



# The Importance of Data Science in Technical Industry with Special Reference to Hardware/Software Industry

DOI 10.5281/zenodo.570019

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**Abstract:** The data is converted into information from long time ago. Information is the key for any business to excel and overcome to competitions. Earlier the data was not so large and it was computed and converted into information. As the industry grows and with the growing need of demand and supply in comparison to increasing population of the world. Companies are strategically focusing on the information so that they can make the best strategy to win. The new flavor of the old win named as “Data Science” which is dedicated to computing data and extract the valuable information for formulating strategies. In this paper first we discuss about data science and how it is beneficial for technical industry with special reference to hardware/software industry.

**KEYWORDS:** Data science, machine learning, AI, analytical tools, hardware /software parts, data analysis, result, application.

## I. INTRODUCTION

In today's world, data present everywhere. The data is converted into information from long time ago. Information is the key for any business to excel and overcome to competitions. Earlier the data was not so large and it was computed and converted into information. As the industry grows and with the growing need of demand and supply in comparison to increasing population of the world. Companies are strategically focusing on the information so that they can make the best strategy to win. The new flavor of the old win named as “Data Science” which is dedicated to computing data and extract the valuable information for formulating strategies. With the help of “Data Science” the technical industries can easily track our data for example where we go, when we go, what we buy, what we searching online, what we share, what we click, and who are our friends etc.. Scientist and researchers are continuously working on it and exploring the probabilities to get the full adoption of this new technology. In this paper first we discuss about data science and how it is beneficial for technical industries. We will also discussed that which type of technology

and tools are used for data science. In this paper we take an example of DELL Laptop with special reference to hardware/software industry. We collect the data from different vendors and then analysis will be done.

## II. DATA SCIENCE

Data Science is a buzz word. It is a dominant and emerging branch of Science and technology for the modern era. This branch of engineering and science is the combination of data mining (processing, analyzing storing data), probability, statistics, algorithm, computer science, imagination and art of creating unimaginable. The idea of data science came from word 'data' (Big Data) that can be turned into various products, application and solution. It is used in almost every field like commerce, health, education etc. Data Science is still an early beginning of growth stage of its advancement. Data Science is prominent field which involves automated process to analyze huge volume of facts and data. This branch incorporates the set of field which include processing, modeling, statistics analysis, mathematics, advanced computing, social science, business, information and computer science design. It is difficult to manipulate the messy data which is available on large scale i.e. big data. Data is rising and is ever present. Now a days we collect data generated from android device, sensors, mobile phones, web records, detectors, gadgets, satellites and convert it into digital.



Fig.1. Methodology used in Data Science  
Source: [https://goo.gl/images/rVu8v\[1\]](https://goo.gl/images/rVu8v[1])

### III. IMPORTANCE OF DATA SCIENCE IN TECHNICAL INDUSTRY

With emerging technology the growth rate of industries, companies and the individual in the era of source of information depends on how rapidly and satisfactorily utilize a large quantity of data into particular commodity or product. And approach towards the invention of new technology. Whether its for processing millions or trillions of data into an actionable form. Data science allows the technical industry to collect the data from almost everything. The data has always been around us. The technical industry have the ability to collect more data at a faster rate and to do something with it.

With the fast improvements and advancements in technology with the help of hardware/software and computing resources etc., the technical industry can be able to gather ample data from almost everything for example: with the help of smart phone the companies traces of your movements and locations, when you searching online then your online search behavior is stored, even which serial, movie, channel etc. you like and how you use television can be captured, when you shopping from superstore/shopping malls what item(s) you purchase and how to purchase everything is recorded, how and where you walk in the city everything is monitored by CCTV and so on. The technical industry can be captured our data from everywhere and all the time without us noticing it.

Therefore the technical industry is pulling in massive amounts of data from users on mobile apps and websites, tracking where they go, when they go, what they buy, what they share, what they click, and who their friends are. They are in the perfect position to use this data to “predict the winners” [3].

