Analytics Special Issue!!

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From the Faculty's Desk...

Hi All,

Happy reading.

Regards
Prof N.S.Nilakantan

TEAM QUANTINUUM

ANALYTICS & WHY ANALYTICS

Analytics is a science of analysis. Practically, it is a process of developing optimal or realistic decision recommendations based on insights derived through the application of statistical models and analysis against existing and simulated future data that drives business decisions and actions.

"*Analytics is defined as the extensive use of data, statistical and quantitative analysis, explanatory and predictive modeling and fact-based management to drive decision making*"**- Thomas Davenport**

Analytics is an application to solve business and industry problems. Past experiences and rule of thumb concepts can be added to the data to create a qualitative aspect of decision making. However, without adequate data sources selected from various factors of real information, the determination cannot be said to be made with the concept of analytics. Analytics is all about people, to make better decision and achieve results and for this analytics help to accomplish it with full potential.

Analytics relates to statistical analysis and data mining but it is based on modeling to take extensive computation into account. Analytics is used in corporate finance, economic consulting, forensic and litigation consulting, brand management and strategic communications, to track existing inventories and predict and prevent future inventory problems.

Why use of analytics is good:-

- Finding the best customers, and charging them the right price
- Minimizing inventory in supply chains
- Allocating costs accurately and understanding how financial performance is driven

As many companies offer similar products use comparable technology, high-performance business processes, so analytics, now-a-days, is considered as a differentiator in order to be a successful company. In addition, the increasingly complex environment in which businesses operate, stringent governance, globalization and cross border trade, increasing competition, choice of business models, reducing time to market and choosy customers – right product, right price, etc.. encourage every company to be more analytical in future. A single analytical initiative results in savings or revenue increases by hundreds of millions or billions for a large organization. The results of analytics can also be measured in overall revenues and profits, market share and customer loyalty.

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Analytics and Insurance Sector

While mobile, social and consumer-derived technologies seem to garner a large amount of mind space lately; in reality they are still peripheral to the business of insurance.

If there is one technology relevant to insurance that has promise it is predictive analytics. While not necessarily a new technology, broader use of predictive analytics throughout the insurance enterprise paired with incredible advances in the hardware and software that enables it, points to something of great import not just for insurers, but other industries as well. A recent article in the Wall Street Journal, "So, What's Your Algorithm" traced the newfound cachet of analytics from Wall Street to "Moneyball"- the game and claims that over time this will be the most disruptive technology.

One way to quantify the analytics explosion is to analyze the bottom line of a company synonymous with the technology, SAS Institute. This week the company reported 12-percent annual top-line growth, achieving record global revenue of US$2.725 billion in 2011. This number is all the more impressive when one considers revenues were in the $1 billion range a decade ago.

Jim Davis, SVP and chief marketing officer for SAS, credits a variety of factors for the technology's growth. While the company has seen a boom in demand in sectors such as government, utilities and manufacturing, financial services firms still account for 40 percent of revenue for SAS.

Davis also credits increasing utilization of ever-improving hardware for improving the visibility and viability of analytics. Inexpensive server blades containing powerful multi-core processors have greatly reduced the cost and time of running even the most complex of analytic calculations. Thus, insurers are now able to analyze all data in a given database rather than a subset of it.

High-performance computing can be used to reduce the latency in decision-making.
Another technology trend catalyzing broader use of analytics is cloud computing. SAS built a dedicated cloud facility on its Cary, N.C., campus that went online in mid-2010.One insurance-specific driver of demand for predictive tools is tele-matics, which combines analytics and mobility and has the potential to revolutionize insurance processes from underwriting to claims.

Source:- http://www.insurancenetworking.com/blogs/analytics-big-data-sas-kenealy-29775-1.html

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Data Analytics as next Frontier for Outsourcing

Big Data Analytics is catching headlines these days. According to Philip Russom, Director of TDWI Research, Big Data has three defining attributes – 3 V's. They are Data Volume, Data Variety and Data Velocity and together they constitute a comprehensive definition of Big Data. So Big Data is not just about Data Volume, but also the variety of data and the velocity with which the data is generated and need to be analyzed.

Given the three V's of Big Data, 'traditional' data storage, retrieval and analytics methodologies are no longer going to work. Cloud Computing plays a key role when it comes to Big Data Management and Analytics and here is the opportunity for outsourcing companies.
Traditionally, data collected by organizations was securely stored in massive relational database accessible to only few within the organization and requires elaborate infrastructure both in terms of hardware and software for storage, retrieval and reporting/analytics. In such an environment, it is not possible to easily outsource Data Analytics function/processes alone given the heavy investments made in terms of hardware and software.

Because of the business requirement of analyzing vast amount of ever changing structured and unstructured Big Data almost instantaneously, companies will be hard pressed to do this on their own. But given the fact that Big Data stored in cloud can be accessed from anywhere the internet is available and can be analysed almost instantaneously by third party service providers, outsourcing companies can offer to their clients value added services in the area of Big Data analytics without heavy investments on the part of clients in specialized hardware and software as was the case with 'traditional' data analytics. This will bring down significantly costs (especially fixed costs) associated with building and maintaining analytics infrastructure and solution centre.

