

Dynamic Buffer Management

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Abstract— This report attempts to explain the phenomenon of Big Data Analytics and how it has changed the way analysis is perceived and mentions several important applications where big data analytics is used while enlisting more ideas and unexplored horizons in the tremendous scope of Big Data Analytics.

Keywords—Big Data Analytics, unstructured data,

I. INTRODUCTION

Big Data analytics is a much ubiquitous term used in the advent of the Internet of things, consumerism and aggregate technology.

But what is big data? How has it managed to radically change the way data is used in the analysis and assaying of real life problems?

To fully comprehend the answers to these fundamental questions about big data is imperative to the appreciation of the scope and the tremendous euphoria that Big Data has galvanised.



Figure 1 - Datastream pictorial

This simple example of the game of chess elucidates this concept with great efficacy.

The computer games chess was received with great alacrity as it was an intellectual pass-time for all ages and moreover it repaired the inherent caveat of the games of chess that would require 2 persons to play the game.

But as more and more people played the game of chess, a flaw become increasingly apparent; the fact that it was quite facile to win a games of chess played against the computer. If you give this fact a deeper thought, not much deliberation is required to understand its reason. The computer only knows the legal moves; the data that has been fed into a computer only incorporates the details of the game of chess, what are the different moves of each player. The computer is not equipped with the basic characteristic germane to chess; INTELLIGENCE.

When the game of chess was redesigned to correct this flow, it was done with the help of Big Data. Instead of only feeding in data about the rules of the game of chess, the computer was made to play several thousand games against itself and terabytes of data, perhaps more, about each and every game entailing every move played in response to another move and the correlation of those moves along with the probability of winning the game if those moves were made was stored and fed into the computer. Gradually after the birth of this idea, the computer finally was able to beat the humans at a game they created simply because of Big Data. Call this Machine learning or artificial intelligence or analytics or statistics, its heart lies in the creation of several terabytes of data coupled with the ability of humans and indeed the computer to interpret and use it.

II. THE ANALYTICS REVOLUTION

But analytics was always there, why the sudden hype and bubble surrounding it? Manufacturing companies have always been analysing their inventories so as to optimise costs, conducting market research to understand market trends, Finance companies have always analysed stock market movements and conducted technical and fundamental analysis to uncover patterns or suggest investment prospects, so the point is, if analysis has always been used in perhaps a large amount of fields, then what is new about big data analytics? What change has effected this revolution sort of movement in the field of analytics?

There can only and only be one answer to this. AN UNPRECEDENTED QUANTITY AND QUALITY OF DATA. There is just such a tremendous amount of data from multifarious sources, that we no longer have to rely on samples and few responses and estimations and statistical approximations based on certain probabilities and trends. Market research for instance, before the advent of big data, relied on small sample sizes or certain surveys carried out on a certain group of people or a locality and we would extrapolate the reviews of the entire population based on these responses or the results of these surveys. But now, we can without much effort monitor the thoughts of the entire population on social media. It is so much simpler for instance to monitor and infer data about the review of a certain product based on the number and type of google searches made or the twitter trends about a certain event. Manufacturing companies can continuously measure or monitor the output or the waste produced by a certain machine or some other characteristic of the machine which would enable the identification of some fault or defect in the machine instantaneously instead of waiting for the next round of periodic maintenance.

Hence to encapsulate my point here, there is such an enormous increase in the data available for us to process and a commensurate increase in our abilities to process them that it has revolutionised the field of analytics and completely revamped the way we perceive this field. Analysis is now not seen as a supplementary act as an auxiliary to the business operations but is not part of the core operations of an enterprise. Moreover, a lot of people subscribe to the school of thought that, gradually, technology will come to a standstill and there will be a limit to the number of problems that can be solved through innovation and invention. Here, big data is thought of as an alternative, it is perhaps a non-conventional source of growth and hence the only sustainable mode of growth in the long run. Hence these myriad of factors converge to explain the rapid investment, burgeoning number of start-ups and the justified hype, if I may say, surrounding Big Data Analytics.

