The Rise of Artificial Intelligence in Insurance – Applications

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NAIC Webinar | September 26th, 2018
The rise of Artificial Intelligence has brought in technology transformation in many industries. This presentation will show use cases in insurance that leverage the recent developments of AI. These use cases are being used across the entire insurance value chain. Artificial Intelligence is used here as a broad terminology that refers to the modeling methods, tools and platforms, applications, big data utilization, and the thought process for problem solving in the field of Artificial Intelligence.
Prospecting Clients – Filling the Protection Gap

• Use big data and machine learning to better identify and analyze client needs
• Cluster clients based on the need of insurance coverage
Originating New Business – Market Intelligence

- Monitor market movements to identify business opportunities and mitigate risks

Attributes extracted from unstructured (text) and structured data from different data sources.

Lower Level Signals

Intermediate Level Signals

Higher Level Signals

Y/N Business Opportunity

Sales & Marketing
App. / Submission
Costing & Pricing
Underwriting
Inforce Mgmt
Claim Mgmt
Risk Mgmt
Expediting Application Process

- Expedite the application process while maintaining an accurate quantification of risk

1. Better Estimation of Risk
2. Expediting Applications
3. Write More Business

Efficiency & Insights to write better and more business

- Lengthy Application Forms
  - Important predictors
  - Unimportant predictors

- Reduced claim amounts per policy
- Increased claim amounts per policy

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Streamlining Submission Handling

- Automate the information extraction from submission documents to improve efficiency
Improving Loss Estimate

- Algorithms developed in AI enrich the availability of statistical models for loss estimation
- These models can bring in more accurate loss prediction

Rich availability of statistical models
- Linear Regression
- Logistic Regression
- Generalized Linear Models
- Decision Tree
- Random Forest
- Gradient Boosting Machine
- Support Vector Machine
- Bayesian Models
- Deep Learning

Predictive modelling targets
- Total incurred loss
- Number of losses
- Claim Rate
- Claim Frequency
- Claim Severity
- Average amount incurred per loss

Mathematical formula:
\[ R_{\text{regularize}}(\theta) = R_{\text{empirical}}(\theta) + \text{Penalty}(\theta) \]
\[ = \frac{1}{N} \sum_{i=1}^{N} L(y_i, f(x_i; \theta)) + \frac{\lambda}{2N} ||\theta||^2 \]
Accelerating Underwriting

• The effectiveness of the underwriting rules/triggers for loss estimate can be evaluated

• A better underwriting ecosystem can be built to improve the accuracy and efficiency of underwriting
Classifying the Risk Class

• Machine learning models can help better evaluate the risk level during underwriting
Predicting Lapse

• Use inforce data to estimate the likelihood of a policy lapse, which helps proactive customer engagement

Use algorithms to understand the behavior of policyholders

Lapse?
Y/N
or
P(Lapse)
Estimating Claims

• Use of satellite images to expedite damage estimation
• Improved claim estimation
• Reserving/capital preparation
• Proactive customer care
Identifying Potential Risks

- Mining large scale of data to screen risks, and identify trends of risk development
Summary

• The rise of Artificial Intelligence has brought in technology transformation in many industries
• This presentation discussed use cases in insurance that leverage the recent developments of AI
• Insurance is a highly specialized industry and would need technology customization
• It is still an early stage of the application of AI in insurance but we have already seen many opportunities
• While there are a lot of excitement, we would still need to proceed with cautious in the AI adoption
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