With the help of technology like Machine Learning, Artificial Intelligence (AI), Data Mining and allied fields help in providing systematic and scientific methods to provide useful

insights, predictions, recognitions and analytical solutions from this gigantic data. Hence we can combine two ideas together and say “Data Science” is important.

1. Data Mining: It is the method of sorting via large volume of dataset to recognize, identify and develop the relation to solve puzzling through the analysis of big data.

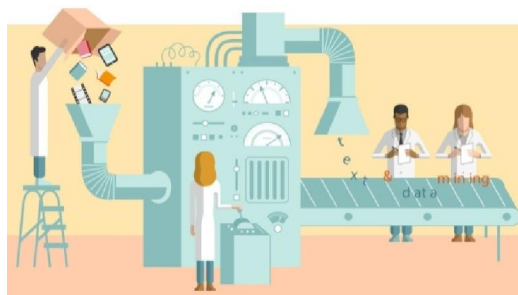


Fig 2. Data Mining

Source: [https://goo.gl/images/ookEm5\[2\]](https://goo.gl/images/ookEm5[2])

It has various parameters:

- Association Rate
- Database
- Algorithm
- Classification
- Predictive Analysis
- Clustering

The concept of Data Mining is growing popularly in every organization present.

2. Machine learning is a subset of artificial intelligence (AI) that provides computers with the ability to learn without being explicitly programmed. Machine learning focuses on the development of computer programs that can change when exposed to new data. The process of machine learning is similar to that of data mining [4].

It is a big part of a "Data Science. It is a set of algorithms that train on a data set to make predictions or take actions in order to optimize some systems. It uses an algorithms to learn from data sets. Algorithms are essentially a series of steps that lead to the completion of a task. With the help of data and algorithms, machine learning technologies make intelligent predictions or perform actions.

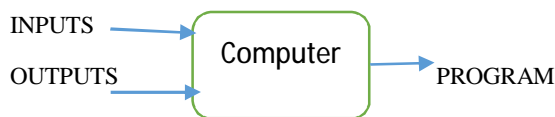


Fig 3. Machine learning



3. Artificial intelligence (AI): AI is a building technology that behaves like a human. In our smart and connected world, machines are increasing learning to sense, learn, reason, act and adapt to the world. AI is the programming that learns by events and reprogramming the devices according to the last seen pattern and not by already programmed instructions it is a kind of learning by experience, it advances time by time and event by event and, recognizing the pattern of the events etc. machine will improvise and work for human beings, but when they follow similar pattern of doing monotonous things and while continuous upgradation in the learning pattern of AI could be threat for human beings it is somewhat shown in science fiction movies. AI is the continuous learning process in which machine learns the pattern of the events and upgrade itself for the future events [5].



Fig 4. Artificial Intelligence

Source:[https://www.edx.org/course/artificial-intelligence-ai-columbia-x-csmm-101x-0#!\[6\]](https://www.edx.org/course/artificial-intelligence-ai-columbia-x-csmm-101x-0#![6])

#### IV. NEED OF DATA SCIENCE TOOLS IN TECHNICAL INDUSTRY

Profitable business is always a driver of technology, and data science is no different. Big data has the potential to be mashed into data sets to understand customers much better than relying on those unscientific experts who make a best guess on hunches and past experience. Instead of guessing at what to recommend to a customer, businesses can use data sets that tell them exactly what a customer wants depending on the season, weather, past purchases, geographic location, and life events [7].

Netflix and Amazon are well known example for their powerful recommendation engines that use not only what people want to buy, but also what they look at. Netflix had been growing quickly since its inception in 1998 and it had a fresh approach to an established industry. It had a strategic competitive advantage in the form of reams of digital data at its fingertips and a hunger to bring to bear the best data science techniques available. The clever people at Netflix developed an algorithm into which they could input the film views and reviews of all of their customers. The algorithm would then make a good guess

at what additional films any particular user was likely to enjoy. Data Science was putting money in the bank for Netflix [8].

