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The Robots Are Coming! Be among the FIRST Actuaries to Prepare for Them

By Dave Snell

I thought I was doing some cool stuff with machine learning and genetic algorithms. After all, I could make Robby the virtual robot move around and pick up soda cans. Then, earlier this year, my brother-in-law came to visit. I knew he was a robotics enthusiast so I took him to the FIRST (For Inspiration and Recognition of Science and Technology) Robotics Championship, which was held here in St. Louis (April 23-26). I was expecting a science project exhibit. I was wrong!

Overwhelming would be an understatement of my surprise! My only exposure to robotics lately has been indirect, since our niece was on a high school robotics team and was having fun with it. Now, she is going to a top engineering school on full scholarship. How? One factor was the robotics team experience.

Wait! What does this have to do with actuaries; and especially for Actuary of the Future (AOF) Section members? Robotics seems as far removed from the actuary of today as we do now from the actuaries years ago who sat on tall stools, wearing green visors, and spending the day cyphering in large ledger books with quill pens.

Robotics is a rapidly growing field of study, and many folks still think of it as only LEGO blocks with some small electric motors and remote control joysticks to make them move as instructed. However, it may be an area of opportunity for some actuaries ... some Actuaries of the Future!

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Yes, robotics currently entails a lot of mechanical work involving material selection, machining and assembly. Hobbyists (and engineers) can do that. It does not require a lot of actuarial skills. But the most impressive areas for advancement are in the control mechanisms—the machine learning.

Machine learning is a facet of artificial intelligence (AI), and it makes heavy use of the linear algebra, matrix mathematics, and calculus and statistics you spent so much time studying to prepare yourselves for actuarial exams. One hypothetical opportunity for the Actuary of the Future might be to build financial models that minimize the risk of a rescue robot getting caught in debris as it searches for the survivors of a building collapse ... or that try to minimize the liability of the robot inadvertently harming the victims while trying to save them. Then again, perhaps we will be asked to price “life” or “health” insurance products on these expensive robots. Designing control models might involve networking theory or particle swarm optimization or lots of other techniques that will require higher mathematical skills coupled with an awareness of risk management techniques.

What do actuaries have in common with robotics engineers? It’s like the photo I snapped shows: They both do math good!

We should not assume though that the robotics industry is going to come looking for actuaries to guide them. The FIRST Robotics Championship attracted many thousands of attendees who came to watch the top 400 teams from the United States and 16 other countries as they competed for the top prizes. This year they awarded over \$20 million in scholarships. This one event dwarfed the attendance at an SOA annual meeting many-fold; and FIRST involves over 350,000 students. Plus, there are several other robotics championship events besides FIRST. Some are even held in cities other than St. Louis!



Figure 1. FIRST Championship 2014, St. Louis, Missouri; many more attendees than an SOA annual meeting.



Figure 2. Not just INGENEERS, but actuaries do math good too!

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Dave Snell, ASA, MAAA, is technology evangelist at RGA Reinsurance Company. He can be reached at Dave@ActuariesAndTechnology.com.

Check out the excitement and enthusiasm of the kids at FIRST at the following link:
<http://www.usfirst.org/roboticsprograms/frc/championship-event>.

See 2013 YouTube video of a match: <http://www.youtube.com/watch?v=Ca8N6vJnrcM&feature=youtu.be&t=2s>.

Enjoy the fun of applying the newer actuarial science applications to model robotic control mechanisms and robotic insurance situations. If you happen to meet my niece, please put in a good word for taking the MLC exam. I still hope she considers becoming an Actuary of the Future. ☆