Significance And Applications of Artificial Intelligence in Big Data Analytics

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ABSTRACT

Artificial Intelligence (AI) is the study and development of intelligent hardware and software, and one of the main concerns of the highly specialized and technical ICT research that goes along with AI is the development of software that can reason, acquire information, plan intelligently, learn, communicate, see, and manipulate things. AI also helps big data users to improve and automate complex descriptive and predictive analytical tasks that would be extremely labour intensive and time-consuming for humans to perform. Therefore, letting AI run wild on massive amounts of data could have a significant impact on how data drives our work, travel, and business practices.

Keywords: - Artificial Intelligence, Big Data Analytics, Machine Learning.

I INTRODUCTION

Big data is the term used to characterize the very rapid expansion, accessibility, and use of information in the modern world. Today's leaders and experts face both more possibilities and more obstacles due to the constantly growing amount of structured and unstructured data, its diversity, and its speed of generation via social media, sensor data, and transaction data. As big data has access to more storage capacity, the focus shifts from deciding which records to preserve to considering how to interpret these massive amounts of data. The previous two years have seen the generation of around 90% of the world's data, which has come from classic databases, text documents, emails, meter-collected data, video, audio, stock ticker data, and financial transactions.

According to estimates, only 20% of this data is numerical, meaning that the other 80% is non-numerical. This data comes from a wide variety of sources and channels. Businesses have resorted to artificial intelligence, a branch of computer science that has captured the imagination since its inception, in order to access this data, assess its significance, and devise strategies for using it to their benefit.

The goal of artificial intelligence (AI), often known as "machine learning," is to research and create intelligent hardware and software. The creation of software that can reason, acquire information, plan intelligently, learn, communicate, sense, and manipulate things are among the main issues of the highly specialized and technical ICT research that goes along with it. "Applied AI" (also known as "narrow AI" or "weak AI") and "strong AI," or intelligent software that equals or surpasses human intellect, are distinguished.

From sophisticated toys to assembly line robots, from voice recognition software to medical research, artificial intelligence is used in many different fields and in many different contexts. Finding patterns in data is its most popular use, which is why internet search engines and recommendation websites often use it.

Big data users would be able to automate and improve intricate descriptive and predictive analytical operations that would be very labour intensive and time-consuming if done by humans thanks to artificial intelligence. Big data may function on a scale that is beyond our normal comprehension. Google's search phrase association

between a few search words and the flue, which is said to be the outcome of testing 450 million mathematical models, is a well-known example. Another is Google convert, which is believed to use billions of pages of translations when deciding whether to convert the English word "light" to French as "lumière," which means brightness, or "léger," which means weight. No human could possibly discover or replicate the exact logic underlying the software's decisions due to the enormous number of calculations it performs on such enormous volumes of data.

However, despite popular culture's portrayal, artificial intelligence is still unable to make judgments for its users. Since AI can only assist people in making choices, it may provide useful approaches for tackling huge data problems:

• Particle Swarm Optimization (PSO) is a computer technique used in data mining that repeatedly improves potential solutions to optimize a given issue, effectively extracting valuable information from huge data. Simple mathematical equations may be used to move these candidate solutions, sometimes known as particles, across a search space. By forming swarms and according to flocking principles, these particles finally enable a particle to reach a place that surpasses the minimum criteria provided to a solution.

• Through agent-based models, economic processes and even whole economies may be simulated in the field of agent-based computational economics, which examines dynamic systems of interacting agents. These models use rules that simulate social interactions and behavior to describe how agents interact, enabling both price fluctuations and behavioral forecasting. For the rules and models to truly represent reality, this technique needs expert engagement. Big data may then be used to provide dynamic, real-time analysis and forecasting.