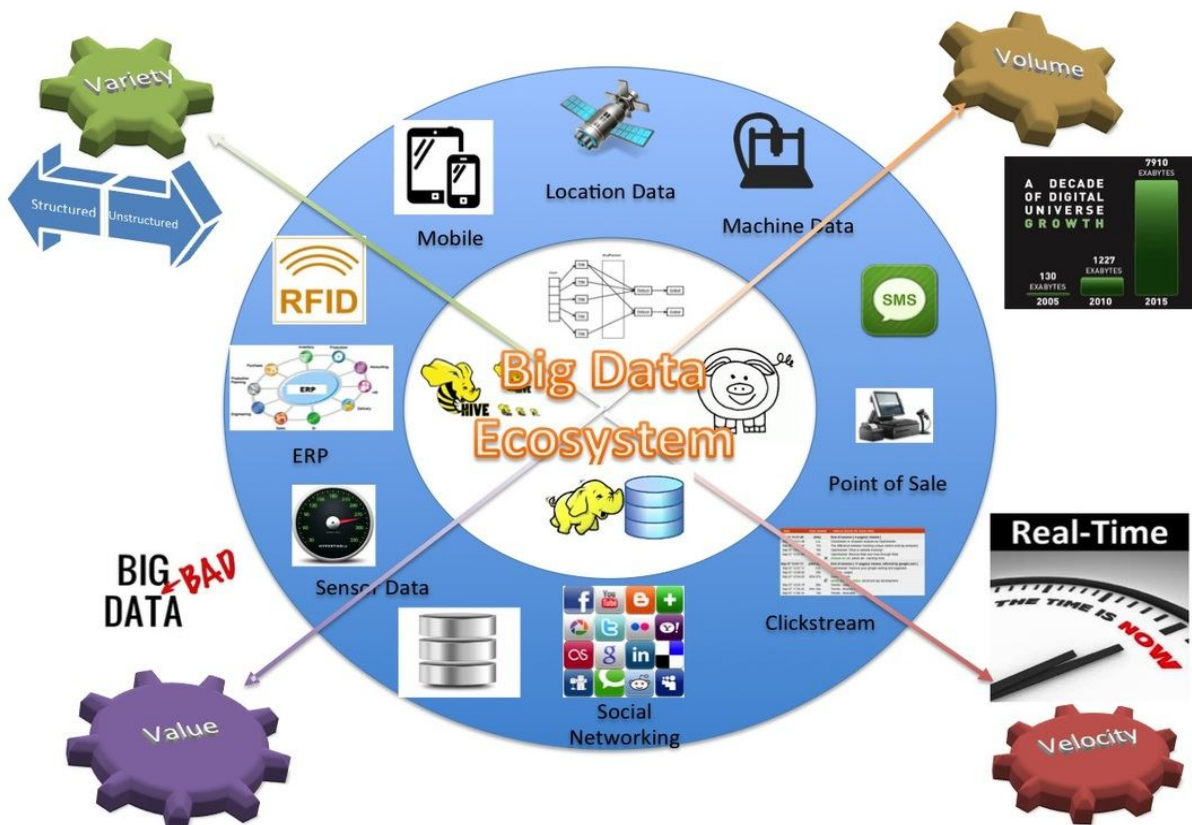


Figure 2 - Big Data Ecosystem

III. NEW APPLICATIONS

Given there are a plethora of applications of Big Data analytics employed in the industry, I would like to enlist a few out of the box ideas or applications that currently have very limited implementation, if any, of Big data analytics that can be pursued more vigorously in the future.

1. The game of cricket can use Big Data analytics to replace the archaic D/W Louis method that is used to predict and declare the outcome of a match that has been hindered by rains. If team B is batting after team A has finished its innings, and there are say 50 runs to get in 7 overs and rain stops play, what the D/W Louis method will do is predict the outcome of the game based on number of wickets left and runs to chase in given overs based on some not so transparent mathematical calculations. Big data analytics can be employed here to predict the outcome of the match based on tonnes and tonnes of historic data of similar situations faced by similar teams and players and arrive at a probability of winning taking into account player ratings, and past winning outcomes in similar setups. This method is more relevant here as outcomes are generated based on previous successes instead of arbitrary mathematics.

2. Banks and insurance companies could use Big Data analytics to make use of the differential interest rate or premium systems in order to reward those customers who have been timely with their payments or perhaps inherently pose less risk of default and higher probabilities of meeting their debt obligations. The idea here is that why should a 40 year old with a stable life and income pay the same insurance premium for a life insurance for instance as a 25 year old boy with eccentric habits and accident prone history hence always a greater threat to insurance companies. An example of how mass volumes of unstructured data could be used is to fit a sensor in a car to measure the relative bumpiness or sudden brakes and accelerations in a car ride to decide what car insurance premium to charge to a client. One who perhaps has a more risk prone driving must be charged a higher premium for car insurance. This is one of the ways Big Data analytics can be used to charge differential payments in the banking and insurance sector.

3. Stock exchange or share price movements of particular companies can never be accurately predicted through any kind of fundamental or technical analysis. Using big data analytics in this field can aid or at least enable us to capture the effects of repeated phenomenon. For instance data about the past 50 year performance of Tata motors can help us measure the movement of stock with respect to specific events like festivals or economic crisis or natural calamities and reliable estimates using this data can be made to predict stock movements of this script during the next period of economic recession or festival.

IV. CONCLUSION

Big Data Analytics is a technique that apart from the minimal investment required in data scientists and other resources, can lead to enhanced margins without any change in other aspects of the business. The sheer ability of identifying the invisible trends in a business or understanding precisely what and when the consumer needs, only because we are dealing with such a large amount of data that patterns are automatically generated and valuable insights can be obtained. Big data analytics is currently at the peak of its hype and excitement cycle as a phenomenon and hence this is the best time to enter the market and yield the advantage big data offers before it becomes so commonplace that the offered edge will be lost.

V. REFERENCES

- [1] Viktor Mayer-Schonberger, "Big Data a revolution that will transform how we live work and think"
- [2] Nathan Martz, "Big Data : Principles and best practices of scalable realtime data systems"