Impact Of Data Science In Business

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- To start, you might try wrapping your head around just how much raw data humans have put out into the world.

- The exact figure is not known, but an article published on Seed Scientific in October 2021 estimated that there were 44 zettabytes of data in the world in 2020.

- It further estimated that 2.5 quintillion more bytes of data are created daily.

- By 2025, the amount of data generated each day is expected to reach 463 exabytes globally.

- For scale, there are one million bytes in a megabyte (MB), and one billion bytes in a gigabyte (GB).

- One quintillion bytes are equal to one exabyte, and one thousand exabytes equal one zettabyte.

- One would need a big head, indeed, to wrap around that much data.

https://bi-insider.com/posts/data-science-overview/
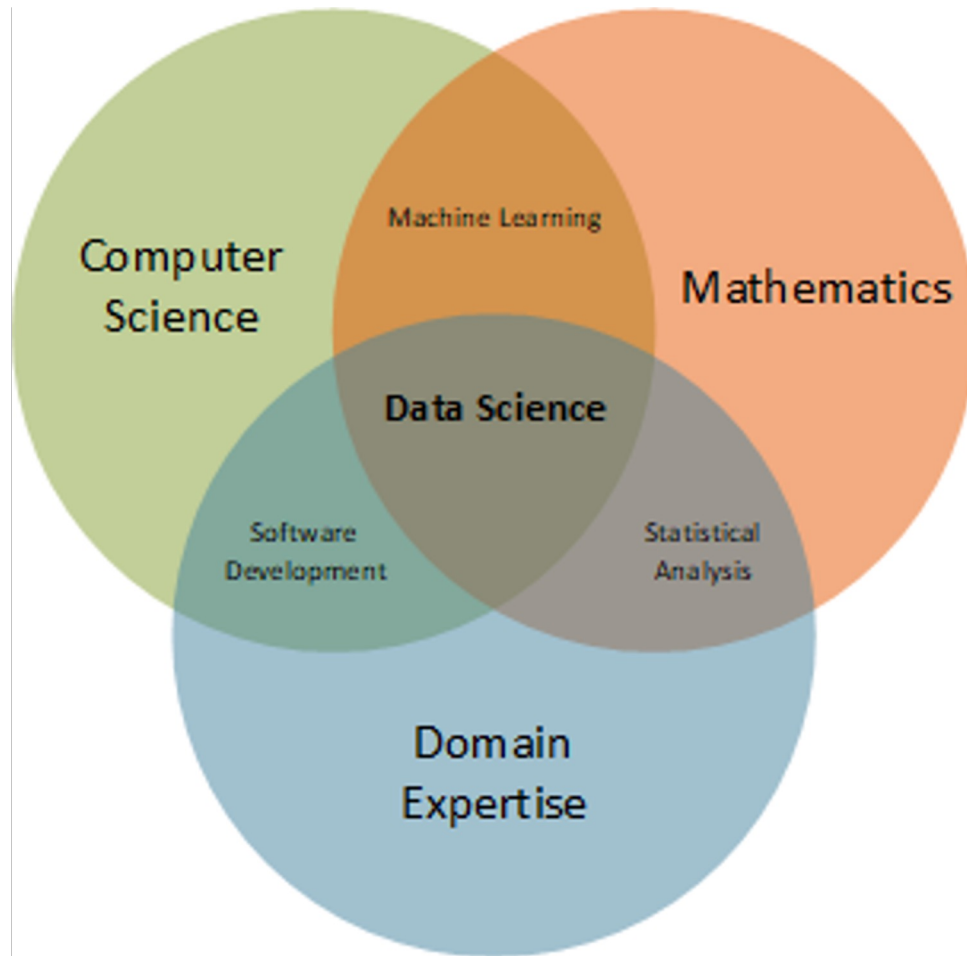
Disciplines That Create Data Science

- Basic disciplines within data science:
  - Computer Science: Encompasses both the theoretical study of algorithms (i.e. well-defined procedures that allows a computer to solve a problem), and the practical problems involved in implementing algorithms in terms of digital computer hardware and software.
  - Mathematics: The study of the measurement, properties, and relationships of quantities and sets, using numbers and symbols including arithmetic, algebra, geometry, and calculus.
  - Domain Expertise: Deep understanding and knowledge in a specific business area, business process, business area, business function, or technical subjects for a project or program.

Disciplines That Create Data Science

- Cross-functional disciplines within data science:
  - Machine Learning: An application of artificial intelligence that provides systems the ability to automatically learn and improve from experience without being explicitly programmed.
  - Statistical Analysis: Science of collecting, exploring and presenting large amounts of data in order to discover probability, relationships, correlation, and trends.
  - Software Development: Process of designing, programming, & deploying executable computer programs for the purpose of accomplishing a specific computing task.

