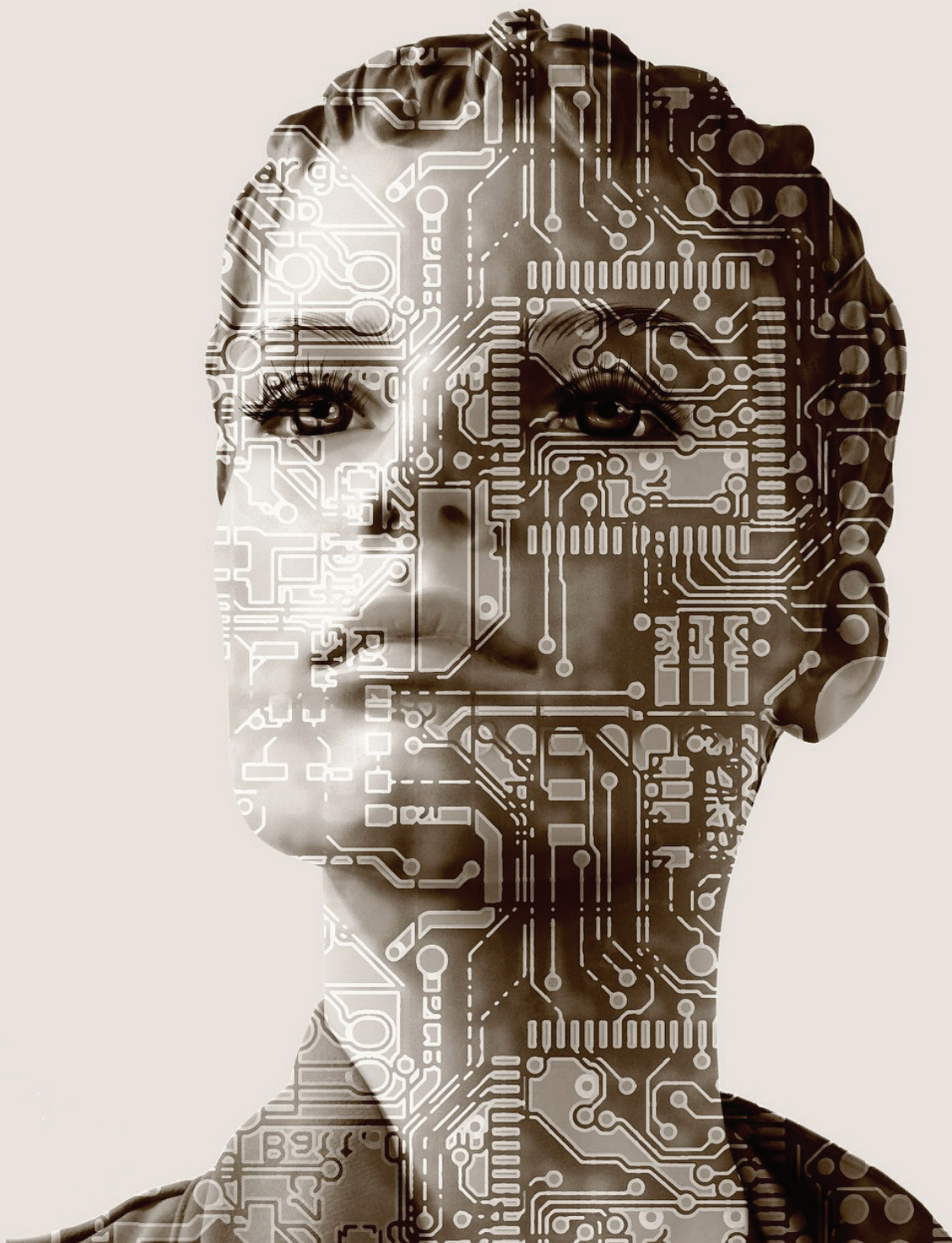# INSURANCE NEXUS

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Machine Learning and Artificial Intelligence in Insurance

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Anything You Can Do, AI Can Do Better

The concept of Machine Learning or Artificial Intelligence (AI) is a delicious paradox for insurers. On the one hand, it is the natural progression of more than a century of predictive analytics. On the other, it is the introduction of cutting-edge technology that has the power to blow apart old-style thinking and catapult a company into generating business ten, a hundred or even a thousand times faster than anything it has done before.

"Actuaries and statisticians have used historical data to recognise patterns in claims and predict future losses for over 100 years. They've been pretty creative in doing so, using tools in line with the technology of their time from minimum bias all the way up to decision trees. The level of sophistication and tools has changed over time and I look at Machine Learning and AI as transformative for the way we try to solve the same problems while also gaining insights from places where traditional methods fail," states George Argesanu, Global Head of Advanced Analytics, Personal Insurance, AIG.

Machine Learning is the modern science of finding patterns in your data in an automated manner using sophisticated methods and algorithms.[1]

Artificial Intelligence is "intelligence" that is not the result of human cogitation[2].

The tools are moving from statistical modelling such as the Generalised Linear Model (GLM) used in pricing to deploying anything from Decision Trees to Neural Networks. The increased speed and sophistication of these models delivered through Machine Learning is particularly useful in terms of accuracy when non-linear relationships are involved.

