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Ajith Abraham · Anu Bajaj ·
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Innovations in Bio-Inspired Computing and Applications

Proceedings of the 13th International Conference on Innovations in Bio-Inspired Computing and Applications (IBICA 2022) Held During December 15–17, 2022

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Augmented Analytics an Innovative Paradigm

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Abstract. Business intelligence (BI) and analytics are a set of techniques, methodologies, and tools used in the analysis of business data, which allow users (decision makers) to have a clearer view of the market, leveraging the decision-making process, allowing timely business decisions. Usually BI refers to Extract Transform and Load processes (ETL), Data Warehouse (DW), Data mining (DM), online analytical processing (OLAP), visualization tools, and reports. In turn, the analytics generally uses advanced techniques, providing BI users with Artificial Intelligence (AI) and Machine Learning (ML) techniques. In this context, Gartner introduced the term "augmented analytics" in 2017, making the line between BI and advanced analytics clear. The main objective of this work is to explore the area of Augmented Analytics in the context of BI, through the use of ML and Natural Language Processing (NLP) resources and capabilities, as an innovative paradigm of augmented analytics in the decision-making process.

Keywords: Business intelligence · Artificial Intelligence · Machine learning · Natural language processing · Augmented analytics

1 Introduction

In companies, the volume of data to be processed has grown exponentially, leading to an increasing complexity in decision-making, which in BI is reflected in the increase in efforts to automate data preparation, analysis and visualization, making all these processes increasingly complex, due to the number of variables required, the dimensionality of the data is also increasing, and the existing analytical approaches do not allow obtaining the necessary information for making an accurate decision.

It is in this context that Augmented Analytics arises, making available easy-to-understand and automated dashboards, as well as a descriptive and predictive approach. In fact, it is designed to do research and produce business information automatically, basically without any supervision required. So, actually, decision makers have the ability to use it directly without needing the support of a business analyst or data scientist.

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New technologies are revolutionizing the analysis of large volumes of data. Due to new developments, data can be exchanged and extracted in a distributed environment, whether in a public or private cloud, combining it with data that the company can store in a local environment.

Major advances in cybersecurity are also being made due to technologies such as blockchain. On the other hand, AI and ML are creating hyper-automated environments in data processing and analysis.

This disruptive trend, uses AI, ML, and NLP techniques to transform the way analytics content is developed, consumed or shared, is transforming the entire business universe in the field of data analysis, and the time is right for organizations to embrace a key component of the future of data and take a step forward in business intelligence.

This work explores the area of Augmented Analytics in the context of BI, as an innovative paradigm of augmented analytics in the decision-making process.

2 Augmented Analytics

Augmented Analytics is a relatively new concept, being one of the biggest technological trends for the next few years. Augmented Analytics can be understood as a segment of Augmented Intelligence that automates data processing using ML and NPL [1].

It is important to point out that Augmented Intelligence, is considered the "mother" of Augmented Analytics, and has nothing to do with Artificial Intelligence. The first supports exclusively human decisions, while the second takes the place of human intelligence for autonomous decisions.

Gartner defined Augmented Intelligence as "a design pattern for a human-centered partnership model of people and artificial intelligence (AI) working together to enhance cognitive performance, including learning, decision making and new experiences." [2], and defined Augmented Analytics is "the use of enabling technologies such as machine learning (ML) and AI to assist with data preparation, insight generation and insight explanation to augment how people explore and analyze data in analytics and BI platforms." [3].

Augmented Analytics, uses Artificial Intelligence, ML and NLP, to help with data preparation, as well as generating and explaining insights to increase the way people explore and analyze data [4].

Data Analytics means data analysis. This term refers to the analysis of large volumes of data (Big Data) [5]. As well as its transformation to obtain useful information to draw conclusions that facilitate decision making [6].

By analyzing large volumes of data, companies facilitate the growth of their business, improve their operational efficiency, manage risk better and reduce decision-making time [7].

Augmented Analytics differs from traditional analytics and Business Intelligence (BI) tools by including an Artificial Intelligence component that is constantly running in the background [8]. This AI component allows, through new data, to dynamically alert to the unexpected behavior of a metric, for example. It also allows quick access to knowledge from the processing of large amounts of data, thus helping to discover

hidden ideas, such as unknown unknowns, and to remove human bias, such as unknown knowns.

According Gartner, today BI professionals who do not use Augmented Analytics spend approximately 80% of their time collecting, preparing, and cleaning data [9].

Data analytics ML and NLP algorithms techniques are used in conjunction automatizing BI, and data preparation. As result it is possible to perform robust analysis, exploring numerous relevant information in a small fraction of the time normally used.

This is the only way to get an idea of how technology can contribute to the daily lives of companies. Another aspect that sets it apart from traditional analytics is the ability to include natural language processing and conversational interfaces, enabling the human workforce to interact with data and insights, significantly optimizing productivity and decision making.

By implementing augmented analytics, organizations can democratize the use of data so that all users and executives can make data-driven decisions without the help of data scientists or IT professionals [1, 10].