The way artificial intelligence is used to large data may have a tremendous influence on how data determines our work habits, travel habits, and commercial dealings. From travel time to customer pleasure to the amount of time it will take an able-bodied worker to do a job, more and more elements of our life may become predictable. Additionally, this kind of information might be provided in advance by artificial intelligence, enabling better scheduling, planning, and decision-making. This would provide users the crucial knowledge they need at the appropriate moment to seize the finest chances when they arise. Additionally, obtaining the necessary information depending on interaction context without swiping, pinching, scrolling, or clicking is made possible by connecting the usage of artificial intelligence on big data to responsively built user applications.

II POTENTIAL AND RELEVANCE

The big data industry is still in its infancy but is predicted to increase as businesses and government agencies want to improve their competitiveness by better comprehending the ever-increasing volumes of data. The market for tools and applications based on artificial intelligence is expanding quickly, and artificial intelligence provides the technology and methods to do this. Because the creation and administration of artificial intelligence need highly qualified personnel in a variety of sectors, adoption of this trend may help European businesses as well as the EU economy and labour market.

1. Understanding the artificial intelligence market for big data

The precise scale of the artificial intelligence market is hard to predict. Both the Euro-value estimates of existing and future business and the definitions of what should and shouldn't be termed artificial intelligence are subject to variation. According to The Economist, the analytics and data management sector is valued at over €56 billion and is expanding at a rate of about 10% annually [1]. According to estimates, the potential yearly value of applying big data analytics technologies to European public sector management is €250 billion [2]. It is challenging to determine how much of these analytics may be classified as artificial intelligence, however. Global Industry Analysts predict that the artificial intelligence industry will

surpass €27 billion by 2015 (Figure 1), whereas Mind Commerce rates the market at €700 million in 2013 and expects it to develop rapidly over the next few years [3].

The artificial intelligence market is still in its infancy, despite the fact that it is generally seen as very promising. Following its second and longest academic winter since its inception fifty years ago, the discipline is now recuperating [5][6]. There is a well-known disagreement among artificial intelligence researchers over the true nature of artificial intelligence [7]. But the rise of big data has sparked what amounts to a resurgence of interest in the possibility that AI may have applications outside of academia.
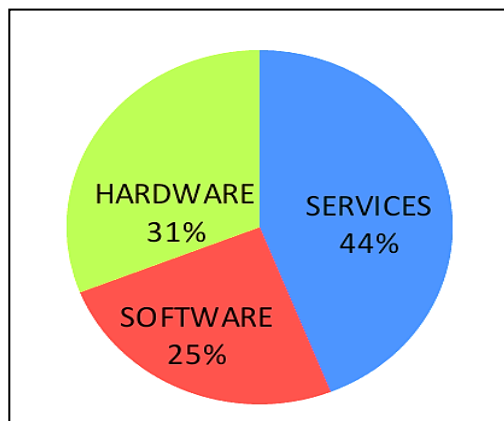

Figure 1: Segmentation of the big data market, 2011

In general, businesses that provide big data infrastructure, software, or expert services make up the big data market. Despite the lack of market statistics, it is believed that the big data market in 2011 brought in around €3.5 billion in revenue from infrastructure, software, and services [8]. Figure 2 displays these sectors' respective market shares. It is difficult to determine what proportion of the €2.4 billion big data software and services

industry, excluding hardware, can be attributed to artificial intelligence.

From sophisticated manufacturing to basic life sciences research, artificial intelligence has applications in a wide range of fields. Artificial intelligence-based methods and technology may be useful in any sector that handles vast volumes of data. By their very nature, artificial intelligence solutions are interdisciplinary, including computer science, mathematics, statistics, and philosophy. While some AI applications have their roots in academia, others were developed by commercial businesses or even individuals who were successful in attracting online clients. Since artificial intelligence technology may serve as the foundation for software that supports, facilitates, and enhances analytics and decision making, there is considerable overlap between the markets for artificial intelligence and analytics and decision-making software. Beyond analytics and decision-making, artificial intelligence technology may also be used for large data applications, such as enhancing and carrying out negotiations or resolving disputes between parties.