MAKING DATA
ACTIONABLE
FOR DATA SCIENCE

Source: https://towardsdatascience.com/

Predicts Trends and Customer Behavior

- Predictive models are essential business tools.

- Data scientists organize huge swathes of historical data and utilize it to inform planning processes, thus helping businesses make informed decisions about the future.

- **It's possible, for example, to determine peak customer shopping times and adjust staff levels accordingly**, or to identify early buyer trends and implement appropriate promotional campaigns.

Enables Competitor Research

- As much as companies value data that helps them understand their customers and internal processes, they're also eager to gain an edge over their competitors.

- **Data scientists are responsible for understanding and gleaning insights from data about competitors.**

- Effective competitor research helps businesses make competitive pricing decisions, reach new markets, and stay up to date with changes in consumer behavior.

Case Studies

1. [How Pfizer Is Using Artificial Intelligence Technology [Detailed Case Study]](#)

2. [How Does Amazon & Netflix Personalization Work?](#)

3. [Case Study: Unilever's Integration of AI in the Supply Chain - AIX](#)

4. [The Evolution and Scaling of Predictive Maintenance: A Comprehensive Overview](#)

5. [Deploying Generative AI In Wealth And Asset Management](#)

6. [UPS Routing Software (ORION): Does it Really Help Drivers Manage Their Work Efficiently?](#)

Data science and machine learning are having profound impacts on business.

Gartner research director Erick Brethenoux explains the five categories of impact and provides real-world examples taken from the worlds of government, sport and business.

Innovation: Foster new thinking and business disruptions based on data science

" Data scientists hold the key to unveiling better solutions to old problems"

Moneyball

- One example, popularized by the film and book Moneyball, showed how old ways of evaluating performance in baseball were outperformed by the application of data science.

- One baseball team used data science techniques to overcome its financial disadvantage.

- It achieved this by using analytics to identify high-performing players who other teams had overlooked using traditional methods, and therefore acquired their services at a relatively low cost.

- The result was that the team regularly beat higher-spending competitors in their league.

Moneyball

- The "Moneyball" concept has evolved significantly since 2003.

- Today, data science and analytics are deeply ingrained in professional sports, with advanced metrics, player tracking technology, and sophisticated modeling influencing nearly every aspect of the game.

- Teams now employ specialized data science departments, utilize machine learning algorithms, and leverage insights from vast datasets to optimize decision-making.

- This includes strategies like:

  o Player recruitment and evaluation: Identifying undervalued players based on advanced metrics and performance indicators.

  o Game strategy and tactics: Optimizing pitch selection, defensive positioning, and offensive approaches based on real-time data analysis.

  o Injury prevention and performance optimization: Analyzing training data and movement patterns to predict injury risk and optimize player workload.

UPS ORION

- Another example is that of a multinational package delivery company, UPS.

- Its On-Road Integrated Optimization and Navigation (ORION) system used data science to figure out how to significantly change the routing of its delivery trucks using many new data sources.

- The impact was hundreds of millions of dollars of savings and an improved customer experience.

Exploration: Explore unknown transformative patterns in data

Japanese Maritime Services

- Data scientists should be encouraged to make "big data expeditions" where there is no clear objective other than to explore the data for previously undiscovered value.
- For example, Data scientists at a Japanese maritime services provider realized that when providing their traditional services for ship classification, they were collecting a valuable store of data that had great potential in other areas.
- Ship classification data might include detailed information about the performance and maintenance history of different types of ships, fuel efficiency, navigation patterns, and operational practices.
- Applying the right analysis to this data meant that ship operators could reduce equipment failures and lifetime maintenance costs by 10%.
- This allowed the organization to quickly increase its market share by 20% when offering this value-added service to customers.

Prototyping: Challenge the status quo with radical new solutions

- " Data science is already changing lives for the better — or even saving them"

- A U.S.-based police department that needed an efficient automated way to pull actionable insights from a huge volume of crime data.

- The predictive analytics solution put in place generated crime "forecasts" that optimized deployment of police forces, reducing the murder rate by 35% and robberies by 20% year over year.

- The estimated ROI of these impacts was 863%.

- Automated analysis of various disease symptoms and medical test data is another common area where the application of data science is already changing lives for the better — or even saving them.

Refinement: Continuously improve existing processes and products

- " A deeper dive by a data science team can uncover something interesting about what is really happening

- Zurich Insurance, which reduced the inefficiencies around handling injury claims by using an **artificial intelligence (AI)** solution to fully automate injury report assessments.

- It leveraged AI to fully automate the medical report evaluation so that human agents could focus on value-added activities such as negotiating with the counterparty.

- The time to assess a medical report was cut from one hour to just a few seconds, saving $5 million per year.

Firefighting: Identify the drivers of certain undesirable situations

o For example, a rise in customer complaints or a rapid drop in profitability. In these narrow cases, the data science team has to identify only the cause, which limits the range of datasets it needs to analyze.

Questions?