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Fundamentals of deep data science

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Abstract
The present study reports the fundamentals of deep data sciences and their emerging roles across the globe. The influence of deep data science plays important roles in information science. The tools and softwares designed using big data science are creating huge impact on the society. Keeping these into consideration, the study reports the beneficial aspect of it along with basic information.

1.Introduction

Deep data science is one of the branch of data science that has little if any overlap with closely related fields which we know such as machine learning, computer science, operations research, mathematics, or statistics. In addition, classical machine learning and statistical techniques such as clustering, density estimation, or tests of hypotheses, have model-free, data-driven, robust versions designed for automated processing as in machine-to-machine communications, thus these techniques also belong to deep data science. In few cases note that unlike deep learning, the deep data science is not the intersection of data science and artificial intelligence. however, the analogy between deep data science and deep learning is not completely meaningless, in the sense that both deal with process like automation [1-4].

2.Tools for Deep Data Science

- Reporting and Business Intelligence
- Predictive Modelling and Machine Learning
- Artificial Intelligence

3.Business intelligence reporting

Business intelligence reporting or BI reporting is the process of important gathering data by utilizing different software and tools to extract relevant insights. Ultimately, it provides suggestions and observations about business trends, empowering decision-makers to act. Online business intelligence and reporting are closely connected. If you gather data, you need to analyze and report on it, no matter which industry or sector you operate in. Consequently, you can develop a more strategic approach to your business decisions and gather insights that would have otherwise remain overlooked. But let's see in more detail what the benefits of these kinds of reporting practices are, and how businesses, whether small or enterprises, can develop profitable results.

4.Benefits Of Business Intelligence And Reporting

Increasing the workflow speed:

Managers, employees, and important stakeholders often can be stuck by waiting for a comprehensive BI report from the IT department or SQL developers. Especially if a company connects its data from different data sources. The process can take days, which slows down the workflow. Decisions cannot be made, analysis cannot be done, and the whole company is affected. Centralizing all the data sources into a single place, with data connectors that can provide one point of access for all non-technical users in a company, is one of the main benefits a company can have. The data-driven world doesn't have to be overwhelming, and with the right BI tools, the entire process can be easily managed with a few clicks. One additional element to consider is visualizing data. Since humans process visual information 60.000 times faster than text, the workflow can be significantly increased by utilizing smart intelligence in the form of interactive, and real-time visual data. Each information can be gathered into a single, live dashboard, that will ultimately secure a fast, clear, simple, and effective workflow. This kind of report will become visual, easily accessed, and steadfast in gathering insights [5-7].

5.Implementation in any industry or department:

Creating a comprehensive BI report can be a daunting task for any department, employee or manager. Main goals of writing successful, smart reports include cost reduction and improvement of efficiency. One business report example can focus on finance, another on sales, the third on marketing. It depends on the specific needs of a company or department.

6.Utilization of real-time and historical data:

With traditional means of reporting, it is difficult to utilize and comprehend the vast amount of gathered data. Creating a simple presentation out of voluminous information can challenge even the most experienced managers. Initial reporting in business intelligence is a seamless process since historical data is also provided within an online reporting tool that can process and generate all the business information needed. Artificial intelligence and machine-learning algorithms used in those kinds of tools can foresee future values, identify patterns and trends, and automate data alerts.

7.Customer analysis and behavioural prediction:

There is no company in the world which doesn't concentrate on their customers. Customers have also become more selective towards buying and deciding which brand should they trust. They prefer brands "who can resonate between perceptual product and self-psychological needs." If you can tackle their emotional needs, and predict their behaviour, you will stimulate purchase and provide a smooth customer experience. BI reports can combine those resources and provide a stimulating user experience. The key is to gather information and adjust to user needs and business goals.

8.Operational optimization and forecasting:

Every serious business uses key performance indicators to measure and evaluate success. Few countless KPI examples to select and adopt in a strategy, but only the right tracking and analysis can bring profitable results. Business intelligence and reporting are not just focused on the tracking part, but include forecasting based on predictive analytics and artificial intelligence that can easily help avoid making a costly and time-consuming business decision. Reporting in business intelligence is, therefore, highlighted from multiple angles that can provide insights that can otherwise stay overlooked.

9.Cost optimization:

Another important factor to consider is cost optimization. As every business needs to seriously consider their expenses and ROI (return on investment), often the costs and savings are hardly measured. In the example below, you can see an interactive calculator that features yearly savings by investing in a business reporting software.

10.Informed strategic decision-making:

Whether you're a CEO, an executive, or managing a small team, with great power comes great responsibility. As someone with corporate seniority, you will need to formulate crucial strategies and make important choices that have a significant impact on the business. Naturally, decisions and initiatives of this magnitude aren't to be taken lightly. That's where reporting business intelligence tools come in. Concerning senior decision-making or strategy formulation, it's essential to use digital data to your advantage to guide you through the process. BI reporting dashboards are intuitive, visual, and provide a wealth of relevant data, allowing you to spot trends, identify potential strengths or weaknesses, and uncover groundbreaking insights with ease [8-10].

