Panel Discussion in P&C Insurance:
How & When Predictive Modeling is Leveraged at the Co-operators
+ What are Possible Areas for Academic Research?

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AGENDA

- Traditional Practice
- Applied Analytics
- Research & Innovation
- Possible Areas for Academic Research
1. Traditional Practice

Profiles
- B.Sc Actuarial
- Typical actuary

Analyses
- Risk Models
- Price optimisation
- Risk sharing pool
- Territories / VRG

Techniques
- SAS / Earnix
- Logistic regression
- Freq / Sev GLMs
- Spatial smoothing
1. Traditional Practice - Example

- Policy System
- Charged Premium
- Predicted Losses
- Other Data

- N ~ Poisson
- X ~ Gamma

- Live Analytics Decision Manager

- RSP Cession Decision
2. Applied Analytics

Profiles
- B.Sc or M.Sc
- Actuary
- Statistician
- Computer scientist

Analyses
- Big Data
- Cross sell model
- Inspection scores
- Claims fraud

Techniques
- SAS / SPSS / R
- Regression / GLM
- Decision Trees
- K-Means
2. Applied Analytics - Example

Claim:

Fast track?
- Yes: Control group?
  - Yes: Fast Track
  - No: Regular Track
- No: Control Group

Control group?
2. Applied Analytics - Example

Models for Losses / Expenses / Fraud / Client satisfaction ...

\[ t = \frac{\bar{X} - \bar{Y}}{\sqrt{\frac{\sigma^2}{n_X} + \frac{\sigma^2}{n_Y}}} \]
### Profiles
- M.Sc or Ph.D
- Data Scientists
- Problem Solvers
- “Hackers”

### Analyses
- Text / Voice / Image
- AI
- Climate Perils
- Geo-spatial

### Techniques
- R / Python coding
- Machine Learning
- Ensemble methods
- Geo-computation
3. Research & Innovation - Example

Before

After
4. Possible Areas for Academic Research

1. Non-Traditional Techniques for Risk Models
2. Geo-spatial & Advanced Classification Techniques
3. Multi-Line Price Optimisation & Client Lifetime Value
4. Actuarial Modeling of Climate-Related Perils
5. Big Data Opportunities in Pricing Emerging Products
4. Possible Areas for Academic Research

1. Non-Traditional Techniques for Risk Models
   - Non-Multiplicative
   - Machine Learning
   - Non-Parametric

2. Geo-spatial & Advanced Classification Techniques
   - Geocode Territories
   - Unsupervised Clustering

3. Multi-Line Price Optimisation & Client Lifetime Value
   - Combined Auto & Home Pricing
   - Asset Share Pricing

4. Actuarial Modeling of Climate-Related Perils
   - Flood/Wildfires/Wind/EQ
   - Concentration/Accumulation

5. Big Data Opportunities in Pricing Emerging Products
   - Pay per use insurance
   - Sharing Economy
THANK YOU