In the area of Social CRM, Social Media has empowered customers, as they can discuss about brands/products on Social Media channels. Any marketer can Listen, Learn and engage customers. Given the three Vs of Big 'Social' data and the fact that most of the user generated content resides in the cloud, outsourcing companies can offer cost effective analytics solution to their clients to enable them effectively engage their customers/prospects in real time.

Source:- http://hkotadia.com/archives/4687
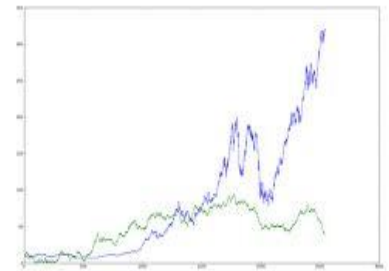
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Making Heads/Tails of a Highly Skewed Distribution

The areas where the distribution is highly uneven like the Zipf or the Pareto 80/20 principle results in a highly skewed distribution, for e.g. human performance and market variability. There are many scenarios in which one parameter is contributing twice or more than the other parameter i.e. there is a *head* in which a small top group that accounts for most of the phenomenon and *tail* in which everybody else account for what remains.

Due to this difference in contribution, what should a group do?
Well, there are few conditions which are resulting in this
kind of outcome:-

- In an industry, an unequal distribution may be within the bounds of normal variation for small number of cases and large number of variables.
- There might be a situation where No 1 customer in volume is resulting in a loss for the manufacturer.
- In certain events or fields, the outcome is extremely rare and is related to a peculiar circumstance and thus automatically concentrated.
- Comparison between two or more different professions may not be valid.
- Sometimes only 20% of a group is buying 80% of inventory as they might be working on most of the big projects.
- Is the phenomenon like musical chairs where about 60 percent of available seats will be claimed by 40 percent of participants?
- Sometimes the same distribution applies to the high group as well as to the low group.
- If concentration is kept mostly on one event, then it is likely that there isn't much for the other events.
- If the head and tail are two different populations, very often the head will be affected mainly by considerations entirely different from most of the market.

Source:- http://www.allanalytics.com/author.asp?section_id=1413&doc_id=237990&

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Emerging Trends in Analytics

The first theme is the increasing sophistication of analytics software and the need for a simplified approach to presenting the results of complex analysis. Over the past couple of years, Analytics tool vendors have realized that analytics software should present the results of sophisticated analysis on large and complex data sets in an easy to read, actionable format to be effective and reach the widest audience. As a result, most tools today have advanced visualization capabilities.

The next trend that he sees is the transition of analytics from personal computers to the mobiles of the executives. It made everyone do the analytics in hand easily. But complex functions are seen lacking. People once had this technological gadgets in the wish list but now it has turned into the must have list. It helps executives achieve true collaboration with analytics delivered via mobile technology no matter what the time is. You can have the information you need to make decisions when you need to make them.

The third trend is that companies are starting to realize that analytics gives them to gain a competitive edge. Analytics has been used as a strategic weapon to share information enterprise-wide, grow revenues and streamline operations in hopes of winning in this ultracompetitive, highly economically unstable business environment by the competitors worldwide.

The problem that many companies are having dealing with "big data," is the potential trend which brings in some worries. To be able to leverage analytics software effectively, it's essential to have a handle on how much and what types of data you have to analyse. It's a necessity to have newer parallel processing technologies in place to handle the volumes of data required to run the complex analytical algorithms that can help you spot emerging trends and potential problems.

The final trend is that agile development techniques, new data quality tools and methodologies, and technical innovations like in-memory analytics are taking analytics out of the realm of the data warehouse.

The author thinks that the enterprise data warehouse will likely be relegated to a supporting role and an aggregative function rather than the mainstay of reporting and analysis. Instead, he thinks that companies will store data in their warehouses for use in temporary one-off applications that may or may not survive long-term and for distribution to mobile analytics consumers.

He suggests that all these trends will not play out but he says that the signs are there that analytics is levelling the playing field in IT. Even if the companies doesn't have millions of dollars to spend on analytics, the tools and development techniques available today will help with competent IT people to compete with analytics.

Source:-http://www.information-management.com/newsletters/analytics-big-data-warehousing-BI-emerging-10021713-1.html

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How to apply OODA Framework to your BI Efforts

There are many processes business executives use nowadays to make decisions. One of them is OODA. OODA –Observe, Orient, Decide, and Act -- is one decision-making framework that has developed in business. John Boyd (1927-1997), a British military strategist designed this concept and applied it for training fighter pilots.

The obvious time to use OODA is after a BI implementation.

It can be used as a

as a key component in observation (examining transactional or unstructured data) and

in orientation (applying to a predictive modelling or a balanced scorecard).

This discusses about OODA to what comes *before* implementation.

Observe

At first, users must observe the facts of the situation and understand the unfolding circumstances and interaction with the environment. Determine on the following:

- What competitive forces are driving the industry?
- What strategies and goals does your company use to compete in this environment?
  What business processes impact and drive these business strategies?