Although the businesses in this case study don't now have very high revenue, they all began small and have grown their workforces as their businesses have expanded. Highly qualified experts, the majority of whom have university degrees in mathematics or computer science, create and implement artificial intelligence. We now turn to the four firms we met with to illustrate the industry they operate in and the influence these businesses have on the local economy and society (Table 1).

Table 1: Company case studies

Company	Location	Business innovation	Success signals
Path Intelligence	UK	Footpath technology, mapping 3D visitor journeys to generate data- driven insights into visitor and customer behavior	Entered multiple foreign markets, Winner of several technology awards.

Qlik View	Sweden	Business discovery platform, allowing for associative data exploration	VC funded, entered numerous foreign markets, winners of several awards including the Network Products Guide's 2013 Hot Companies and Best Products Award,
Expert maker	Sweden	Making online interactions with e-commerce customers more intelligent and more precise	In use in major implementations in various industries and in various parts of the world
Cogni Cor	Spain	Complaint resolution and negotiation technology	2012 Most innovative European Startup Award Winner, selected for the Microsoft pre- incubation program.

Retail, transportation, healthcare, telecommunications, and e-commerce are just a few of the industries that might benefit from the innovations created and marketed by these businesses (Table 2). These businesses have a strong global reach and sometimes have physical locations across many nations. Because their solutions are relatively easy to scale, they have been able to develop and extend overseas. They are physically situated close to some of their customers, but, due to the nature of their applications and the amount of customization that may be needed.

The businesses examined in this research demonstrate that it is not unusual for AI technology startups to be located near a university and a number of other tech firms. These businesses eventually establish sales and support offices close to their clientele when their business begins to expand and sales begin to increase. Sometimes this entails setting up a physical presence on the other side of the globe.

Table 2: Examples of the various sectors for artificial intelligence on big data

Company	Sector of Big Data Market	Client Sector
Path Intelligence	Software / Services	Retail, transport, human logistics, entertainment venues
QlikView	Software / SAS / Services	Large variety of sectors, including automotive, health care, education, and banking
Expert maker	Software /SAS	E-commerce
CogniCor	Software /SAS	Telecom

This was the situation with Expertmaker, a business that chose to maintain its technological center in Sweden while establishing a sales and support office in San Francisco to be near its Silicon Valley clientele. Similarly, QlikView, a Swedish company, has established sales and support offices in almost every nation where they do business. Both businesses came to the realization that, although being software-based and hence easily scalable, their technology requires unique user customisation and tailoring, as well as thorough training on how to maximize the advantages of their AI-based solutions.

2. The benefits of artificial intelligence

As intelligent, learning machines carry out tasks that were previously exclusively performed by humans, artificial intelligence has the potential to replace entire departments, improve customer interaction with the company, and give unexpected business intelligence to organizations. Unsurprisingly, both the public and commercial sectors are seeing an increase in demand for artificial intelligence-enabled products.

This report's unique solutions address a range of market gaps and requests for artificial intelligence-driven applications across several industries. In order to improve spatial design, Path Intelligence examines and forecasts human behavior. In order to arbitrate and settle disputes, CogniCor use adaptive learning to make computers engage in negotiations with people. While Expertmaker gives e-commerce company consumers an interaction experience that is comparable to asking questions of a real salesperson who is assisting in finding gift ideas, QlikView's associative experience delivers replies as quickly as users can conceive of queries.

III CONCLUSION

Big Data technology offers enormous potential to use machine learning skills to enable precise decision-making for better performance across all sectors. Numerous machine learning techniques can be applied in the manufacturing sector, but their successful implementation necessitates top management's commitment to facilitate process changes, operational resources' active participation, data availability, and cooperation with academic institutions and technology partners who are knowledgeable about machine learning models and big data technology. Recent advancements in analytics, low-cost sensors, and powerful computing have the potential to revolutionize the sector. The use of big data and machine learning might spur the next wave of innovation and soon be seen as a necessary strategic step in reaching greater optimization levels.

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