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From the Editor: Predictive Analytics and Futurism (PAF)—It's Bigger on the Inside!

By Dave Snell

Many PAF Section members are fans of the science fiction series "Dr. Who," the time traveler who uses technology and creativity to save planets, galaxies and sometimes our entire universe. The doctor undergoes many shape changes over the years (convenient when the lead actor is replaced). In fact, the current Dr. Who character is female. Another main character in the series is the TARDIS (Time And Relative Dimension In Space). The TARDIS is the doctor's home, companion and time machine in one. The TARDIS evokes surprise from newcomers as they enter what looks like a British police box (about the size of old stand-alone phone booths) and find inside that it houses infinite rooms and vast spaces. The typical exclamation is that it is "bigger on the inside." The doctor is used to this reaction. One of my favorite episodes is the one where Clara, another new acquaintance, walks in, walks out, walks around it, goes back in and then exclaims, "It's smaller on the outside!" Some fans feel that she was the first to notice that the world is smaller than the TARDIS and not that the TARDIS is simply "bigger on the inside."

> Unencumbered by the baggage of human knowledge, the new AI can learn faster and more effectively!

Predictive analytics and futurism are two topics that have grown in importance over the past several years. One presenter at the recent Predictive Analytics Symposium stated that 90 percent of the data available today was created in the last two years. The amounts and types of data for analysis are increasing at an accelerating rate: YouTube claims that over 1 billion hours of video is being viewed on its site every day. Wearable and embeddable devices like Apple watches and diabetes monitors are streaming data faster than ever previously imagined. The processing power to analyze these data is, likewise, growing at phenomenal rates. Consider that the average smartphone has over a million times more memory and similar speed improvements than the onboard computer (4K of RAM and laughable speed) that put the first human on the moon! The advances in artificial intelligence (AI), which PAF also embraces, have been similarly impressive. The watershed moment, in 1997, when Deep Blue beat World Grandmaster Gary Kasparov in chess, has been eclipsed by the likes of AlphaZero, which has become the world champion in chess, Go, and Shogi; and the training of AlphaZero consisted of merely inputting the rules of the games, as opposed to the tedious inputting of thousands of the best games that humans have played. Unencumbered by the baggage of human knowledge, the new AI can learn faster and more effectively!

Autonomous vehicles are no longer science fiction. They are proving themselves safer than human drivers. The newer concerns regarding them center around the ethical issues. A survey by Massachusetts Institute of Technology researchers surfaced the disturbing conflict that "people thought an autonomous vehicle should protect the greater number of people, even if that meant sacrificing its passengers. But they also said they wouldn't buy an autonomous car programmed to act this way. What does this tell us?"[1] Perhaps actuaries can be involved in the formulation of legislation to ensure ethical vehicle actions.

I am honored to be a judge of the Actuarial Speculative Fiction contest, and the entries this year (results should be available by our next issue) included stories where actuaries, as experts on human life and health with the ability to analyze and understand vast amounts of data analytics, become the people who reverse global warming and save millions of lives. This is a phenomenal time to be an actuary who understands and uses predictive

analytics and has the vision and open-mindedness to embrace futurism. This section is truly "bigger on the inside."

Starting next year, the PAF newsletter, like the TARDIS, will become bigger on the inside. We are transitioning to a web-based format, and this year's issues will appear as both paper (as you may be reading now) and an online version that will contain essentially the same content but in a more reader-friendly format. Beginning next year, the online version will not have the same constraints on article size, code availability and other features that section members have expressed concerns about; and it will be the expanded, more feature-rich counterpart of our printed newsletter. This also opens the door for more timely articles, less likely to be locked into print production schedules. Peruse the print version in your hand and then see the counterpart articles on our website. We welcome your feedback and ideas.

- Starting us off in the **Chairperson's Corner**, Eileen Burns tells about exciting new dimensions to PAF resources, including the digital newsletter, a new Delphi study in progress, and the new platform for Jupyter (named for Julia, Python, and R) notebooks that PAF members will be able to download and use directly. She also describes some hot topics reports and ideas and welcomes the 200-plus new members (that still fit easily into our expanding section).

- Next, we have a **"View from the Top."** Here is an excerpt from a fascinating interview that Xiaojie (Jane) Wang and I conducted with two noted industry leaders from very large companies and two leaders from start-ups. Normally, we would have to drastically cut this down to fit into the PAF newsletter; but here we can give you a few highlights in the printed version and a link to the actual keynote session interview, complete with synchronized slides and audio online.

- Michael Niemerg follows this with **All About Them Curves: Ordered Lorenz Curves and Lift Curves**. Michael explains Lorenz curves and Gini gain, which he describes as "great alternatives to life curves." Lorenz curves do not involve binning, and they are far less susceptible to misleading results from small perturbations. He suggests adding them to complement your lift curves to form a better overall measure of risk stratification.

- In **The Growing World of "Off-Balance Sheet" Talent and Workforce Modeling,** Megan Gauer, Nathan Pohle and Priyanka Srivastava team up to explain the benefits and challenges associated with the changing mix of workers across time zones, priorities and employment status. They point out that 40 percent of U.S. employees fall under

alternative staffing arrangements, and the global trend is similarly moving toward freelancers and the self-employed.

- Sarah Abigail follows this with a summary of **Artificial Intelligence and the Actuarial Profession**, an SOA Annual Meeting session that PAF and the General Insurance sections jointly sponsored. The burgeoning interest in AI is evidenced by her statement, "The SOA provided the largest room available at the convention hall, however it was filled to capacity, with people standing in the back, and more attendees unable to get in." Read it and get on board this AI tsunami about to hit the insurance industry.

- Another trio of authors—Zhen Hui Trinh, Ben Johnson and Eileen Burns—write about **Interactive Plotting**. They describe the dangers of too-busy plots as "about as helpful to your reader as donning a track jacket when confronted with Snowmageddon." They also describe the increased benefits and opportunities present with online graphics (Did I mention enough times that we are transitioning to online?) and some tools such as Plotly and Billboarder. They also provide a handy table with links to several interactive plotting tools.

- Wrapping up the print issue, Jeff Heaton gives us an excellent introduction to Cython, a way to address the speed issues of Python runtime performance. In **Getting C++ Performance From Python With Cython**, he covers more than just speed issues. He also describes Cython as a better way to protect your intellectual property of source code. And, of course, Jeff provides links to his online code examples so you can test out the language with code that already works!

Just like AI and predictive analytics and futurism, the PAF section has become smaller on the outside than the inside. The link to our online version is right here: *http://bit.ly/2UTNbfY*. Come on inside! Experience a new dimension and perhaps some time travel to the future of our profession. ∎

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ENDNOTES

1 The MIT study is summarized in the online interview written by Morgan Meaker, a British journalist, who spoke with Jean-François Bonnefon, Azim Shariff and Iyad Rahwan, MIT researchers who designed an online quiz called The Moral Machine. *https://medium.com/s/story/how-should-self-driving-cars-choose-who-not-to-kill-442f2a5a1b59*