Understanding this will allow anyone to frame BI in the context of business needs and benefits, making it easier to create a basis for ROI.

Orient

Secondly, one must orient the observations of the competitive environment, business strategy, and business processes in the context of BI readiness. The factors involved are:

- How much strategic alignment exists between business strategy and business processes?
- How inclined is your company or department to use analytical applications?
- Do you have a structured decision-making process?
- How well does the technical environment support a BI initiative?
  Do business and IT have a partnership? How much management support do you have?

The degree to which these factors inform you of your ability to align and govern a BI program, to execute technically, and to adapt your corporate culture in order to leverage BI for profit.

Decide

Then decide on having a system in place to observe and orient lets you decide on BI opportunities that create the most business benefit. Develop a BI roadmap -- which BI projects to create and in what order.

- What business improvement opportunities can you realize using this BI capability?
- How does this help achieve business goals and strategies?
- What information is available to support these business goals and strategies?
  What types of tools and capabilities will you need for execution?

How to apply OODA Framework contd...

Act
The last stage in OODA is action. This means executing the BI projects based on the selected roadmap. This means not only designing, developing, and deploying a BI project, but also implementing the business process change needed to get the most out of the project.

Don't forget to loop
These processes feedback on one another. This helps in re assessing the execution, and it helps in setting new targets based on lessons learnt and new information collected through the process.

Source:- http://www.allanalytics.com/author.asp?section_id=1426&doc_id=237955&

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Pattern Recognition Analytics and Social Web

Social media experts try and uncover trends on Twitter and elsewhere and perhaps even get a sense of the public's overall mood. Some companies try to predict everything from stock market performance to brand and product reactions based on Twitter sentiments.

Pattern-based analytics could help make this dream a reality. Here are a few examples of how pattern-based analytics might come into play:

- **Beating the news to breaking stories.** Twitter has been credited with spreading big news (e.g the death of Michael Jackson) much more quickly than the traditional news media. With pattern based analytics, traditional and online new sources, PR firms, and other news watchers can monitor tweets to help identify breaking news before their competitors do.
- **Beating your competitors to actionable intelligence.** As in the case of news stories, people tweet about everything imaginable, but getting through all the "noise" of the Twitter verse doesn't make locating it easy.
- **Instant notification of trending developments.** Through pattern recognition analytics regular updates to cellphone, smartphone, or other mobile device can be sent to give a real-time over view of trends as they unfold.
- **Track sentiments connected to your key issues.** We can use it to track the issues we are most concerned about and the sentiment of others on Twitter toward those issues.

Quantum Leap Buzz uses pattern recognition analytics and allows users to sort through millions of updates on Twitter by typing in a keyword and bringing up all occurrences of that keyword displayed in trends and patterns. The tool displays the individual tweets under each trend or pattern category and how many times each keyword was tweeted.

Source:- http://www.allanalytics.com/author.asp?section_id=1412&doc_id=238060

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Advanced Analytics Requirements

Advanced analytics are important because they allow us to improve the quality of decision-making in our organization. The requirements challenge for most organizations is that they don't really know what these decisions are but to be successful with predictive analytics, the gathering of requirements in terms of these decisions is critical.

Decisions can be categorized into decision taxonomy. Such a taxonomy includes a number of types of decisions including risk decisions (how risky is this loan and how should we price it), fraud decisions (how likely is this claim to be fraudulent and what should we do about it) and opportunity decisions (how can we maximize the value of this customer interaction).

To be able to effectively prioritize and manage these decisions we need to link them to the business. We should model the business objectives and key metrics that they affect so we can tell good decisions from poor ones. The processes that need the decisions and the business context helps direct analytic effort and constrains it to solutions we will actually be able to use.

Decision characteristics like including volume, timeliness, consistency over time, the difference between a good decision and a bad one and the time it takes to see the value of a specific decision should also be included in the documentation.

The top level decisions are seldom precise enough to effectively target data mining and predictive analytics efforts. To effectively apply advanced analytics we should decompose these decisions into, more closely scoped decisions. In general, a decision can be thought of as being dependent on a set of other, smaller precursor decisions. The dependency of a decision on other decisions gives more clarity to the decision-making involved.

Decisions are not only dependent on other decisions they are dependent on the availability of both internal and external information sources. They are also dependent on know-how – everything from expert knowledge to regulations and policies to analytic insight in the form of data mining results and predictive analytic models. Decomposing decision-making in this way as part of our requirements process makes it clear how decisions are made and what is required in terms of analytic insight and data. Only then can more advanced analytics be specified accurately and developed and deployed effectively.

By replacing a vague "define the business problem" with a more precise "define the decision dependency network and show where in that hierarchy the analytic insight will be applied" makes for more successful advanced analytics projects.

Source:- http://www.information-management.com/newsletters/advanced-analytics-requirements-BI-predictive-10021784-1.html

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Quantinuum, the Quant's forum of KJ Somaiya Institute of Management Studies and Research is formed with two objectives. Firstly to remove the common myth from the students mind that mathematics is difficult. Secondly to give students an exposure on how to make decisions in real life business problems using quantitative techniques. This helps to bridge the gap between theory and the practical application.

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