Article from

Predictive Analytics and Futurism

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From the Editor: Introducing the Predictive Analytics and Futurism (PAF) Newsletter

By Dave Snell

Welcome to your new section! The former Forecasting & Futurism (F&F) section has rebranded and this is our first issue under the new name. We are excited that this name better reflects the work and interests of the various members and is less confusing to SOA members who are trying to choose which sections to join.

How did we arrive at this new name? Why, we did it through a Delphi study, of course!

The section council and friends participated in a three-round Delphi study and narrowed a field of 15 proposed names (including Innovative Tools and Techniques, The Forecasting Section, Alternative Forecasting Methods, etc.) down to a phrase that concisely, yet clearly, describes us: The Predictive Analytics and Futurism Section; or in the SOA's official TLA (three letter acronym) form, PAF.

The three rounds saw much debate, and many passionate arguments supporting the various choices; but a couple dominant themes emerged:

1. Predictive Analytics is a more popular and more comprehensive term for the many quantitative techniques we use such as predictive modeling, generalized linear models, neural networks, genetic algorithms, hidden Markov models, deep learning, fuzzy logic, k-nearest neighbors analysis, singular value decomposition, agent based modeling, and many other algorithms and methodologies that use various analytic approaches to predict outcomes.
2. Futurism is much less numbers oriented; but it recognizes the importance of the qualitative predictive techniques such as Delphi studies, behavioral economics, the actuarial speculative fiction contest, judgmental forecasting, tapping into the wisdom of crowds, and historical perspectives, among other non-numeric methodologies. A recent title of one of our sessions at the Health meeting and the Annual meeting this year was "Behavioral Economics: the Reason Strictly Analytic Models Fail."

In this issue, as in previous ones, we offer you a robust mix of both the technical and the non-technical: the yin and yang of PAF.

Starting us off is our Chairperson's article from Brian Holland, titled "In Good Company." Brian makes the point that the section has become a community beyond the actuarial exams. He also explains that this community building effort is a major strength of the section. It allows us to serve the membership and the profession by facilitating continuing education and forming partnerships with other specialists, such as data scientists and even mathematical oncologists.

Next, Ian Duncan, our outgoing Board Partner, explains in "SOA Launches Predictive Analytics Initiative" how our new name and our continuing focus fits into the SOA initiative to "move Predictive Analytics (PA) front and center for actuaries of the future." This high profile (and funded) campaign is a big plus for our section. The SOA wants to reach out and promote actuaries for predictive analytics opportunities beyond the traditional insurance company roles that actuaries have had in the past. As Ian says about this enhanced marketing by the SOA in 2016, "expect more attention and opportunities for PAF section members."

"How did we arrive at this new name? Why, we did it through a Delphi study, of course!"

Some of us longer-term section members remember that we had a name change back in 2009 when we rebranded the Futurism section to emphasize quantitative actuarial forecasting methods. Ben Wolzenski explains one reason why Futurism has remained an important part of our name through the years. A major futurism method we employ is the Delphi method. Ben's article, "Back to the Futurism," summarizes the section's various Delphi studies, from 1989 through the present, and notes that one of them even made a *Wall Street Journal* bulletin item on the front page!

One of the Delphi studies Ben mentions is the one that Steve Easson led 10 years ago: "*A Study of the Use of the Delphi.*" Steve describes the study and its Trend Impact Analysis (TIA) method which was used in conjunction with the Delphi method to derive the quantitative results. You can read about this in his article, "2005 Delphi Study - Reflections 10 Years Later."

Looking forward now, Mary Pat Campbell gives us a head start on the predictive analytics part of our new name. Her article, "Get-

ting Started in Predictive Analytics: Books and Courses," gives us a cornucopia of courses (mostly free) and books (some free) to give a jump-start to your PAF education. You do not need to be an expert in the field to benefit from most of these resources. Many are for the actuary with a casual interest in becoming more PAF literate; and some claim to be for the absolute beginner. Mary Pat provides her perspectives on each of them for us.

Once you get through the basics-to-intermediate coursework described by Mary Pat, you may be ready for the challenge of a certification program in data science, and Shea Parkes shares his experience going through one of the most highly respected online data science programs—the one from Johns Hopkins. His article, "Johns Hopkins Data Science Specialization courses: A review" is from the perspective of an actuary already proficient in data science. He is an official "Kaggle Master" on the site *www.kaggle.com* where data scientists compete on a world-wide basis. Shea relates that he still felt that the nine courses and the capstone project were useful for him, and he writes, "We ultimately deemed it useful enough to make available to all of our staff alongside the actuarial exams and other credentialing opportunities."

