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STEM Disciplines Relating to Computers and Their Applications

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ABSTRACT
Big data analysis is a good opportunity to learn more about users and their preferences. The more accurate the infor- mation, the higher the corporate profit. Big data includes unstructured data sets of various kinds: text and multimedia files, metadata, etc. It is virtually impossible to analyses such information using traditional methods. Therefore, modern technologies built on AI, neural networks and deep learning are used for its analysis. Therefore, big data play a big role in the decision-making of companies. Most companies often use big data analysis in their development policies. This article uses an analytical research approach to study the selected topic. The purpose of the study is to analyses the latest articles on big data technology. There was also an analysis of documents related to the idea of companies using big data technologies to improve their business.
Анализ больших данных дает хорошую возможность узнать больше о пользователях и их предпочтениях. Чем точнее информация, тем выше прибыль компании. Большие данные включают в себя неструктурированные наборы данных различного рода: текстовые и мультимедийные файлы, метаданные и т. д. Анализ такой информации традиционными методами практически невозможен. Поэтому для его анализа используются современные технологии, построенные на ИИ, нейронных сетях и глубоком обучении. Поэтому большие данные играют боль-шую роль в принятии решений компаниями. Большинство компаний часто используют анализ больших данных в своей политике развития. В данной статье используется аналитический исследовательский подход к изучению выбранной темы. Целью исследования является анализ последних статей о технологии больших данных. Также был проведен анализ документов, связанных с идеей использования компаниями технологий больших данных для улучшения своего бизнеса.

Keywords: big data, company policy, application of AI in business, new technologies.

Introduction

In the modern world the amount data that is being produced is immense. According to last computations, the amount of data being produced doubles each 18 months, which resembles Moore's Law. Interestingly, Moore was not able to see that his empirical findings about doubling pace of increase in the number of transistors on a chip is actually touching all aspects of information processing and data available in our daily lives. Consequently, in the modern world we a reliving in the world where huge amounts of data are being introduced, while business are trying to utilize these bits in order to grow profits and improve operational performance.

The first occurrence of huge amounts of data were reported in 1970s, when a group of researchers computed that this fugue will rise up to just below 2 trillion bits of data being produced by 2000. Moreover, later it was proved that the amount of data will be increasing and double each two years, which led to a conclusion that availability of data and its production will have a growing trend. This finding laid a foundation for the definition of "Big Data" that were historically established and described as increasing data in terms of its firstly, diversity, secondly, volume, and finally, speed. Moreover, the first issue of Big Data was first witnessed by NASAscientists, who were unable to store the amount of data available for data visualization neither on computers nor onhard disks (Wamba et al. 2017).
In this paper we will show that industries encounter issues with data such as growing amount of unstructured data generated, since fail to transform and analyze data with existing MIS, while integration of Big Data technology helps with this and suggest better insights to decision makers, while insights value grow with the pool of available data, consequently, making it "the more data available, the better insights are produced by the Big Data technology". Furthermore, in order to prove this the paper will firstly, define Big Data and Big Data technology, later suggest special features of Big Data such as volume, diversity, speed, and reliability, and finally, show and discuss how Big Data technology can suggest value for businesses in informed decision making.
The aim of the research is to analyze scientific publications about big data technology that contributes to informed decision making in companies.
Research question: How does big data analytics contribute to informed decision making in companies?
Methodology. This paper aims to study Big Data and benefits it can bring to conventional businesses and firms that rely on massive amounts of data collected from their target environment. In order to do this, we will **rely on an analytical research paper approach**. Analytical research paper approach is useful, complies objectives of this paper since it suggests a question, and relies on information suggested by other researchers in order to provide their viewpoints and later produce a new viewpoint. Therefore, it was decided to study recentarticles on Big Data technology and review the history and development of Big Data as a term. Furthermore, a special focus was given to paper that are linked to the

idea of companies utilizing Big Data technologies in order to improve their businesses, run operations smoother, increase sales, reduce costs, increase market share, or sharpen their competitive edges. This was done in order to gain insights on how companies can benefit from investment in and use of Big Data technologies in order to do more informed decision making and understand the changing market environment in their respective businesses. Consequently, the list of literature stud- ies has shown that majority of material contains the same information and cover the same topics. Therefore, we were able to identify several papers that help us attain this paper objectives. **The practical significance of theresearch** is that the results reflected in the article can beused in further research.

Literature review

According to Wamba S.F, Gunasekaran A., Akter S.,Ren S. Ji-fan., Dubey R., Childe S.J. Big Data as a termand field is a recent phenomenon that occurred in the world of information and communication technologies. Moreover, Big Data is highly expanding and increasingly changing field that is being implemented in many other fields. Currently, many professionals and scholars in the field associate Big Data with current developed technologies that are able to generate huge amount of data that are used in a variety of forms and transfor- mations. This makes a definition of Big Data complex, and that complexity is even more complicated with the development of technologies, where a modern mobile phone can process information that required at least ten computers just 20 years ago (Wamba et al., 2017).