3 Trends of Data Analytics

According to the specialized company SDG Group Data Analytics, the trends in Data Analytics for 2022, presents in its reports the main trends that will mark the direction of the sector this year, being incredible the interoperability between this great diversity of technologies involved. According to this consulting enterprise, the top 10 trends in Data Analytics for 2022 will be as follows [11]: a new generation of Data Warehouse; unlimited enterprise data management; a customer-centric paradigm; data as a transformational asset; the creation of trust environments based on cybersecurity analytics, blockchain and privacy-enhancing computation; the commitment to self-service 2.0 and the auto ML model; ethical data management; quantum computing and its convergence with advanced data analytics techniques; metaverse and extended reality; and automated creation of new content (Table 1).

Table 1. Trends in data analytics for 2022 (source: [11–20]).

Trends	Description
New generation of data warehouse	Due to cloud computing, companies are adopting new data architectures and structures that are increasingly deeper and scalable. This year we will see a new generation of Data Warehouse due to the architectures Data Mesh, Data Vault 2.0 and Data Fabric, technologies conceived and created natively in the cloud

(*continued*)

Table 1. (*continued*)

Trends	Description
Unlimited enterprise data management	DataOps applies the teachings of DevOps to analyzing and managing data to create predictable results. In addition to managing changes to data, data models and related artifacts. It does so by leveraging technology to automate the delivery of data with the optimal level of security, quality and metadata to improve the usability and value of data in a dynamic environment. DataOps is now evolving to the next level thanks to artificial intelligence and machine learning creating hyper-automation environments
Customer-centric paradigm	A paradigm shift is taking place in which the customer is placed at the center of the shopping experience. The goal is for the customer to have a unique and homogeneous shopping experience wherever they are. As a result, barriers between digital and physical channels will disappear, thanks to hyperconnectivity (IoT, Cloud, 5G). Thus, with data analysis and intelligent process automation, companies offer customized products and services. Using this approach makes it easier to feed artificial intelligence models that are activated in real time
Data as a transformational asset	Data only has value if it becomes a monetizable and differentiating asset, and should be understood here as the set of data, algorithms, practices and information available to a company. Companies that take advantage of the information that this data provides and extract value from it are the ones that differentiate themselves from their competitors
Creation of trust environments based on cybersecurity analytics, blockchain and privacy-enhancing computation	Companies are adopting cybersecurity strategies that provide protection beyond the traditional perimeter. This is a proactive approach to cybersecurity that is identity-based and uses data collection and analysis capabilities (cybersecurity analytics) for faster threat detection. As well as the automation of manual security tasks. This cyber secure environment is also based on Blockchain technology

(*continued*)

Table 1. (*continued*)

Trends	Description
Commitment self-service 2.0 and the auto ML model	These Data Analytics technologies accelerate the adoption of solutions, giving direct access to end users, democratizing access to data and focusing on generating insights. Self Service 2.0 is integrating and leveraging the analytical capabilities of AI-driven models. Auto ML is using visuals and reports to present its advanced algorithms
Ethical data management	The disruption caused by Quantum Computing associated with AI forces us to improve the ethical management of data. After the advances in privacy that came hand in hand with the GDPR, it is now time to ensure ethical and responsible data development. In this line, the new concept of Private AI emerged. In the domain of public administrations or entities where data sharing is complex, encryption is being used to expose the data as little as possible
Quantum computing and its convergence with advanced data analytics techniques	Quantum artificial intelligence could be the next revolution. We are currently experiencing important parallels in the way quantum computing is developing and its convergence with advanced analysis techniques
Metaverse and extended reality	Metaverse is not just a buzzword in the technology sector. The metaverse is an ecosystem that will facilitate the exploration of extended reality. Within this reality we find all the immersive technologies that merge the real world with the virtual world: augmented, virtual and mixed reality. Extended reality is a set of technological resources that will offer users the possibility to immerse themselves in interactive experiences based on the combination of virtual and physical dimensions
Automated creation of new content	Generative AI is one of the most promising developments in the AI environment for years to come, where artificial intelligence is used to train algorithms on conclusions. Generative AI allows computers to automatically recognize underlying patterns related to inputted information in order to generate new original content

4 Augmented Analytics Benefits

Each in its own way, all the data generated is of enormous importance to organizations. The increase in data means that customers are increasingly online and this translates into more opportunities for businesses.

Augmented Analytics offers advantages related, above all, to data accessibility to all types of companies and sizes. Any user of augmented analytics, with a minimum of knowledge about how it works and what it contributes, will be able to obtain relationships and valuable insights from the data stored by the company. Unlike those who do not use it, who will have to choose to go to professionals specialized in data science with very technical profiles. And allows use dashboards in an automatic and understandable way, as well as descriptive and predictive approaches with the same simplicity [1].

With the augmented analytics, analyzes and the predictions that are carried out will be totally impartial, obtaining, in addition, a precise result. This type of analytics offers a wide variety of automations, thus streamlining any data collection, extraction and analysis process.

