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I Held a Human Brain!

By Dave Snell

There I was, wearing surgical gloves, and holding a real human brain! This was a healthy one, as described by the professor of neurology teaching this part of the lab, and soon afterwards I got to hold and inspect others with various stages of dementia. Perhaps some of you readers might not find this a thrilling experience; but I was elated. After many months of studying what I could about biology and genetics to better understand artificial neural networks and genetic algorithms, I was finally seeing first hand, literally, the marvelous organ I had been trying to replicate.

During that same evening, over the course of three hours, I moved on to see and hold and feel a human heart, lungs, liver, and several other organs. Seeing a healthy lung and feeling its elasticity, and then feeling and seeing the ulcerated lung of a heavy smoker was enough to scare almost anyone thinking about smoking. In the life insurance world, we assume essentially standard mortality after a certain number of years of not smoking; but it was visibly clear here (and confirmed by the professor of pulmonology) that these holes and ugly scars would never heal—ever.

Why is this article in the F&F newsletter? Because I want to let you know about the many low cost, and often free, classes and other educational opportunities available to actuaries and anyone else interested in learning more about machine learning, and the biological systems we try to mimic with our various F&F modeling techniques.

Dave Snell

I have just completed all 24 weeks of the Mini Medical School classes at Washington University's Medical School—one of the finest in the country. The total cost was $150 for each of my three eight-week semesters and for that really low amount, I had personal interaction with world experts in various medical fields. Plus, I had hands-on labs on suturing (both laparoscopic and microscopic—with a 150 nanometer needle), a tour of their world-famous genome center, and many more experiences beyond my expectations.

Lots of medical schools across the country offer this type of public service to their respective communities. Search for MiniMed and your school or city name to find what may be available in your area.

Note that this is not something I recommend as an alternative to the wonderful Med School for Actuaries that the SOA sponsors. I have attended one of those too; and the two types of schools complement each other rather than replace each other. Med School for Actuaries is much more condensed, and focuses on more-direct applications to health insurance claims and cost management.

The various medical training available now to the layperson far exceeds what used to be available only to those dedicated to many years of medical school, internship, residency, etc. to the exclusion of almost all other aspects of their lives during those years.

Likewise, the caliber of free courseware from Stanford, MIT, SFI, and other prestigious schools is amazing! I enrolled in a Machine Learning course from Stanford, a matrix algebra course from MIT, a complexity science course from the Santa Fe Institute taught by Melanie Mitchell (the author who rekindled my interest in complexity sciences years ago in her book Complexity: A Guided Tour), a neural networking course from the University of Toronto taught by Geoffrey Hinton (one of the pioneers in the field), and they all were free! Well, free of tuition cost anyway. The hours spent studying were hard and I sometimes start a course and decide afterwards that I just can't justify the time to do the assigned problems and keep up with the other items I want to enjoy in my life; but that's OK! Learning a little about a particular subject is better than learning nothing about it. I made some progress and kept that grey matter active in the learning process. Current thoughts about the plasticity of the brain suggest that continual learning helps defer the impact of dementia. I want my skull to be holding the healthy brain.

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I recommend Coursera (www.coursera.com) and MIT's Open Courseware (www.ocw.mit.edu) as good starting points for seeing the thousands of courses available now for free. These tend to be at an undergraduate or graduate level and sometimes they assume some heavy mathematical or programming background. Sometimes, you can get a head start on that background with the free classes from the Khan Academy (www.khanacademy.org) which offers thousands of easier courses. Salman Khan earned three degrees from MIT and an MBA from Harvard, and then left his job at a hedge fund firm to provide free tutoring for his cousin, her family and friends, and ultimately, the world. Sal charges no fees, accepts no advertising revenue, and is funded by philanthropists such as Bill Gates, who takes Khan Academy courses along with his son, Rory, and who calls Khan "his favorite teacher." Obviously, Bill Gates can afford any teacher he wants. Tuition is no obstacle for him. You can have the same teacher—for free!

In my presentations on complexity science, I often stress the value of inductive reasoning to supplement our typical deductive reasoning. In those talks, I say that if you dissect a brain (the top-down deductive approach), you end up with mush; but if you build a brain (inductively, from simple rules and the interaction of adaptive agents), you gain insights and create knowledge.

I held a brain in my hand! You can build a brain—your brain! I hope you study complexity science and the associated machine learning and artificial intelligence topics I find so fascinating. But the opportunity is here now for you to study almost anything you wish—beyond just SOA study notes. Please do it! Hold a brain in your hand … or at least in your head. ▼