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A Survey on Importance and Opportunities in Big Data Analytics

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Abstract: Big data analytics is the process of examining Big data to uncover hidden patterns, unknown correlations and other useful information that can be used to make better decisions. With big data analytics , data scientists and other can analyze huge volumes of data that conventional analytics and business intelligence solutions cannot touch. Consider that our organization could accumulate (if it hasn't already) billions of rows of data with hundreds of millions of data combinations in multiple data stores and abundant formats . High-performance analytics is necessary to process that much data in order to figure out what's important and what is not.

Keywords: *Analytic Science, Communicating Sequential Processes, Application Programming Interface, Software Development Kit, S-Kips, QOE, Self-Organizing Networks.*

I. INTRODUCTION

Why we collect and store terabytes of data if we can't analyze it in full context? Or if we have to wait hours or days to get results? With new advances in computing technology, there's no need to avoid tackling even the most challenging business problems. For simpler and faster processing of only relevant data, we can use high-performance analytics. Using high - performance data mining, predictive analytics , text mining , forecasting and optimization, big data enables us to continuously drive innovation and make the best possible decisions .In addition , organizations are discovering that the unique properties of machine learning are ideally suited to addressing their fast - paced big data needs in new ways.

Big data analytics is the use of advanced analytic techniques against very large, diverse data sets that include different types such as structured or unstructured and streaming or batch, and different sizes from terabytes to zettabytes. Big data analytics is a term applied to data sets, whose size or type is beyond the ability of traditional relation data bases to capture, manage and process the data with low-latency. And it has one or more of the following characteristics:

1. Data volume,
2. Data velocity,
3. Data variety,
4. Data complexity

Big data comes from sensor devices, video or audio, networks, log files, transactional applications, web, and social media-much of it generated in real time and in a very large scale.

Big data analytics allows analysts, researches, and Business users to make better and faster decisions Using data that was previously inaccessible or unusable. Using advanced analytics techniques such as text analytics, machine learning , predictive analytics data mining, statistics and natural language processing, business can analyze previously untapped data sources independent or together with their existing enterprise data to gain new insights resulting in significantly better and faster decisions.

II. BIG DATA ANALYTIC CHARACTERISTICS

A. Data Volume

The word "big" in "big data analytics", itself defines the volume. At present the data existing is in petabytes (10^{15}) and is supposed to increase to zettabytes (10^{21}) in nearby future . Data volume measures the amount of data available to an organization , which does not necessarily have to own all of it as long as it can access it.

B. Data Velocity

Velocity in big data is a concept which deals with the speed of the data coming from various sources. This characteristic is not being limited to the speed of in coming data but also speed at which the data flows and aggregated.

C. Data Variety

Data variety is a measure of the richness of the data representation like text, images, video, audio, etc. Data being produced is not of single category as it not only includes the traditional data but also the semi structured

data from various resources like web pages, web log files, social media files, e-mail, documents.

D. Data Value

Data value measures the usefulness of data in making decisions. Data science is exploratory and useful in getting to know the data, but "Analytic Science", encompasses the predictive power of big data. User can run certain queries against the data stored and thus we can deduct important results from the filtered data obtained and can also rank it according to the dimensions we require . These reports help people to find the business trends according to which they can change the strategies.

E. Complexity

Complexity measures the degree of inter- connected (possibly very large) and interdependence in big data structures such that a small change (or com- bination of small changes) in one or a few elements can yield very large changes or a small change that ripple across or cascade through the system and substantially affect its behavior, or no change at all (katal, wazid & goudar)

