Big Data = Big Benefits for Insurers

By Patrick Gallagher

Three Ways the Insurance Industry Can Harness the Power of Big Data

Technological advancements have given rise to a paradigm shift in managing data, particularly as concerns "big data," which are volumes of data so large they cannot be easily processed using traditional methods. In the insurance sector, personal lines insurers are increasingly using underwriting and pricing techniques that take advantage of new analytical tools to help digest and act on the rich, precise data now available. Commercial lines insurers will likely follow in their footsteps, leading to price benefits for superior risks.

Big Data is a broad topic so insurance and underwriting professionals should focus on three interactions that add value to their lines of business: 1) becoming aware of and using new data; 2) understanding the benefits of linking existing, disparate datasets; and 3) seeing the ability of Big Data to enhance the efforts of highly skilled human specialists.

#1 - Embrace New Data

Insurance has traditionally relied upon classification data to supplement the numeric data that underwriters use to select and price risks. For instance, there are subtle and complex differences to the work performed by Surgical Oncologists as compared with that of Thoracic Surgeons; insurers code their datasets so that premium and claim amounts can easily be aggregated separately for these two groups. The underwriter may collect additional detail about these physicians but it is costly to maintain and difficult to organize this information for use in pricing models. Instead, it is collected as textual information and processed on an individual-file basis by the underwriter.

An insurance application may require a narrative describing any disciplinary action taken against a doctor. The underwriter may consider whether the action was a fine, suspension, or censure and the severity of the penalty in terms of dollars or days. A Big Data approach would be to process this information by gathering keywords like "fine," "New Jersey," "$250" and systematically compare it to the responses of thousands of other historical applications. This approach could enable the underwriter to consistently apply rules that sync with the historical cost of a given disciplinary action.

#2 – Drive Value by Linking Disparate Datasets

Insurance operations require consistency in data collection for regulatory purposes. It is not uncommon for insurers to collect and process information in the same way that they did many years ago. Much of the work done in promoting Big Data solutions brings together disparate datasets and links them to enable access to create new information. New York City’s ClaimStat program linked datasets from its many agencies to determine if liability claims against the city could be better managed. The program uncovered that falling tree branches were the source of significant liability following the reduction of the tree-pruning budget (see image).
This insight may have remained hidden had the city maintained separate liability databases for the claims from Parks and Recreation, Transportation, and Environmental Protection agencies. By combining the datasets, the City was able to identify a cause that when addressed, resulted in lower liability.

#3 - Blend Breakthrough Analyses with Human Insight

Innovative analyses, like machine learning data techniques, seek to find patterns in data that are difficult or impossible for individuals to see, even with the use of regression analysis. Insurers should take account of new machine learning data techniques and leverage their strength by using those techniques to supplement the expertise of seasoned underwriters.

In personal automobile underwriting for instance, insurers typically file a rating manual, in which it may be straightforward to see the presumed pricing impact of a driver’s age, geography, type of car, miles driven, and family size. The manual will reflect the historical data: that the more expensive the car, the higher the risk as it is a target for thieves. But perhaps there is a subset of the data that are highly preferred risks – perhaps in a subset of the zip codes the houses are likely to have garages and the highest price cars are actually safer from theft than lower priced cars.

The ability for an insurer to underwrite based on an individual company’s risk rather than relying on industry standards could be a boon to insureds as well. For example, workers’ comp underwriters currently rely on payroll by state and class code to evaluate risk exposure. Now they might be able to introduce secondary characteristics about the individual workers; differentiating between a 58-year old male with a history of back problems versus a 30-year old woman with no prior claims in the same position. As employers react to their changing insurance rates based on Big Data analyses by shifting job responsibilities among their employees, the overall effect could be a lowering of industry-wide risk.

Machine learning techniques can determine these multi-way interactions from the data quickly and easily, even when there is no simple narrative to explain the cause-and-effect of the indications in the data. Giving innovative underwriters access to these techniques allows them to find solutions to questions about risk profiles that used to be unanswerable. Commercial lines insurers may see even greater benefits in adapting these techniques, since their increased freedom in setting pricing models will enable faster adoption than personal lines insurers.

While freedom to set pricing models may benefit commercial lines insurers, the lack of a narrative to explain the workings of machine learning may be a barrier to their adoption with specialty lines commercial underwriters who create their own heuristics. Over the course of a career these
underwriters develop insights that modify overly simple classification systems and actuarial models. Given a black-box indication from a machine-learning model, it will be difficult for specialty underwriters to know when their own approaches to risk-selection and pricing are double-counting.

For example, an underwriter may increase a book rate by 50 percent when underwriting the products liability for a producer of GMO grapes, because the public awareness, political and ethical environment around these products could lead to class action lawsuits in the event that these products caused damages to even one individual. A machine learning analysis may have set the book rate, and perhaps already factored in some of the underwriter’s intuition, but it cannot fully capture the underwriter’s insight into the public mood.

**Conclusion: Harness the Power of Big Data to Enhance Specialist Efforts**

While there is no question that actuarial techniques are being impacted by Big Data practices, a full embracing of the analytical tools and shift in underwriting behaviors that come with it seems to be eluding the insurance industry. Early adopting underwriters have an opportunity to gain an advantage over their slower moving peers. However, even with the adoption of Big Data practices, there will be no replacement for the analysis of highly skilled human specialists. Rather than fear or ignore Big Data, specialists should learn how to use emerging technology to enhance the value it brings to the insurance organization.

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**About the Author**

Patrick Gallagher is a Managing Principal and Practice Leader for Actuarial and Risk Analytics in Integro’s New York office. His specializations include excess casualty, management risk, property catastrophe insurance and health reinsurance.

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