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Miami Hurricanes



Robert Plant, Associate Professor, School of Business Administration, University of Miami
4/3/2013
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People assume that in Miami we enjoy the sunshine all year long, but like any blessing there is the negative side, and for us that is hurricane season. We live with the knowledge that the big one may come, but we hope it's just not going to happen this year, and selfishly we hope if it does come it misses us and goes somewhere else - it's a zero sum game.

Not to be taken lightly

Living in paradise clearly has a price. Miami got devastated in 1926 by a Category 4 storm, with an estimated cost of \$157 billion (adjusted to 2005 dollars) and with no satellites or data feeds, its inhabitants only got a short warning. Contrary to the theory that history never repeats itself, on August 24, 1992, Hurricane Andrew, a Category 5 storm, struck Miami, once again devastating the city and surrounding population.

Even with satellites and data buoys, most residents the day before, myself included, were not worried. I, in fact, was at the beach. It was a perfect day, the data showed Andrew as a category one minimal hurricane located off the Bahamas, and the forecast was that wind shear would be sufficient to keep it from intensifying. The forecast was wrong, we all hunkered down through one wild night, and hurricanes would never be taken lightly again in Miami.

Weather forecasting and hurricane predictions have come a long way in the last 100 years, yet in some ways they haven't. While Dr. William Grey performs his annual ritual of predicting at the beginning of hurricane season the number of named storms that he thinks will form in the Atlantic that season, and thus scaring the population a little, his predictions are like a Wall Street analyst predicting that five of the Fortune 500 stocks will go up in the next year: interesting but not very actionable. The data that would be really interesting and valuable would be along the lines of "Where are the storms going to make landfall?" or "Which 20 stocks are going to go up?" But that's not going to happen anytime soon.

Managers and executive take stock

This discussion of the variability of hurricane landings and the use of forecasting data should lead managers and executives to take pause and think about their big data in context. Hurricane forecasting has a long and technical history. Hundreds of Ph.D.s, now rebranded "data scientists" have spent their entire careers using some of the biggest computers on the planet trying to find an answer to the prediction problem.

Hurricane models come in many forms. The TV channels in the 1990s loved to use the "Cone of Terror" to show the predicted path of the storm and inform the population of impending hurricane doom, but have recently toned down the rhetoric to the more palatable "Cone of Uncertainty." Yet this forecast model has such high variability (e.g., landfall could be anywhere in Florida), as to make it almost useless beyond highlighting that the storm may impact your geography. More useful visualizations are the so-called "spaghetti models." This is the nickname given to the computer forecast models created by meteorological researchers. There are about 15 of these models usually known by their abbreviations (e.g., TVCN, NHC, BAMD, etc.). TVCN, for example, is a consensus model based upon an average of at least two other models: GHMI, EGRI, NGPI, HWFI, GFSI, GFNI, EMXI; while GHMI is a "interpolated-dynamical" model that takes the previous cycle of GFDL, which is then "adjusted using a variable intensity offset correction that is a function of forecast time," according to the National Hurricane Centre.

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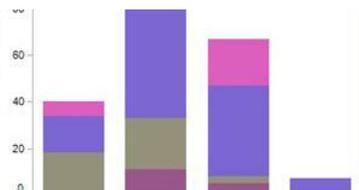
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Spaghetti Models

Each of these models is developed with access to NOAA's data and uses proprietary analysis algorithms, yet each offer a different path or trajectory for the storms. The decision of which model to follow has huge significance both economically and politically for decision makers. Choose the model that actually accurately hits your town and your decision to evacuate residents, close schools and businesses, and re-route tourists, and you're a hero, but when it doesn't happen, you're left making speeches on being "better safe than sorry" but having lost millions in revenue for your city, and caused upset for the residents, who are voters no less. For business managers, the decisions are not dissimilar, your big data analytics will often offer significant variability in its output depending upon the algorithms and analytics applied. As such, managers would benefit from a consideration of the following three points before rushing off to execute strategies based upon their big data analytics:

1. First, understand the why not the what. Why is the model you're using predicting an outcome is a key question, and a deep understanding needs to be gained from your data scientists as to why this situation is highlighted by the system and what is the variability or associated risk.
2. Second, develop consensus models. Just like in hurricane forecasting these can combine the other models and smooth out the variability.
3. Third, develop a culture of organizational learning to refine the models, drawing from expertise and knowledge both in and beyond the development team.

At the end of the day, managers need to remember that the computer is generating a forecast, not certainty, as we embrace technology, big data, and powerful models, there is a danger that this gets forgotten. So it is a good call to remember that human oversight and heuristic reasoning can still prove a valuable asset even in this age of big data, as it will be the human who gets praised or fired depending upon the actual economic outcome.

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— Robert Plant, Associate Professor, School of Business Administration, University of Miami

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 Saul Sherry, User Rank: Blogger
4/4/2013 | 8:57:28 AM

Re: Combining models
The idea of combining models i.e. the spaghetti approach here is interesting to me. When we discuss big data analytics and modelling in the enterprise, there tends to be this assumption there will be one shining path laid down. The concept of various models being shown simultaneously (and planned for) must make businesses more agile on some level.

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 legalcio, User Rank: Exabyte Executive
4/3/2013 | 1:35:31 PM

Re: Combining models
We can never remove the human element. Absent these models, how were CEO's predicting market trends, sales, etc.? They were still using models, but with limited data and more chance for error. But being a CEO is about making decisions, and the maturity of Big Data makes those decisions more informed. It's still a gamble, but the odds are better.

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 Saul Sherry, User Rank: Blogger
4/3/2013 | 12:23:11 PM

Combining models
Interesting link between Hurricanes and business with those spaghetti models... @Robert in business terms, would it be a matter of providing a spaghetti style selection and having the c level draw influences on the overlapping points between models? Or would it be a case of picking on from a bunch and banking on it?

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