11.Streamlined procurement processes:

One of the key benefits of BI-based reports is that if they're arranged in a digestible format, they offer access to logical patterns and insights that will allow you to make key areas of your business more efficient. This is particularly true if you deal with a high turnover of goods or services. And if this is the case, it's more than likely that you have some form of a procurement department. Your procurement processes are vital to the overall success and sustainability of your business, as its functionality will filter down through every core facet of the organization. Business intelligence reporting will help you streamline your procurement strategy by offering clear-cut visualizations based on all key functions within the department [11].

12.Enhanced data quality:

One of the most clear-cut and powerful benefits of data intelligence for business is the fact that it empowers the user to squeeze every last drop of value from their data. In a digital business landscape where new data is created at a rapid rate, understanding which insights and metrics hold real value is a minefield. With so much information and such little time, intelligent data analytics can seem like an impossible feat.

13.What is predictive modelling?

Predictive modelling is a process that uses data and statistics to predict outcomes with data models. Commonly these models can be used to predict anything from sports outcomes and TV ratings to technological advances and corporate earnings. Predictive modelling is also often referred to as:

- Predictive analytics
- Predictive analysis
- Machine learning

These synonyms are often used interchangeably. However, predictive analytics most often refers to commercial applications of predictive modelling, while predictive modelling is used more generally or academically. Of the terms, predictive modelling is used more frequently, which is illustrated in the Google Trends chart below. For instance, machine learning is also distinct from predictive modelling and is defined as the use of statistical techniques to allow a computer to construct predictive models. In practice, machine

learning and predictive modelling are often used interchangeably. However, machine learning is a branch of artificial intelligence, which refers to intelligence displayed by machines [12].

14.Overview

Predictive modelling is beneficial because it gives accurate insight into any question and allows users to create forecasts. For maintaining a competitive advantage, it is critical to have insight into future events and outcomes that challenge key assumptions. Mainly analytics professionals often use data from the following sources to feed predictive models:

- Transaction data
- CRM data
- Customer service data
- Surveyor polling data
- Digital marketing and advertising data
- Economic data
- Demographic data
- Machine-generated data (for example, telemetric data or data from sensors)
- Geographical data
- Web traffic data

Mainly analysts must organize data to align with a model so computers can create forecasts and outputs for hypothesis tests. BI tools provide insights in the form of dashboards, visualizations, and reports. Best process should be put in place to ensure continued improvement. Important things to consider when integrating predictive models into business practices include:

- Benchmark analysis
- Data-gathering
- Data-cleansing
- Analysis
- Evaluating goals and KPIs
- Creating action plans based on analysis
- Executing on plans
- Streamlining processes

15.Applications machine learning

Mainly for organisations overflowing with data but struggling to turn it into useful insights, machine learning can provide the solution. No matter how much data an organisation has, if it can't use that data to enhance internal and external processes and meet objectives, the data becomes a useless resource. These

predictive analytics is mostly used for security, marketing, operations, risk and fraud detection [13-15]. Here are just a few examples of how predictive analytics and machine learning are utilised in different industries:

16.Banking and Financial Services

Here in banking and financial services industry, predictive analytics and machine learning are used in conjunction to detect and reduce fraud, measure market risk, identify opportunities and much, much more.

17.Security

Cybersecurity at the top of every business' agenda in 2017, it should come as no surprise that predictive analytics and machine learning play a key part in security. many security institutions typically use predictive analytics to improve services, but also to detect anomalies, fraud, understand consumer behaviour and enhance data security [15].

18.Retail

Some retailers are using predictive analytics and machine learning to better understand consumer behaviour; who buys what and where? This type of questions can be readily answered with the right predictive models and data sets, helping retailers to plan ahead and stock items based on seasonality and consumer trends – improving ROI significantly [16-19].

19.Artificial Intelligence (AI)

Artificial Intelligence, or AI, has already got a lot of buzz in recent years, but it continues to be a trend to watch because its effects on how we live in future, work, and play are only in the early stages. Other branches of AI have developed widely, including Machine Learning, AI refers to computer systems that were built to mimic human intelligence and perform tasks such as recognition of actual images, speech or patterns, and decision making. AI can do these tasks faster and more accurately compared to humans. Four out of five Americans use AI services in their daily life one form or another form every day, including the navigation application, streaming services, smartphone personal assistants like Google assistant, ride-sharing apps, home personal assistants, and smart home devices. In addition to use, AI is also used to schedule trains, assess business risk, and improve energy efficiency, among many other money-saving tasks [18].

Conclusion

The world is shaping towards the development of digital world and deep data sciences is creating tremendous impact. The over study defines the deep data sciences and its influence on the day to day life. In future much more studies are awaited to reveal more applications.

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