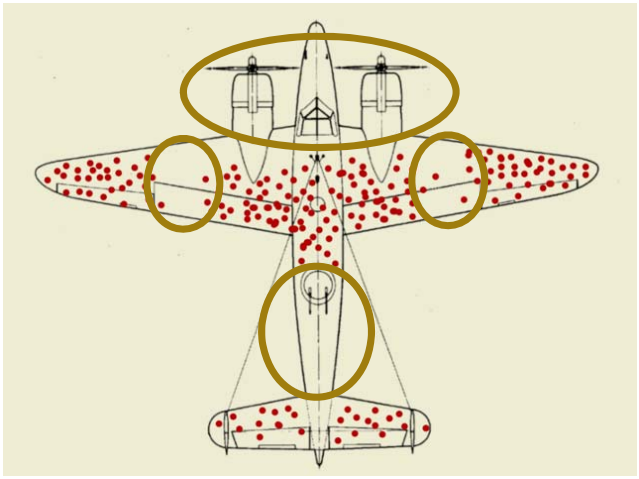
Option B



Institute and Faculty of Actuaries

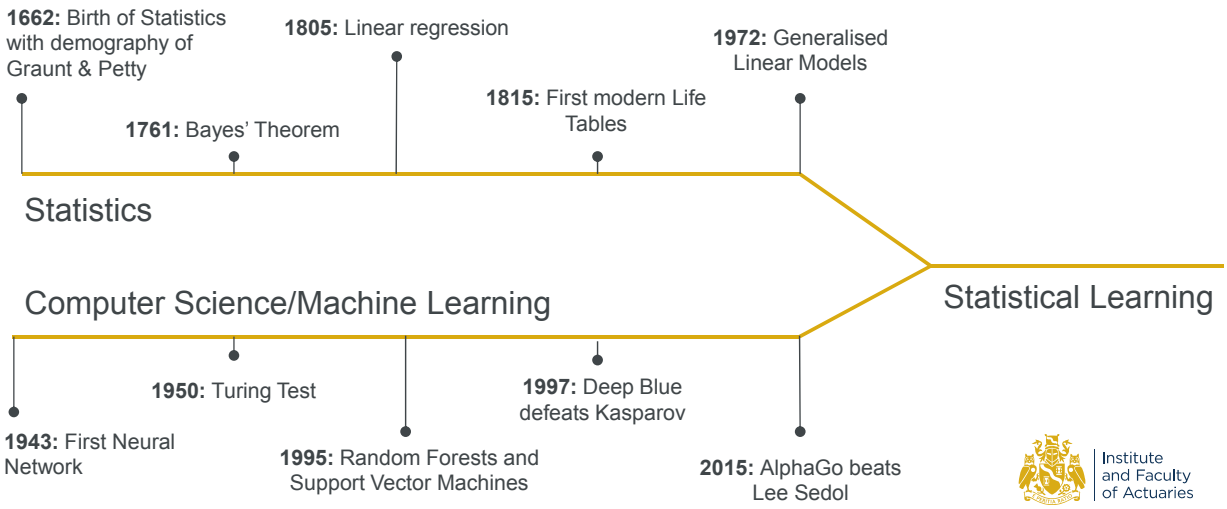
Wald's Aircraft Survival Problem

Option A



Institute and Faculty of Actuaries

The Two Traditions



Institute and Faculty of Actuaries

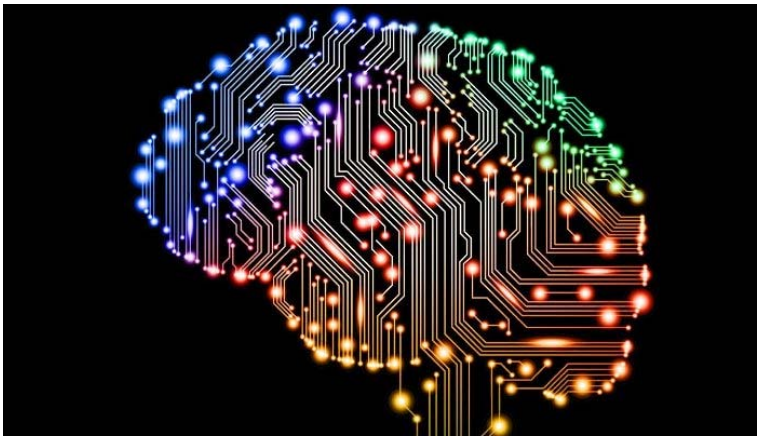
General Artificial Intelligence

Institute and Faculty of Actuaries

Narrow Artificial Intelligence

Institute and Faculty of Actuaries

Machine Learning



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

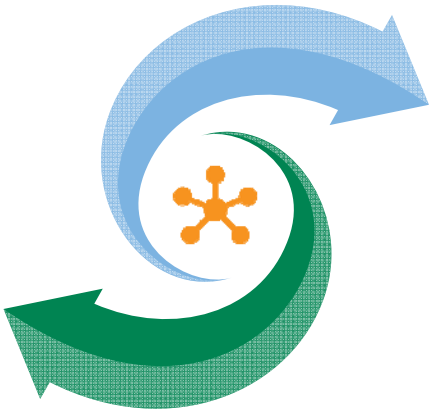
Institute and Faculty of Actuaries

Supervised and Unsupervised Machine Learning (ML)

Supervised Machine Learning

Class of ML techniques that learn from labelled data. Can be used for providing predictions.

These techniques include classification and regression methods.



