Pumping Data: How Data Analytics is the New Athletic Advantage

Stefan Groschupf, CEO and Co-founder, Datameer

In a sport where milliseconds matter, the 2012 U.S. Women's Olympic cycling team found their competitive edge in an unlikely place – data science. The team went from a five-second deficit at the world championships to earning a Silver medal in the 2012 London Olympics — a triumphant feat that was achieved not only through dedication and athletic ability, but also through enhancing training with insights gained from analyzing big data.

The fall of Lance Armstrong, Barry Bonds, and other American sports heroes illuminates how widespread PEDs (performance enhancing drugs) have been as a route to optimizing athletic performance. More recently, the use of data and technology are showing promise as a safer option to naturally increase strength, endurance, and accelerate recovery. With a flood of sensors and smartphone apps that record physiological and psychological states, we are able to measure ourselves like never before. The explosion of data, when joined together and analyzed, is enabling us to solve problems and improve lives in ways we never thought possible, including athletic training. Professional teams are catching on, evident by the recent purchase of a $500,000 Cray Supercomputer by an "unnamed" Major League Baseball Team.

After a disappointing finish in the 2012 world championships, the cycling team turned to Olympic cyclist Sky Christopherson, who had personally leveraged the quantified-self movement in his training to break a world record. Sky established an experimental project to help the team record and analyze relevant data that could reveal actionable insights for optimizing their athletic performance.

Three months prior to the 2012 London Olympics, the indoor velodrome proved to be an ideal experimental space. In addition to controlling temperature and

humidity, velodrome cycling also has the unique feature of precise quantifiable athlete output via stress sensors contained inside the bicycles sampling at 200 hz and recording every 100 milliseconds. By correlating this performance data with health data tracking such as sleep cycles, circadian rhythms, continuous blood sugar levels, blood biomarkers such as Vitamin D, and hormone levels, Sky set out to uncover patterns between health and performance. Not only did they have the challenge of recording relevant data, they also had to find a way to integrate, analyze and visualize all of these data points to reveal insights they could incorporate into training.

Faced with a complex and vast set of raw data, the team needed a solution that could help them bring all of the data together and quickly reveal critical patterns that could optimize performance. Because of the sheer amount of data, and with each device producing different types of data (often in unstructured formats), traditional database and business intelligence technologies were not an option. Instead, they turned to Datameer's big data analytics and visualization solution. Because Datameer sits on top of Hadoop, an unlimited storage and compute platform that can take in any amount of data and any data format, structured or unstructured, in its raw format, the team could easily input, join, analyze and visualize how all of the sensor and device data was interconnected. Traditional data analytics tools require you to know what questions you want answered from the beginning, but with Datameer the U.S. cycling team was able to let the data speak for itself revealing insights they didn't know they were looking for.

Immediately, the team learned how routines and behaviors could be adjusted to naturally maximize human performance. For example, patterns revealed how room temperature affected the number of minutes spent in deep sleep, a state where bodies naturally release testosterone and human growth hormone. To increase the amount of deep sleep the team experienced, they adjusted temperatures accordingly. Ultimately, adjustments such as these ended up making the difference between winning and losing: the team won an Olympic medal by 8/100th of a second.

By integrating, analyzing and visualizing quantified self data to find insights that could help improve training, the 2012 U.S. Women's Olympic cycling team propelled themselves to glory and earned the Silver medal in London. Their approach not only revealed how data could optimize athletic performance, but also gave a glimpse at what professional sports might look like in the future with athletes turning to data — not doping.

Source URL (retrieved on *07/29/2014 - 12:42am*):
http://www.scientificcomputing.com/blogs/2014/05/pumping-data-how-data-analytics-new-athletic-advantage