



**SOCIETY OF
ACTUARIES®**

Article from

Predictive Analytics & Futurism News

August 2018

Issue 18

From the Editor: PAF—Much More Than a One-trick Pony

By Dave Snell

My Merriam-Webster dictionary defines a one-trick pony as “one that is skilled in only one area; also one that has success only once.” Occasionally, I hear a disparaging comment from a colleague that some actuaries are a one-trick pony. Sure, we math dweebs have had a lot of success in insurance risk management; but how does that help the world beyond shareholders of those companies?

In the past that would incite me to launch into the importance of various types of insurance to protect families and loved ones. I could talk or write passionately about those for a long time. As a member of the Predictive Analytics and Futurism (PAF) section though, I can add how actuaries are using their new PA skills to benefit current and future generations of humankind in other ways. Predictive analytics techniques, sometimes coupled with data from health and life insurance companies, are enabling precision medicine. This is not just insuring lives, but also improving quality of life for insureds and for the population in general.

It used to be the case that a serious malady would require life-threatening or debilitating surgery; or medications so strong that they killed off beneficial as well as harmful bacteria and weakened the immune system to the point where Americans over age 65 average several different medications per day¹—some primary meds to combat specific ailments or illnesses, and others to combat the harmful side effects of the primary (or secondary) meds.

Now, we are on the verge of being able to analyze not just a person’s blood and other fluids, but that same person’s exome (the less than 2 percent of DNA that codes for proteins), complete genome (all 3.2 billion nucleotide pairs), microbiome (our collection of mostly gut bacteria cells that outnumber our human cells), family history, lifestyle, and an increasing number of other factors (such as wearables and embeddable devices) that differentiate one human from over seven billion others, to precisely attack or even prevent diseases that once were fatal. One company recently claimed that more than a third of the people



they analyzed were found to have a stage zero cancer or some other malady that could be cured now—prior to any discernable symptoms—that might not otherwise manifest for many years.²

A fetus can be scanned and genetic abnormalities, such as Huntington’s Disease, might be cured before birth via CRISPR/Cas⁹ interventions. Some health and life actuaries I chat with are trying to extend their predictive analytics skills to bioinformatics and other new interdisciplinary fields to be a part of this action and contribute to more progress for humanity. Yes, this increases the bottom line for shareholders. Health companies can save expenses by paying only for the medications and procedures that will truly benefit the specific individual. Life companies can help their insureds live longer lives and extend the premium stream. Beyond the bottom line though, they are actively helping insureds to live both longer and more enjoyable lives.

As the actuaries at the forefront of these new technologies, we are certainly not one-trick ponies. The term unicorn comes to mind instead. Be proud to be a member of PAF!

- In this issue, Anders Larson summarizes some of the recent PAF achievements and initiatives that have catapulted us into the limelight as the fastest growing SOA section. His “Chairperson’s Corner” highlights the section member preference for learning new tricks, techniques and even new subject areas; and how the council is listening and responding accordingly. Anders describes where we excel and where we still have room for improvement. See the exciting ideas he has for continuing our fabulous momentum.
- Next, I shamelessly ... in fact, proudly, plug the September Predictive Analytics Symposium in my article “To be, or not to be ... an Actuary.” We like to think our newsletter is a valuable source for you to get up to speed on various PA techniques; but the PA Symposium will be an immersive experience that will quickly benefit all levels of actuarial

attendees: entry level actuaries through senior managers, and PA newbies through advanced practitioners. Read, register, attend and reap the rewards of your increased capabilities.

- I initially talked about actuaries getting into epigenetics; but that is only one area where we can see actuaries embracing new disruptive forces rather than ignoring them and hoping they will go away. Nathan Pohle and Darryl Wagner describe automation as another opportunity for us. In their article “Why Actuaries Should Welcome Automation” they say, “for professionals like actuaries, technology—and namely automation to start with—creates many opportunities for those willing to embrace it.”
- Most of these new opportunities involve some sort of predictive model; and model sophistication can vary widely. Brian Holland provides insights into how to choose the right level for your situation. In “Goldilocks and the Three Modelers” he shows the impact of adding complexity to spline regression models and to decision tree models. Brian introduces us to the bias-variance trade-off, which reflects the compromise between model complexity and predictive value. Ultimately, you have to communicate your results, and too much complexity can hamper that.
- In “How Credible is a Predictive Model?” Eileen Burns continues this thought process by addressing two very important considerations when evaluating a model: credibility and believability. No, they are not exactly the same; and Eileen explains how they differ and what they mean in the context of PA models. She also provides a summary of actuarial literature on the subject (much from former PAF newsletter issues) and she gives us her takeaway opinion of when they apply, and how to benefit from them.
- Further complicating the issue of how to explain a model is a host of different modeling languages and platforms. Some prefer R, others Python, MatLab, Octave, etc. and this exacerbates the “language” problem when reproducing results is necessary. Jeff Heaton shows us Predictive Model Markup Language (PMML) in his article “Introduction to PMML in R.” Jeff summarizes the potential of PMML: “The standard format of PMML allows model deployment platforms to be designed without consideration to the original language that the data scientist chose to implement the model in.”
- Dorothy Andrews gives us another glimpse of the changing landscape for insurance with her article “InsurTech: The Next Disrupter to the Insurance Industry.” Dorothy discusses the Gartner Hype Cycle and its five stages from Innovation through the Plateau of Productivity, passing through stages such as the Trough of Disillusionment along

the way. The National Association of Insurance Commissioners (NAIC) identified InsurTech as the number one threat to the insurance industry. It is yet another testimonial to why we need to put in the continual learning effort to be actuaries—and to reinvent what that means.

In this issue, we also have a reminder that PAF stands for more than just Predictive Analytics (PA). PA is great! But our section also covers Futurism (F). Disruptive technologies and movements can have great impact upon our industry and our profession, and we choose to think beyond just present technologies and attitudes.

The Actuarial Speculative Fiction contest typifies some unconventional projections of the future, and we are proud to be a long-time sponsor of this biannual contest. As a bonus in this issue, please enjoy a winning entry from our last contest, “Timeline,” by Robert Ellerbruch. I like the speculative fiction stories mainly because they cause me to think about ideas I normally would not consider. For example, in “Timeline,” one of the characters says, “You are correct that you can’t predict the future, but you shouldn’t extrapolate the inability to predict the future to mean that the future is not completely determined.”

Regardless of how we may feel about free will vs. determinism, stories like this are thought provoking. Please consider writing your own story and entering it in the next contest. Here is a link to the contest site <https://www.soa.org/sections/2016-speculative-fiction-contest/>

Clearly, we are not a one-trick pony. We are a cavalry of cool ideas and great progress. My bet is on PAF to win in the first race ... and the rest. ■



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ENDNOTES

- 1 https://www.washingtonpost.com/national/health-science/the-other-big-drug-problem-older-people-taking-too-many-pills/2017/12/08/3cea5ca2-c30a-11e7-afe9-4f60b5a6c4a0_story.html?noredirect=on&utm_term=.07ec698fa9d0
- 2 Craig Venter’s company, HLI, claims to have “found serious detections in roughly 40 percent of patients, and many of the discoveries are found much earlier than they would have been found previously via traditional testing. They are finding cancerous tumors that are in phase 0 and 1 in patients who are experiencing no pain, whereas most people are often diagnosed in phase 4, where pain is prevalent and the disease is more difficult to beat.” <https://www.cnn.com/2018/03/27/genome-pioneer-craig-venter-is-trying-to-decode-death.html>
- 3 <https://en.wikipedia.org/wiki/CRISPR>