Continuing our introduction to predictive modeling, Bryon Robidoux has written an insurance application for us. Read his "Introduction to Predictive Modeling of Fund Manager Behavior for Variable Annuities Riders" to see how an actuary charged with hedging variable annuities can build predictive models that address both short-term and long-term goals of the fund. In essence, he explains the considerations involved to "relieve the tug of war between the fund basis and fund modeling lines … and it improves the accuracy of the Greeks." Bryon's article forms a good primer for any actuary who must work with variable annuities. He explains how to help find the better available information sources, and incorporate them into your models.

On a similar theme of making the "best possible decision with all available information," Kurt Wrobel gives us some practical guidelines in "Predictive Analytics: An Alternative Perspective." Kurt takes us through the conditions we need for a useful analysis, such as accurate historical data, a stable underlying system, a danger of increased sophistication and complexity, and a need to avoid bias in your analysis. He presents a seven point plan to "produce better decisions" and he reminds us that this is not necessarily the same as just adding greater technical sophistication.

Ronald Poon Affat gives us a delightful reminder of the art that accompanies the science in our PAF section. In his article "Actuaries – Personal Time Off," Ronald introduces us to a group he has founded called the Artuaries. Nope, that is not a misspelling of actuaries, the Artuaries are painters, photographers and quilters who use their artistic talents to benefit charities such as the Actuarial Foundation. Ronald represents the futurism side of our section and I felt it was appropriate to include this reprint from the Reinsurance Section newsletter as he inspires us to use our personal talents for worthy causes. His many SOA volunteer efforts have resulted in his 2015 SOA award as an Outstanding Volunteer for the SOA. Congratulations to Ronald!

Continuing the theme of volunteering to help others and the profession, Doug Norris, our outgoing Chair leaves the council with an article "How to get involved: Step one, get involved!" It's great advice. Some actuaries feel unsure of how to start giving back to our profession. Doug offers us a dozen ways to begin; and explains that by helping others you invariably help yourself as well. You can "build your brand," learn and practice management skills, hone

your presentation and writing skills, and learn to network with like-minded actuaries across the globe. It's a big world; and volunteering through your sections can help you explore it and enjoy it. Of course, "Big," especially in the phrase "Big Data" is a common term now. The media are overwhelming us with quotes from companies boasting of their big data capabilities and expertise. Yet, big data seems to have a big number of definitions and sometimes it is hard to discern what constitutes "big." In my article, "Big Data or Infinite Data?" I question some of the claims to big data; and I try to put "big" into perspective. Many actuaries are intimidated by the term now, just as previous civilizations found the concept of "many" a challenge. Ironically, actuaries have many of the skill sets to work with big data. Often, we just don't realize it. I try to show that some of the breakthroughs in dealing with many, and with infinite, also apply to big.

Dihui Lai and Richard Xu are pretty comfortable with Big Data. They describe a way to process it in their article "Spark: the Next-generation Processing Engine for Big Data." Spark offers a way to get some dramatic speed and scalability advantages over the Map-reduce methodology whenever you are doing iterative data processing and particularly when you want interactive data analysis capability. Find out why "lazy execution" can be a desirable characteristic when dealing with big data. Hopefully, their examples will whet (spark?) your interest in these new and useful techniques and tools.

The next article takes new and useful and applies it to artificial intelligence (AI). Jeff Heaton, in his research toward a Ph.D. in computer science, and for his book series on AI for Humans, summarizes what is essentially the state of the art in artificial neural networks. His article is "The Third Generation of Neural Networks." Yes, I remember that in the 1980s we thought that AI was going to do wonderful things and we were later disappointed with the limitations of expert systems and neural networks. But in recent years, Deep Learning has changed that and as Jeff writes, "It is a very exciting time for neural network research." If you wish to investigate neural networks, be sure to read Jeff's article and skip the mistakes that early researchers made and instead, use the latest published techniques from recent successes.

We finish this issue with an article that exemplifies how the section is advancing our collective knowledge of predictive analytics. Geof Hileman read the July 2015 newsletter article that Shea Parkes and Brad Armstrong wrote on ridge regression; and Geof utilized it in his article "A Comparison of Risk Scoring Recalibration Methods" where he compared ridge regression to full recalibration and to a residual approach. Geof's analysis supported the assertion made by Shea and Brad for populations of moderate size, but not fully credible. As children we are taught that sharing is a good trait; and in PAF we find that it helps us collectively benefit.

We have come a long way in the past six years. Our newsletter reflects the increased section interest in predictive analytics and in predictive non-analytics. I'm usually not one to give sports analogies (Doug Norris excels at this); but a baseball legend, Yogi Berra, died this year and he was known for many Yogi-isms, such as "It's tough to make predictions, especially about the future." One of my favorites was "The future ain't what it used to be." He was right. The section is not what it used to be either. Welcome to the future. Welcome to PAF! ■

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