III. OPPORTUNITIES IN BIG DATA ANALYTICS

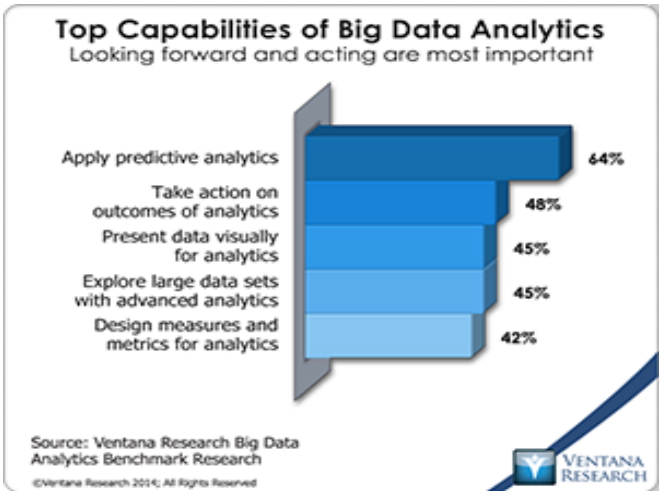

Figure 1: Opportunities in Big Data Analytics

Analytics is essential to the enablement of cost-efficiencies and business innovation across all Communicating Sequential Processes (CSP) business segments. Accordingly, solutions will need to provide cross-domain support with a common architecture to maximize reusability, agility and cross-selling of analytics applications based on facilitated use cases. Insights can be exposed through an integrated and interactive platform that implements or reuses existing APIs and SDKs, allowing multiple applications to be supported by the same underlying data infrastructure. The underlying big data technology is an enabler, but it does not, in itself, generate value. This is generated by the faster and smarter decisions enabled by insights gleaned from newly discovered and defined data relationships that lead to successful and beneficial use cases . The following sections provide a sample of the kinds of use cases that can be realized using big data analytics.

IV. SMARTER NETWORKS

Smarter Networks optimize the use of network resources and management of network traffic to improve the consumer experience. This enables the delivery of more compelling service offerings.

The mix and behavior of services are not static. Every Day , new services become available in app stores, and network traffic patterns for individual services change over time. It is therefore important to have solutions that capture relevant characteristics and excel in a changing environment. Big data analytics provides the means of such large - scale statistical analysis for observing and predicting traffic patterns, as well as quickly detecting trend shifts and anomalies. An example application of big data analytics for smarter networks is the prediction of optimal network parameter settings based on the characteristics of the traffic, to reduce battery consumption on the user device while not increasing network delay.

Self - organizing networks (SON) efficiently use net-network near analytics in planning ,building and optimizing network resources. All SON auto- mation such as provisioning , configuration and commission-ing can be adapted to changes in the environment and traffic demand based on the in- sights gained from big data analytics.

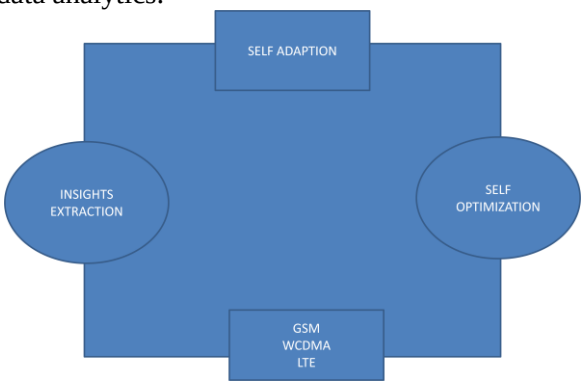

Figure 2: Smarter Networks

Finally , next – generation networks will provide ubiquitous mobile communication not only for people but also for connected things . This will add new challenges , such as the ability for the net- work to

handle a massive number of connected devices at low cost and the need for increased energy performance on both the client and network side- challenges where big data analytics will play an important role.

V. USER EXPERIENCE

Big data analytics reveals what the CSP needs to know to be able to take timely action to resolve issues that impact the user across devices, subscrip- tions , services and network resources. For instance, CEM systems monitor and analyze the individual user experience of mobile broadband services and voice. Measuring QoE through well-selected system Service Key Performance indicators (S – KPIs) requires the analysis of distributed network data.

Analysis of large data sets also enables precise analysis of the user experience and leads to insights into subscribers real experience, which could incorpoporate social data , for example . A CEM platform collects data down to an individual subscriber's session and can automatically pinpoint the root cause of problems affecting consumer experience, either reactively (within customer care) or proactively (within the Service Operation Center (SOC) / Network Operation Center (NOC)). In addition, communication between customer care and the NOC/SOC is simplified by creating a common interface and language, easily linking QoE to the underlying network . Off the shelf data-processing technologies are not enough because root cause insights are highly network –specific. In-depth network knowledge is required to work out what network data must be analyzed - at the user session level and in relation to the detailed consumer-experienced service events (user triggers) – to understand both the perceived user experience and the directly associated root cause (in real time). The user experience reported from the S – KPI measurements is not sufficient to understand the impact on the Net Promoter Score (NPS). The experiences must be evaluated using psychophysical methodologies, and the resulting perception under- standing per each user service level index is a step closer to the NPS . The consumer gets in touch with a CSP on several occasions, defied as " Touch Points ". The touch points in question are Find , Buy (pay for), Receive (get, install) ,Use, Get Help, Modify and End. "User" is (hopefully) the touch point to which the user has the longest exposure. It therefore becomes one of the most important in terms of measuring quality. The whole range of consumer experience journey data must be considered, covering all the user's touch point experiences with the network provider and how each positive or negative event impacts their perception. Applying analytics to such data enables a CSP to predict which subscribers are best for up - selling or re profiting in order to target their needs better. Compared with most other industries, CSP s are in a unique position ; few other businesses can potentially measure virtually every usage of their services in real time per consumer.