"We have always tried to find patterns in data. What we can do now is automate that pattern finding. Then, we can be more sophisticated and use more complicated algorithms than humans do," explains Monika Schulze, Global Head of Marketing, Zurich Insurance Company.

"Modern Machine Learning focuses on algorithmic approaches, while the traditional methods mostly use a parametric approach. Technology, as the big enabler of the revolution we are living now, moves everything from a static framework such as historical data is used to predict future losses, to a really dynamic environment where the lines between past and present are blurred. The self-learning element of AI is the driver of this dynamic environment that creates a continuous loop of feedback and decision-making," Argesanu states.

Machine Learning also negates the need to rely on data samples. Devolving predictive analytics to automated technology means insurers benefit from predictions based on actual data on a customer by customer basis. It also allows for the

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1   http://www.skytree.net/2015/08/06/driving-profitability-and-lowering-costs-in-the-insurance-industry-using-machine-learning-on-hadoop/
2   https://www.pwc.com/us/en/insurance/publications/assets/pwc-top-issues-artificial-intelligence.pdf

immediate incorporation of unstructured data - pictures, sound etc - that add colour and information, particularly to claims data.

Moving Beyond Price: Areas of Opportunity

One of the benefits of investing in Machine Learning is that it is far from a one-trick pony as far as capabilities are concerned. While predictive analytics technologies to date are largely focused on generating pricing outcomes, the uses for Machine Learning outputs can be applied to:

- Fraud
- Claims
- Marketing
- P&L Analysis
- Behavioural analysis
- Preventative insurance

"For the insurance business as a whole, one of the focal points is fraud mitigation. That's where I see insurance applying Machine Learning to improve the P&L. Then claims management which is also very important. It is a much faster process and it is easier to reduce errors by using Machine Learning to process large amounts of data," suggests Schulze.

Certainly, Machine Learning can optimise pricing on a case-by-case basis, improving customer experience while mitigating losses for the insurer. The speed with which this is possible is undoubtedly a driver of cost efficiencies that positively impact the bottom line. However, Machine Learning will make perhaps the biggest contributions in underpinning some of the fundamental changes that the insurance industry is experiencing today.

Schulze adds: "The old way of working can be modernised and be made more efficient but it's also possible to find new products and services. How do we get from paying out *when* something happens to helping customers predict when and how something *might* happen."

The insurance industry is undergoing a period of huge disruption and the development of new products and services will be essential. Autonomous cars, AI-driven home management systems, the Internet of Things and the quantified self are all leading to a consumer landscape that is changing insurance beyond recognition.

"Motor alone is going to change dramatically. Self-driving cars and telematics systems mean you can prevent a lot of accidents. That means premiums will go down and insurers will not have the income levels they previously had. There also needs to be more differentiation because of increasing price competition encouraged by comparison websites. Insurers must think about other income streams," Schulze insists.

Predictive and preventative technologies could limit house fires and flooding and provide greater security against criminal activity and loss of possessions. Also, the quantified self movement of Fitbits and Jawbones are the technologies that will hopefully drive individuals towards much better health management.

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Machine Learning needs to take the outputs of all of these technologies, analyse the newly uncovered customer behaviours and understand how insurers can expand their remit beyond risk transfer into service provision and lifestyle stewardship.

AIG's Argesanu illustrates the scope of the opportunity: "I think there is tremendous potential for our industry to use Machine Learning to do things faster and smarter. There's not going to be a big bang followed by a new order of the universe, but slowly and surely, we are getting to a more accurate pricing of risk. Claims processes are becoming a lot more efficient, fraud will likely be caught more often and most importantly of all, more and more losses are and will continue to be prevented. There is no greater accomplishment for our industry than saving lives or preserving possessions.

"The one thing I am the most excited about is the dynamic aspect. With telematics, Machine Learning will enable us to "see" and hopefully prevent an accident before it happens, by recognizing the patterns in the driving behaviour, traffic and road conditions. It is like *Minority Report* but with the precogs replaced by Machine Learning and AI and much sooner than 2054," he adds.

Engaging With New Technologies

Machine Learning and AI is all contained in one area where delivery through the cloud is becoming increasingly important. This is because it allows insurers to access technology on a Software as a Service (SaaS) basis, reducing upfront costs of installing Machine Learning at the heart of their own organisation. Machine Learning makes demands of insurers existing software and data architecture that can prove to be a steep hill to climb:

"Per line of business we have to be able to articulate what data we need and for what purpose. We work with Palantir and one of the big questions they had for us when we started our relationship was 'what business problem are you trying to solve?' and it wasn't an easy one to answer. Just in terms of data, it's easy to be overwhelmed," Zurich's Schulze states.

Insurers need to work in partnerships, not just externally, but internally across departments. Machine Learning has the potential to be transformative but also highly disruptive if not all departments who need to share data, knowledge or technological resources are pulling in the same direction.