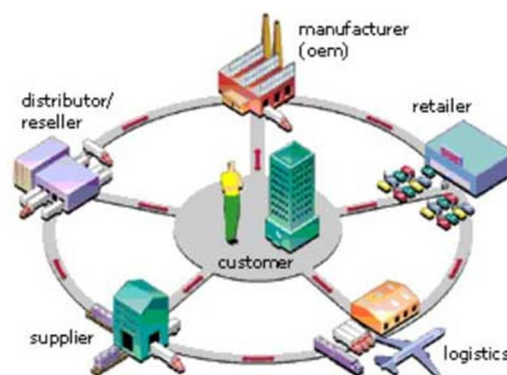


Fig 5. Business Cycle

Big Business, it turns out, really needs Big Data. And because of that, the tech industry is needed to harness the power of data science into something usable. Someone must create the apps and systems and algorithms that power these data-driven customer targeting engines [9].

#### IV.I. Tools used in data science

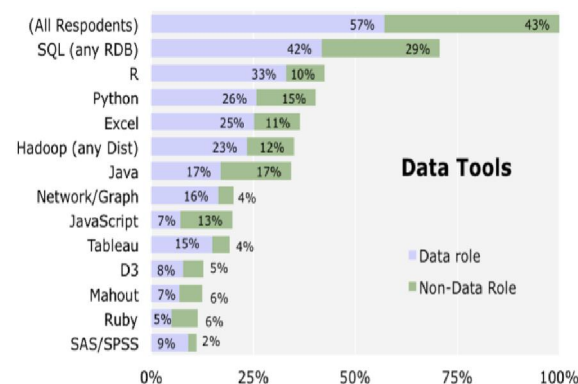
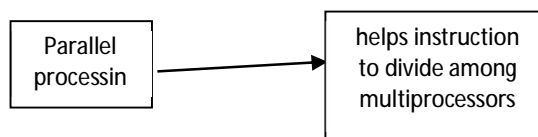


Fig 6. Data Science Tools

Source: <http://goo.gl/images/KcxZ0J>[10]

1. R - R is most popular software package which is used to calculate math and visualization of results after collecting data. It is statistical modeling language which is freely available to users. It can undertake functionalized task like text analysis, speech analysis and genomic science. Now it has been upgraded for handling big data and parallel processing techniques. It includes-

- Parallel - This feature helps R take advantage of parallel processing.









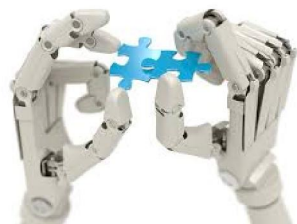


Fig 8. Emerging trends in data science

Source: [http://encrypted-tbn3.gstatic.com/images\[12\]](http://encrypted-tbn3.gstatic.com/images[12])

- Helps in fighting with crime via data
- For price comparison
- Predict flight delay
- Helps to solve fraudulent and in risk detection.

## VII. PROS AND CONS OF DATA SCIENCE

### Pros -

- Large volume of data collected contribute in wide level for various causes.
- It uses various field like programming, machine learning, statistic, computation, probability. For which claim is to predict to grow and cultivate rapidly.

### Cons -

1. A large allocated amount of time is spent on analyzing and learning the data which is not existing.
2. Less probability of scope for longer investigation researches.

## VII. FUTURE SCOPE

Here we are discussing about how helpful is data science and has wide range of applications in every field.