VI. WHY IS BIG DATA ANALYTICS IMPORTANT?

For years , customers have evolved their analytic methods from a reactive view into a proactive approach using predictive and prescriptive analytics. Both reactive and proactive approaches are used by organizations , but let's look closely at what is best for our organization and task at hand.

A. Reactive Vs Proactive Approaches

There are four approaches to analytics and each falls within the reactive or proactive category.

B. Reactive-Business Intelligence

In the reactive category, Business Intelligence (BI) provides standard business reports, ad hoc reports, Online Analytical Processing (OLAP) and even alerts and notifications based on analytics. This ad hoc analysis looks at the static past, which has its purpose in a limited number of situations.

C. Reactive-Big Data BI

When reporting pulls from huge data sets, we can say this is performing big data BI. But decisions based on these two methods are still reactionary.

D. Proactive Big Analytics:

Making forward – looking , proactive decisions requires proactive big analytics like optimization, predictive modeling , text mining, forecasting and statistical analysis. They allow us to identify trends, spot weakness or determine conditions for making decisions about the future .But although it's pro- active , big analytics cannot be performed on big data because traditional storage environments and processing times cannot keep up.

E. Proactive-Big Data Analytics

By using big data analytics, we can extract only the relevant information from terabytes, petabytes, exabytes and analyze it to transform our business decisions for the future. Becoming proactive with big data analytics is not a one-time endeavor it is more of a culture change a new way of gaining ground by freeing our analysts

and decision makers to meet the future with sound knowledge and insight.

With big data analytics, we can truly change operations, prevent malpractice, gain competitive edge, retain more customers, anticipate disease outbreaks or run unlimited budget simulations and the possibilities are endless.

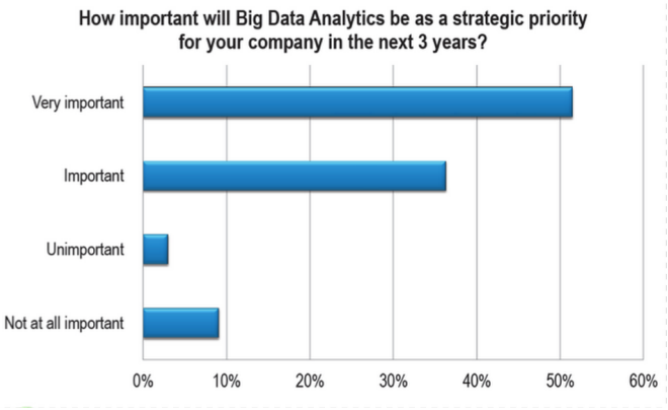

Figure 3: Importance of Big Data Analytics

CONCLUSION

True data-driven insight calls for domain expertise. For the CSP , this means in-depth knowledge of how the network functions , what data to pull from the net-work's nodes and OSS / BSS systems , and an understanding of how to connect data from multiple sources end-to- end to yield an enriched set of information sources.

This is what ultimately enables the creation of a range of services and user centric applications. In Smarter net , customer experience management, data brokering and marketing are just some examples of what is possible . A common , horizontal big data analytics platform is necessary to support a variety of analytics applications. Such a platform analyzes incoming data in real time , makes correlations (guided by domain expertise) , produces insights and exposes those insights to various applications . This approach both enhances the performance of each application and leverages the big data investments across multiple applications.

Storing and processing huge amounts of information is no longer the issue. The challenge now is to know what needs to be done within the big data analytics platform to create specific value. While big data storage and processing techniques are necessary enablers , the goal must be the creation of the right use cases. The big data tools and technologies deployed have to support the process finding insights that are Adequate , Accurate and Actionable.

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