"I feel very fortunate to work for a company which places analytics and technology at the core of its transformation. And we've started this journey in a very collaborative way, by working together across multiple teams. We have a large science organisation that provides support and expertise throughout the company and analytical functions within various business areas looking at ways to leverage these tools. We also have a strong push within IT to create the foundation needed by the analytics in order to actually make this operational, not just a theoretical exercise. As such, we look at Machine Learning and AI from a lot of different angles: pricing, underwriting, marketing, claim handling, telematics and loss prevention," Argesanu advises.

In an area where new developments are happening all the time, insurers rightly question the wisdom of buying and hardwiring a full system outright when

innovation might render their acquisition obsolete in short order. Engaging with suppliers on a SaaS basis or managing data and technology in the cloud allows insurers to work with start-ups and innovators as well as more established providers. There is even open source software available that allows insurers to dip a toe in the water at minimal cost.

The fact that the landscape is constantly changing is a strong reason for insurers to avoid keeping all their eggs in one basket, provider-wise. Engaging with a mix of established providers and innovative startups helps insurers stay at the cutting edge without betting the farm on a single direction. That said, having an established technology partner is vital if the capabilities internally are not market-leading in this particular area (as few are likely to be). Although based on existing business theory, the process of deploying Machine Learning is complex, particularly in understanding data, and expertise is to be welcomed.

The only option that is not on the table is to avoid engaging with Machine Learning at all. Argesanu elaborates: "Machine Learning and AI are right at the top of the Gartner Hype cycle. How do we avoid going all the way down the hill before we find the plateau of productivity is obviously what every insurance company is trying to determine. At some point the pace of the change will accelerate and some will be ready while others will not. You need the right technology and systems to deploy Machine Learning, otherwise its power will be limited. Those that are making the right investments today in data and technology are those who are going to write history."

Potential Plans of Action: Where to Begin

With so much in front of them, it is easy to see why insurers are worried that they have reached a point of paralysis through choice. Where to start? Both Argesanu and Schulze insist there is no option but to engage with Machine Learning or AI. Even taking on a small test area of the business is better than no action at all. Here are two areas insurers might want to consider when creating their Machine Learning engagement strategies:

Chicken and egg: Many insurers are considering the move to a risk mitigation model (ie providing concierge-type services to customers and encouraging prevention rather than claim). However the customer base may not be ready to approach insurance in this way.

Many utilities companies are leading by example here. They provide homeowners with free Nest or Hive technologies to help reduce household bills, which may seem counterintuitive for a company whose revenues are based on energy consumption. However, this build a relationship with homeowners, giving utility companies the opportunity to increase overall loyalty and decrease switching; permission to offer related products and services (ie equipment maintenance, ancillary products such as dehumidifiers etc) and a chance to move from a price-critical positioning.

"Insurers suffer from a lack of frequent customer contact and that means there isn't the trust or relationship that should be had with a brand. How do you deliver concepts that can help people master their daily lives, instead of just scaring them that their house might burn down? One of the problems we have is that we

start with low trust levels and then hound customers with negative messaging. Approaching relationships from a positive perspective is a big deal," Schulze insists.

Insurers should consider how they can encourage their customers to engage in the Machine Learning process, either through taking on physical technologies themselves (Nest, telematics) or simply providing greater access to data (online logins, mobile app downloads).

Starting with the basics: Machine Learning opens up a raft of new service developments that will be essential in the future but aren't mission critical today. Indeed, commentators suggest that the speed with which the insurance industry will experience this type of change has been exaggerated.

"The pace of the change is very debatable. People always talk about the next five years in different contexts such as self-driving cars and over time the previous five years are replaced by the next five, so we're looking at a moving target. Change is slow but it is happening," says Argesanu.

In the interim there are many benefits to be derived from Machine Learning. Greater understanding and engagement with customers even on the existing insured risk and claims level is highly beneficial. According to Statcore[3], the estimated improvement in loss ratio performance from Machine Learning methods is at least 1%.

Insurers need to be pragmatic:

1. Engage Machine Learning with a proof of concept before jumping in with both feet

2. Select an area of the business where the data is robust and plentiful enough to deliver well in the algorithm

3. Find ways of measuring the campaign that deliver against meaningful KPIs

Schulze concludes: "The insurer's business model is going to change significantly and a lot of companies are struggling to identify how to go about it. People use a lot of data but the question here is how should it be used? How do I get people with the great skills not just in gathering it but using it to make decisions? Strategic skills are what is needed."

Partnerships and taking it slowly are going to be the two defining ways of approaching Machine Learning in the future. It is clearly an area insurers cannot afford to ignore and has the potential to accelerate customer trust, engagement and ultimately growth in a business environment that is as challenging as ever.

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3   http://statcore.co.uk/news/machine-learning-in-insurance-pricing/

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3rd Annual Insurance Analytics Europe Summit

Our two whitepaper contributors, George Argesanu, Global Head of Advanced Analytics, Personal Insurance, AIG and Monika Schulze, Global Head of Marketing, Zurich Insurance Company will be speaking at the upcoming **Insurance Analytics Europe Summit** (5th & 6th October, London) alongside industry leaders from Aviva, RSA, Generali, Hiscox, XL Catlin, Swiss Re and more.

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