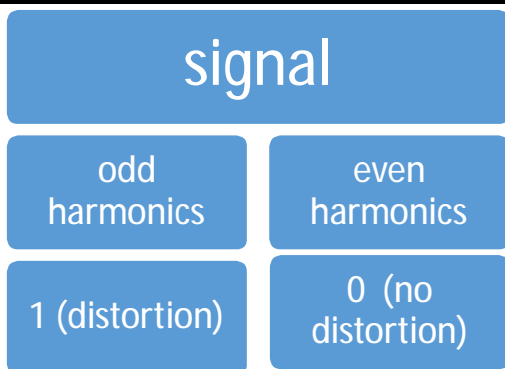
- Evolution - Within sixty or hundred years we can say that new set of new sets of creatures are going to emerge. There organisms will be very difficult from the present ones. They will be completely artificial in the way they will be designed by the technology. As the data rising day by day it shows that coming generation will be based on artificial intelligence. This will create an enormous change in the field of coming evolution.



Fig 9. Future of Data Science

Source: [http://24.media.tumblr.com \[13\]](http://24.media.tumblr.com [13])

- Molecular Randomness - This will help in the prediction of deformation in atomic and molecular structure. In simple words we can say that the understanding of physical as well as molecular structures and material properties along with the deformities will be easy.
- Product Development - In this emerging trend of Data Science and Big Data is helping the engineering driven techie to develop various product by utilizing cloud based on Hadoop, SAS, machine learning and data analytics. This will be useful for startups.
- Sensex - As the data is generated every second it grows. Every company's people take decision for investment on shares. By using the collected data by big data the probability in share market and banking sectors increases. Hence profit can be increased.
- Power harmonics - As we know that removal of high order harmonics we use various kinds of filters but it is difficult to remove low order harmonics by using these filters. So for the removal of low order harmonics we can use data science and save energy. Thus we gate distorted free power signal. Which will work on predictive analysis and machine learning. It can be done by an algorithm, which will feed in the system software and by using this we will be able to find harmonics of low order which filter cannot remove.



#### Algorithm

1. Start
2. Declare variable H (Integer), B (Integer).
3. If  $(H \% 2 == 0)$ 
  - a.  $B = 0$ 
    - Else if  $(H > 5)$
    - $B = 0$
  - i. Else
  - ii.  $B = 1$
4. End

According to this when system displays output 1 which means signal is distorted (harmonics). When it displays output 0 it means signal is distortion free. When output 1 is generated that particular pace of an electrical signal get detected and pure signal will be sent for the transmission. So by using predictive analysis pure electrical signal and distorted signal can easily be identified.

Weather Forecasting - Data Analytics can be helpful in weather forecasting. Researchers uses the collected data and utilizes it for describing the science of atmosphere and to create computational mathematical models. It will help in prediction of floods, drought, hurricanes and save millions of life and property loss.

#### IX. CONCLUSION

To conclude this it can be said that in this emerging field of engineering science and technology. Data science is the art of using the data effectively. It has immense probability to bring a change in coming era. Build the future to smartest tech. Its scope are huge and beyond our imagination. We suggest that the world explores its full potential and utilize it for the humanity and all over the development of nation.

Through this idea we have emphasized more in hardware & software domain so that they will be able to earn profitable to manage the product cost & features. Here we have successfully collected data from different vendors, the leading and emerging

brand which hold highest position in the global market. Through this research we concluded that price range between Rs.25001-35000 holds peak value. More numbers of customers are attracted towards this price range. Second best preference is hold by the customers who can afford to the price range of Rs.35001-45000. The laptop range of Rs.25000 & 45000-60000 are the least priority of customers. These are the market analysis of software & hardware products will help the company to manufacture their product according to the demand of the consumer. We have analyzed the data this will help the company to design their products whether it is hardware or software parts like Processor, RAM, ROM, Hard disk and many other parts. This data will not only help the specified company but other company also get benefited from this. Our idea will create revolution in product comparison, marketing analysis. Through this we successfully be able to predict the probability of customer choice towards particular product. According to the analysis of above data we concluded that company should design a device with these characteristics like processor i3 with system memory 4GB,8GB and storage capacity to 251GB-500GB in minimum cost price i.e. Rs. 25001-35000.

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