Fourth Industrial Revolution and Data Science: General Overview

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Abbreviated abstract: Data is increasingly building upon who we are, who we know, where we are, where we have been and where we plan to go. Mining and analyzing this data lets us understand and predict how people behave at the individual, group and global level. These swathes of new digital data are as valuable for statistics. However, the volume and variety of data have far outstripped the capacity of manual analysis. As data continue to grow in size and complexity, new algorithms need to be developed so as to learn from diverse data sources. Data Science is a combination of multiple disciplines that use statistics, data analysis, and machine learning to analyze data, and extract knowledge and insights from it. This paper gives general overview of big data revolution, the concept of data science.

Related publications:

– **Popoola et al,** The Concept of Data Science in the Era of Big Data. *International Journal of Research, Volume 09 Issue 07, 44-54* (2022)

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The concept of the Fourth Industrial Revolution

- It as an exponential growth of several key technological fields' concepts, such as intelligent materials and block chain technology
- A name for the current trend of automation and data exchange in manufacturing technologies, including cyber-physical systems, the Internet of things, cloud computing and cognitive computing and creating the smart factory.
- A world where individuals move between digital domains and offline reality with the use of connected technology to enable and manage their lives
- The 1IR changed our lives and economy from an agrarian and handicraft economy to one dominated by industry and machine manufacturing. Oil and electricity facilitated mass production in 2IR industrial revolution. In 3IR, information technology was used to automate production
- 4IR is building on the Third, the digital revolution that has been occurring since the middle of the last century. It is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres.

i. reduce barriers between inventors and markets due to new technologies such as 3D printing for prototyping
ii. increasing trends in artificial intelligence, Robotic, Electric Car, Ultra-Fast Train ,Drive less cars etc

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Fourth Industrial and Data Revolution

- At its core, data represents a post-industrial opportunity.
- We create 2.5 exabytes [10^{18}] bytes of data every day
- 90% of the data in the world created in the last two years
- Through the use of internet, social media, commercial transactions, digital images etc.
- In 2020, the digital universe was estimated to consist of 44 zeta-bytes of data, predicted that by 2025, approximately 175 Zeta-bytes data would be created every 24 hours worldwide
- **Big Data is a collection of data sets so large and complex that it becomes difficult to process using on-hand database management tools or traditional data processing applications**

Figure 1 – Annual Size of the Global Datasphere

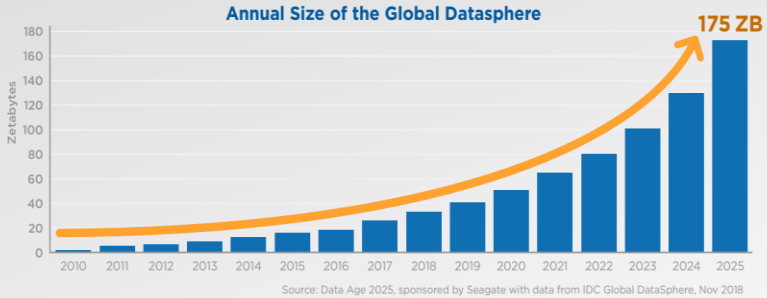
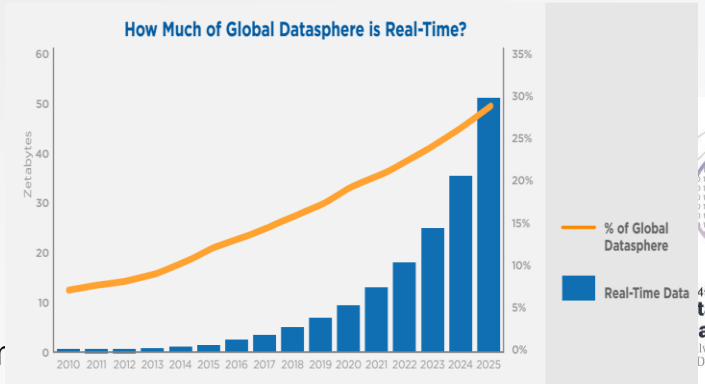


Figure 8 - Real-Time Data



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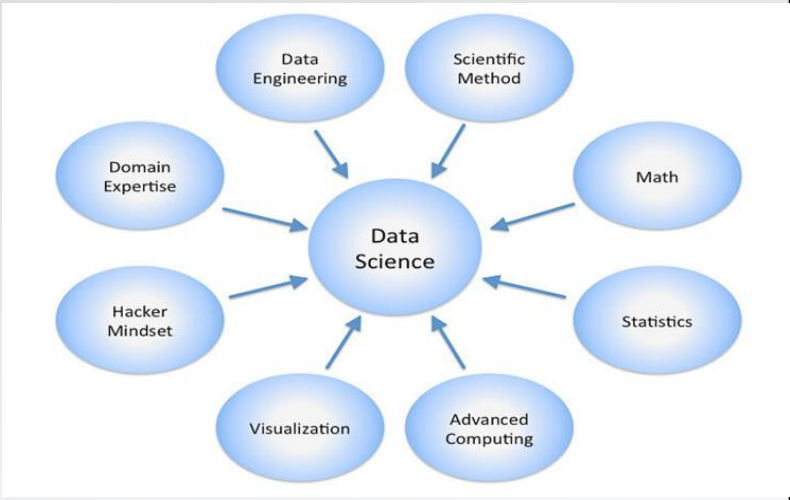
Data Science General Overview

- What do we do with all of these data? How do we make it useful to us? What are it's real-world applications? These questions are the domain of data science
- The volume and variety of data have far outstripped the capacity of manual analysis. As data continue to grow in size and complexity, new algorithms need to be developed so as to learn from diverse data sources
- Data Science is a combination of multiple disciplines that use statistics, data analysis, and machine learning to analyze and extracting meaningful insights from the complex and large sets of data.
- It is a blend of various tools, algorithms, and machine learning principles with the goal to discover hidden patterns from the complex and large sets of data.



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