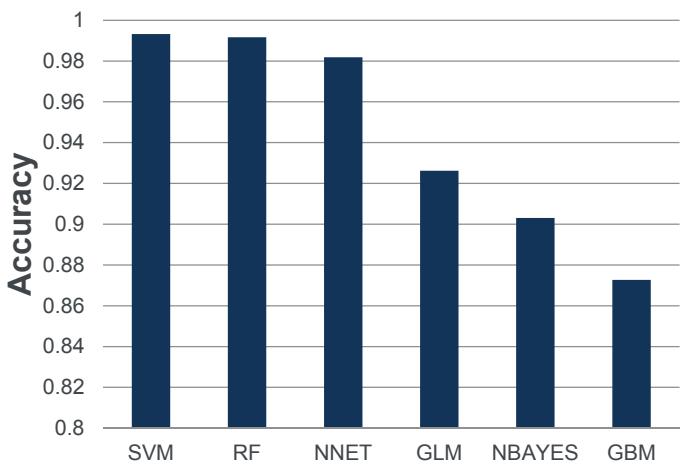
Unsupervised Machine Learning

Class of ML techniques that aim to describe unlabelled data "as is". Cannot provide direct predictions.

These techniques include clustering and dimensionality reduction methods.

Institute and Faculty of Actuaries

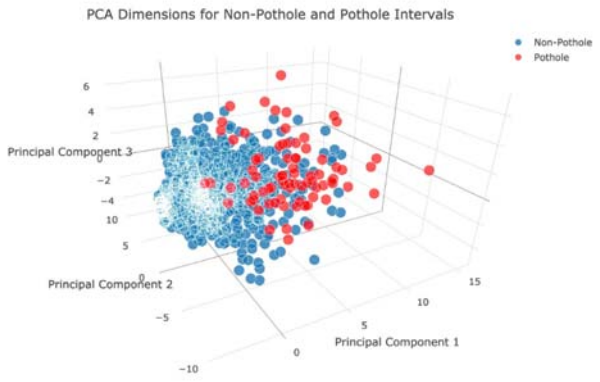
Comparison of Learning Algorithm Performance



https://rpubs.com/m3cinc/Benchmarking_20_Machine_Learning_Models_Accuracy_and_Speed

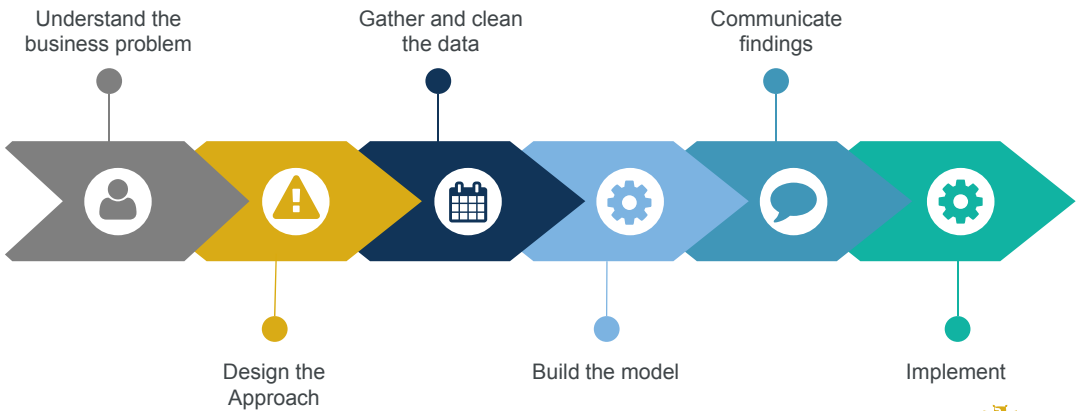
Institute and Faculty of Actuaries

Example – Pothole Detection



Institute and Faculty of Actuaries

Data Science Workflow



Institute and Faculty of Actuaries

Using ML to detect Misrepresentation

Implementation

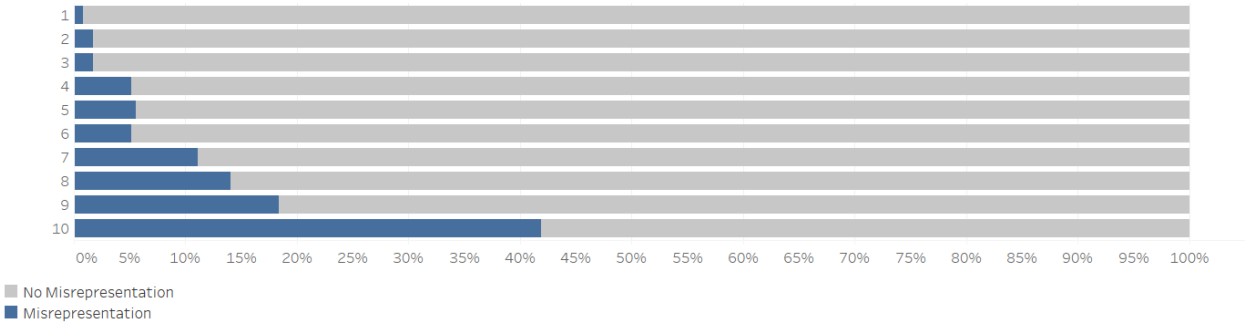
Supervised or unsupervised approach

What features to use

Labelled data

Institute and Faculty of Actuaries

Some results



Institute and Faculty of Actuaries

Questions

Comments

Institute and Faculty of Actuaries