A more formal definition of Big Data is suggested by Small (2016) who stated that Big Data is massive amounts of unstructured data that can be applied for knowing the environment and human experience. Further, he states that Big Data is explained as wide utilization of data that is being harvested by the use of digital technologies, thus, Big Data is currently being employed by firms to research and keep pulse on market dynamics and changes in client's behavior in order to improve efficiency of business operations.

Another definition is suggested by Shabbir and Gardezi (2020) who state that Big Data is about massiveamounts of data that is growing every time and can not be stored modern hardware and software, thus, mostly people rely on variety of technologies in order to store and analyze these unstructured data. This is possible with the recent developments and introduction of thingssuch as social media, high speed and widely available internet, mobile devices with sensors and cameras that are able to generate visuals, all these generate huge amounts of unstructured data that can possess useful in-formation. Thus, Big Data is about massive amounts of various data that are generated from different sources, and current traditional approaches or technologies for itsprocessing owned by firms make it costly or too time consuming in order to get any insights from Big Data.

Big data analytics refers to a set of large amounts ofdata and technologies that are collected from different sources and enable a business to gain an edge over its competitors by improving business performance (Gandomi, 2015).

Goes P.B. defines the concept of big data as huge volumes of numerous observational data used in decision making (Goes, 2014). Schrock and Shockley have described big data as real-time information, a non-traditional form of media data, IT-driven data, social media, and massive data. While "diversity" and "volume of big data" have received considerable attention (Schroeck, 2012). It is appropriate to mention here that analytical skills and tools are important "components" for big data analysis. Sun and Xu define big data analytics as a procedure for accumulating, consolidating, scrutinizing and using large datasets from heterogeneous and autonomous resources to identify patterns and other pertinent information to make better management decisions (Sun, 2015).

Result and Discussion

Research has shown that when it comes to firms benefitting from the use of Big Data at least six different point can be mentioned such as lowering the risk of client loss or improving brand loyalty, personalized pricing or adjusted offers meeting individual needs of clients, automating the call center, automating maintenance processes, improvement or continuous improvements in the existing provided service of the company.

Continuing Big Data is recent term that is character-ized as a set of technologies and structures that can deal (process) with massive amounts of unstructured data. Such technologies and structures enable fast harvesting of data, processing, analyzing in order to get useful insights from the pool of increasingly producing unstructured data. IBM one of the leading business analytics service provider describes Big Data as a technology or system that enables firms to utilize huge amounts of data in order to get insights and produce informed decision making (IBM, 2022). Big Data as a platform contains varieties of technologies and systems for working with massive amounts of structured and unstructured data that often tied to modern technologies that rely on flexibility, set task exploring, discovery, and analyses of data. Furthermore, IBM suggest a systematic vision of characteristics of Big Data and states that factors such as volume of data, diversity of data, speed of processes, reliability of insights gained define Big Data.

Firstly, when it comes to **volume** of data, it is characterized as massive amounts of information that is available for further processing and analyzes. For instance, a single Airbus flight carrier is able to produce 80 terabytes of information in just one hour, while a popular social media such as Facebook 50 terabytes of information.

The second factor defining Big Data is **diversity** that can be found when harvesting massive data. Nowadays, technologies enable firms to receive terabytes of information that often comes in the form of structured, semi-structure, and unstructured data. Possible examples include data harvested in the form of images, information filled in forms, interactions within the internet of things, and other.

The next characteristics of Big Data is **speed** of processes. When it comes to valuable insights generated

from harvested or readily available information it takes time to process and analyze them. In terms of businesses and firms, time is a valuable resources, since market and its characteristics are changing fast. Such massive amounts of data require significant time resources in order to be processed, and firms mostly lack that time.

Finally, the last factor defining Big Data, is the reliability of conclusions drawn from processing of massive data. Huge amounts of unstructured data can create a lot of noise, which in return can influence confusions drawn by creating a bias or suggesting false results. Originally, Big data contained three main pillars such as speed, diversity, and volume of data available, while the reliability of data is a newly added factors as defined by IBM (2022).

