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"Big Data" for Business and Education

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Have you heard of the phrase, Big Data? The New York Times declared 2012 the dawn of the "Age of Big Data." Today, Big Data, together with social and mobile, are the hottest trends in the technology and business communities. "Big Data" is no longer just a technical term, but rather indicates business opportunity. The Data Warehousing Institute (TDWI) Best Practices Report on Big Data Analytics reports that 74% of organizations have adopted some form of analytics today and 34% companies practice some form of advanced Big Data analytics. However, Big Data brings along challenges with benefits. The purpose of this article is to introduce Big Data for our business and education communities and, hopefully, to encourage a lot more discussions on this topic.

What is Big Data?

According to the National Science Foundation (NSF), the phrase Big Data refers to large, diverse, complex, longitudinal, and/or distributed data sets. These data sets are generated from instruments, sensors, Internet transactions, email, video, click streams, and all other digital sources available today and in the future.

To illustrate the picture of Big Data IDC (the International Data Corporation) did a study called the "Digital Universe." The study found out that in 2011, the world created 1.8 zettabytes of data, or 2 billion terabytes of data. If we load this amount of data to iPads (32GB) and put up all the iPads, we would create a wall of iPads extending from Alaska to Florida (4,005 miles long and 61-foot high). And this is just the data for 2011, one year, in our modern society. According to IBM, by 2020, the world will store 35 zettabytes of data, 20 times the data created in 2011.

Big Data does not just refer to the **volume**. Big Data also spans in other dimensions such as **variety** (many different formats) and **velocity** (fast growing speed). For instance, Wal-Mart has over 6000 stores worldwide. It handles more than 1 million customer transactions every hour. These are transactional data, like the list on our receipts. How about unstructured data? Facebook processes 2.5 billion pieces of content daily and that includes photos, videos, and other non-text information. Similarly, Twitter generates 12 terabyte of data every day, about 5000 tweets per second. On the website of YouTube, it says "72 hours of video are uploaded to YouTube every minute," doubling the number from the year before. In 2011, YouTube had more than 1 trillion views. If we spread this out to all the Internet users on earth, that is 441 views for every one of us. "Did you watch 441 YouTube videos last year?"

In a nutshell, Big Data refers to large volume and complex data. As explained by Teradata, if business intelligence is about *transaction*, Big Data is about *interaction*. It is much more detailed and complicated, measuring every single bit of our lives.

Why Should We Care about Big Data?

We often hear people say that they have way too much data yet too few techniques that can make sense of it. The word "Big" is relative in nature. It indicates a proportion. To many of us today, the explosion of the complex digital information has out grown our knowledge and comprehension. And this is where both opportunities and challenges reside. How do we analyze 1 million transactions every hour and make real-time decisions? How can we monitor social media exchange about our product and service and identify an issue as soon as it's being discussed among our customers? Businesses want to achieve performance optimization. How exactly can we turn big data into deeper analytics and quicker insights?

In the book titled *Taming The Big Data Tidal Wave* by Bill Franks, it says "[T]he reality is that we are in a transformative era in

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terms of analytic capabilities and the leveraging of massive amounts of data.
Big data is the next wave of new data sources that will drive the next wave of analytic innovation in business, government, and academia. "On the one hand, "big data" represents some ultimate business opportunity. Economists now call Big Data the new class of economic and corporate asset, "like currency or gold." According to the Economist magazine, the data analytics industry is worth more than \$100 billion. But, the challenge is that many of us are still just learning and starting to analyze the abundant and complex data. We are still in the early days for big data. We cannot yet answer these questions very well such as:

- How to create a new business model based on big data?
- How would your business change if you used big data for widespread, real-time customization?
- How can big data augment or even replace management?

Emerging Trends in Big Data Research

Today, scholars and experts are conducting some very exciting new research with "Big Data", for instance, *Sentiment Analysis*, or opinion mining. In another word: listen to the Web! Such application goes through website content and uses Natural Language Processing techniques to analyze what people say and their attitude and even emotion about certain things. For example, Kraft Foods monitors the web to learn what percentage of comments about a barbecue sauce is positive or negative so they can improve their products. Sentiment analysis is now used

to monitor customer feedback, user comments, and trends of discussions on the web and in social media. The true beauty is that based on a large amount of data, sentiment analysis may help you to predict certain things such as the American Idol votes or the next president.

Of course, "Big Data" analytics don't just watch web data. New technologies have emerged to address complex structured data, such as RFID sensor and Global Positioning System (GPS) data. For instance, *Telemetry Analytics* are now used for gaming data, to collect and mine the data in real-time as data arrives from the gaming device such as movements and press of buttons so companies can design more engaging and interactive games. Insurance companies already use devices (Snapshot or Drive Wise) to track our driving behavior. There are 250 million vehicles on the road in the US. If on average, each car runs 10,000 miles per year. The analytics can be dealing with mountains of data.

Big Data Coming to the Classrooms

In my recent years of teaching, I have received more and more inquiries about courses and training on data analytics. Students ask when and where they can learn more about data analytics and "Big Data". Beyond such discussion is the need for a new type of professional who can work on business data using technical applications, modeling, statistics, analytics and math. Some people call them the *Data Scientists*, which didn't quite exist five years ago but now is one of the hottest that companies fight to recruit. Harvard Business Review even call data scientist the "sexiest" job of the 21st century.

Today, universities are offering degree programs and training on data analytics and related topics. At our Raj Soin College of Business, we have analytics courses offered in the *Master of Information Systems programs* as well as in our undergraduate MIS program. By the way, our Master of Information Program is recruiting now for the Fall 2013 cohort (business.wright.edu and select Graduate Students then Information Systems). Our students learn to use applications and tools from Teradata, MicroStrategy, Tableau, IBM, etc. to analyze real life business data in case studies. The road to Data Scientists may be long but we will continue to provide the most current education to our students and to explore new opportunities for improvement.

Data Analytics will be one of the most needed domains in business in the near future. Not only is there a high-demand in the market, but more importantly, there are also burning needs for educating our students and conducting research in this area. Business practices and academia bear the joint responsibility to train our future leaders to gain the knowledge and skills in data analytics. I look forward to such collaboration.