According to Dataversity [21], we can find the following advantages in implementing augmented analytics in business:

(1) Allows the data scientist and IT community to focus on special strategies and projects.
(2) Augmented data analysis transforms the work of data scientists and automates their algorithms
(3) It promotes better solutions, better forecasts and measurable analysis of products and services.
(4) Spend less time exploring data and more time acting on relevant insights.
(5) Advances in Smart Data Discovery and other sophisticated techniques and solutions can have a positive impact on ROI and TCO.

Regarding the application and benefits of Augmented Analytics, we present the following (Fig. 1): analysis automation; exclusion of reports; change of priorities; assertiveness; better use of time; target audience analysis; and process improvement.

A company with a BI team is continuously analyzing the data generated by the company. However, much of this date does not provide valuable information that can contribute to the income or a return of investment of the company. In addition, the percentage of data that is analyzed is a minimum amount of data from all that the companies generate daily. With increased analytics, experts can encompass much more, offering more and better insights.

All these advantages for companies translate into that decision making has a lower cost, and with this techniques, companies can have more reliable, more varied, timelier and more useful information for their business strategies.

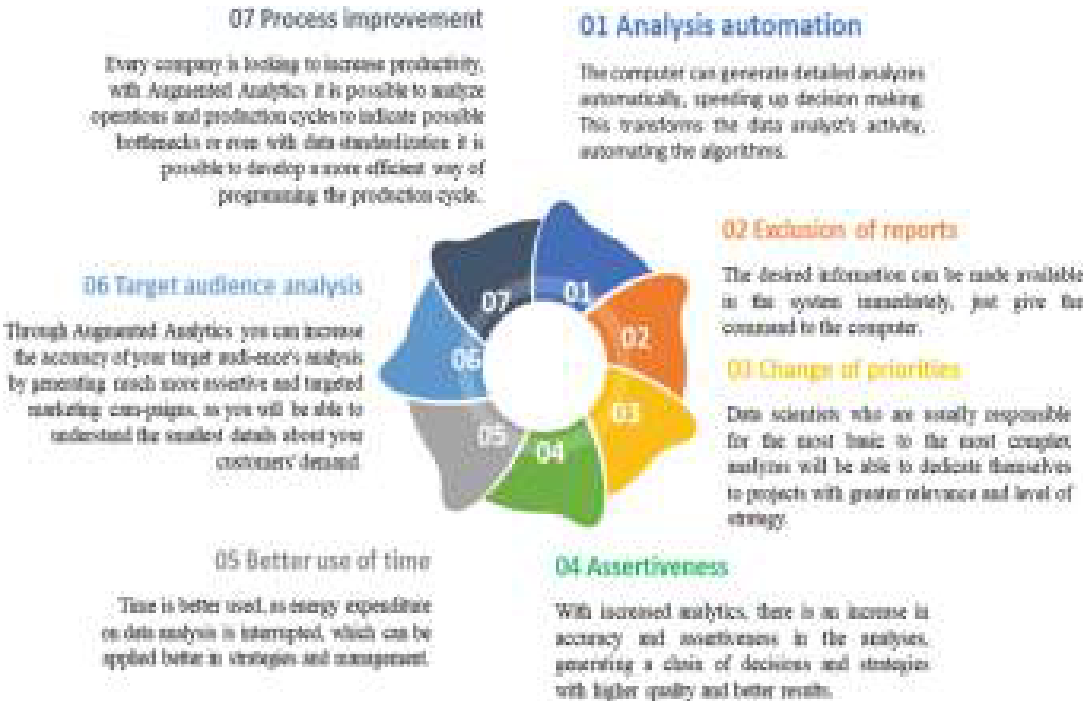

Fig. 1. Application and benefits of augmented analytics.

5 Conclusions

Augmented Analytics at first it may seem like a complex concept, but in reality it is simple to understand. Augmented Analytics is a segment of augmented intelligence that automates data insight through big data, ML and NLP capabilities to revolutionize the way analytical content is created, consumed and shared.

Automation is a feature in augmented analytics solutions, making analytical decision-making reports automatically available to companies, without human intervention.

Augmented Analytics, analyzes large amounts of data, but separates it in an intelligent way, eliminating analysis steps of it. Its technological capacity makes it possible to identify hidden patterns in databases. By creating ready-to-share insights, both the data scientist's life and the state of automation algorithms are made easier.

Augmented Analytics, facilitates the automation of analyses, redefines priorities, eliminates the need for reports, increases assertiveness and improves processes. Enabling decision makers to work more efficiently, accurately, and faster. Being accessible to users with less experience and data skills.

With the use of technology, organizations can become more competitive, reduce costs and optimize results. For the marketing and relationship area, it is a great differentiator as it allows a much deeper understanding of potential customers, at the same time as there is essential agility and productivity in a market that is in full digital transformation.

The estimated growth of the augmented analysis at the global market level for 2022 was S$9.51 billion, representing a compound annual growth rate (CAGR) of 14.43% relative to 2021. US$ 21.70 billion in 2026 (CAGR of 22.90%) [22].

Is time for organizations to embrace this key component of the future of data analytics, and take a step forward in Business Intelligence.

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