Big Data technology enabling more informed decision making for businesses. It is not a secret that BigData technologies and systems enable companies to pro- cess and analyze both structured and unstructured formsof data from various sources. Moreover, this is a prelim- inary reason why big companies and corporations rely on Big Data solutions, since they are able to harvest huge, massive of information from their clients. A good example is Amazon that was able to increase sales by 35% throughits platform by suggesting individually tailored offers that rely on Big Data processing (Wamba et. al., 2017). Interestingly, big corporations and firms are not the only ones to enjoy Big Data solutions, small firms can also utilize Big Data in order to gain insights from still hugeamounts of data they receive and produce more in-formed decision making or improve efficiency of oper- ations while boosting sales or increasing it market share.This can be seen through the revision of Fortune 1000 companies, where almost 9 in 10 companies is investingin Big Data technologies (Wamba et. al., 2017), while a good example of small firms relying on Big Data are call centers. Given this, a review of literature on Big Data application among firms show that there are at least 6 ways in which firms can benefit.

The first benefit of relying on Big Data technologies comes from **lowering the risk of client loss or improving brand loyalty**. Big Data enables firms and corpora- tions to track digital footprints of its clients and under- stand their behavior when it comes to services and prod-ucts they suggest. Big Data for client management can warn the management on any potential risk operations or actions that may lead to a client loss, also it can sug- gest insight on client attraction.

The second benefit of reliance on Big Data is **personalized pricing or adjusted offers meeting individual needs of clients**. By relying on big Data and analyzing the behavior of customers from unstructured data it is possible to model purchasing behavior of customers, thus adjust the product or service suggested according to the wants or expectations of the client. However, such practices may have blurred lines between suggesting personalized product or service to a client or **price discriminating by revealing the preferences** of a client via Big Data technology.

The next benefit to companies from utilization of Big Data technology comes in the form of **automating the call center**. This is possible by processing of already performed interviews and algorithms that can work with human speech. Automated call centers can perform all days and weeks suggest 24/7 and 365 performance, and harvesting the data company needs. At the same time analyzes of unstructured data of clients can suggest bet- ter timing when automated call centers can reach clients(Wang, 2016).

Another benefit suggested by Big Data technology is an opportunity to **automate maintenance processes**of the company. This is applicable in fields where company personnel relies on sensors in order to initiate response or reactive active respectively. For instance, big data can be used to analyze patterns in sensor data and suggest required actions during the process of plant growth. Using visual data and data from sensors it is possible to fully automate plant growth, maintenance and even harvesting. This will add to company's values since it will produce more accurate, 24 to 7 to 365 performance and will erode human factor related risks. Similarly, this approach can be used in order to predict and prevent accidents before (Wang, 2018; Mikalef, 2018).

The final benefit from relying on Big data can be inthe form of **improvement or continuous improvementsin the existing provided service of the company**. Oneof the most vivid and growing application of this kind of benefit is linked to health care services. Previously, doctors were able to determine illness or suggest a cure by merely relying on their knowledge and experience. With growing digitalization of health care services and growing history of cases it is getting more and more possible to rely on these data in order to perform doctor's job via reliance on Big Data processing and analyzes. Consequently, we can view that Big Data technology and systems can be implemented in a variety of ways and these variety will be growing with rising digitalization and development of technology. At the same time, businesses can rely on Big Data in order to achieve better sales, increased market share, reduced loss of clients, and automated or improved operations.

Conclusion

In this paper we have revised Big Data technology and systems. We have provided a definition for Big Dataand found that the there is not clear consensus, but many agree that Big Data is about massive amounts of data that is growing and is often available in unstructured or structured forms via the use of modern technology. At the same time this paper introduced four main characteristics of Big Data technology such as volume, speed, diversity of data, and reliability of produced results.

Moreover, in this paper we covered the benefits of relying on Big Data and investing in it in order to produce more informed decision making in firms and corporations. Businesses mainly witness and face the issues of constantly increasing massive of data with their reach and local environment. Moreover, previously relied on management information systems (MIS) had no opportunity to rely with these massive since time and resources required for processing proved to be not economical, thus managers failed to gain insights from unstructured data. In this case, it was proven that the use of Big Data technology and systems becomes efficient and benefi-cial. Big Data suggests a solution in this case by pro-cessing of unstructured data from various sources and analyzing them. Moreover, the time and resources re- quirements in Big Data is more than feasible. Conse- quently, in this paper we have shown that at least in 6 aspects Big Data can suggests benefits to firms and com- panies. The list of

benefits included lowering the risk of client loss or improving brand loyalty, personalized pricing or adjusted offers meeting individual needs of clients, automating the call center, automating mainte- nance processes, improvement or continuous improve- ments in the existing provided service of the company. Consequently, big data provides company managers an opportunity to process, analyze and extract insights from massive of unstructured data harvested. These insights can be used to produce more informed decision making, improve sales, boost market share, and reduce risks of client loss. Moreover, the pace of increase in the amount of data is increasing with time, while more data can suggest more insight and more accurate results.

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