

Comparative Analysis of Big Data Computing in Industry 4.0 and Industry 5.0: An Experimental Study

Khusnutdinov Rinat¹, Gaurav Thakur², Manish Gupta³, T. N. P. Madhuri⁴, Shweta Bansal⁵

¹Department of management and innovation, National Research University Moscow State University of Civil Engineering, 129337 Yaroslavskoe shosse, 26, Moscow, Russia

²Uttaranchal Institute of Technology, Uttaranchal University, Dehradun, 248007

³Lovely Professional University, Phagwara, Punjab, India

⁴Assistant Professor, GRIET, Bachupally, Hyderabad, Telangana

⁵K. R. Mangalam University, Gurgaon, India

*Corresponding author: hust1@list.ru

Abstract. A comparison of the use of big data computing in Industry 4.0 and Industry 5.0 was carried out utilizing data collected from the actual world for the purpose of this research. The findings suggest that there has been a 2% drop in the number of faulty items produced in Industry 5.0, coupled with a 1% decrease in the amount of energy used in highly automated companies. According to the findings of the quality control, fault Type B accounts for around 65 percent of the overall defects in Industry 4.0. The results highlight the benefits of Industry 5.0, which capitalizes on human-machine cooperation, data-driven processes, and customized products and services. These insights help to contribute to manufacturing processes that are more efficient, more sustainable, and more quality-driven. Big data computing, Industry 4.0 and 5.0, quality control, and energy efficiency are some of the keywords to look for.

Keywords. Big data computing, Industry 4.0 and Industry 5.0, quality control, and energy efficiency are some of the keywords here.

1 INTRODUCTION

The arrival of the Fourth Industrial Revolution, also known as Industry 4.0, brought about revolutionary shifts in the ways in which industrial operations are carried out. Industry 4.0 is distinguished by the incorporation of digital technology, decision-making that is driven by data, and greater automation. Industry 5.0, on the other hand, is a progression that places an emphasis on human-machine cooperation, individualized production, and highly adaptable manufacturing systems [1]–[4]. The landscape of manufacturing has been completely transformed by both Industry 4.0 and Industry 5.0, each of which represents a different technological paradigm. These revolutions have led to substantial breakthroughs in big data computing, which plays a vital role in optimizing industrial processes, boosting efficiency, and maintaining product quality [5]–[9]. These developments have been brought about as a direct result of these transformations. The convergence of Industry 4.0 and Industry 5.0 with the processing of large amounts of data has significant repercussions for the manufacturing industry. Because to Industry 4.0's emphasis on connection, the integration of sensors, and data analytics, manufacturers are now able to gather, analyze, and make use of enormous volumes of data in order to enhance both their operational efficiency and the quality of their products [10]–[14]. However, when Industry 5.0 emerges as the next phase of industrial development, it adds new components, such as collaborative robots, augmented reality, and

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Communication and Computing Systems B.M.K. Prasad, Krishna Kant Singh, Neelam Ruhil, Karan Singh, Richard O'Kennedy, 2017-02-15 This book is a collection of accepted papers that were presented at the International Conference on Communication and Computing Systems ICCCS 2016 Dronacharya College of Engineering Gurgaon September 9 11 2016 The purpose of the conference was to provide a platform for interaction between scientists from industry academia and other areas of society to discuss the current advancements in the field of communication and computing systems The papers submitted to the proceedings were peer reviewed by 2 3 expert referees This volume contains 5 main subject areas 1 Signal and Image Processing 2 Communication Computer Networks 3 Soft Computing Intelligent System Machine Vision and Artificial Neural Network 4 VLSI Embedded System 5 Software Engineering and Emerging Technologies **Recent**

Advances in Information Systems and Technologies Álvaro Rocha, Ana Maria Correia, Hojjat Adeli, Luís Paulo Reis, Sandra Costanzo, 2017-03-27 This book presents a selection of papers from the 2017 World Conference on Information Systems and Technologies WorldCIST 17 held between the 11st and 13th of April 2017 at Porto Santo Island Madeira Portugal WorldCIST is a global forum for researchers and practitioners to present and discuss recent results and innovations current trends professional experiences and challenges involved in modern Information Systems and Technologies research together with technological developments and applications The main topics covered are Information and Knowledge Management Organizational Models and Information Systems Software and Systems Modeling Software Systems Architectures Applications and Tools Multimedia Systems and Applications Computer Networks Mobility and Pervasive Systems Intelligent and Decision Support Systems Big Data Analytics and Applications Human Computer Interaction Ethics Computers Health Informatics Information Technologies in Education and Information Technologies in Radiocommunications

Challenges and Applications of Data Analytics in Social Perspectives Sathiyamoorthi, V., Elci, Atilla, 2020-12-04 With exponentially increasing amounts of data accumulating in real time there is no reason why one should not turn data into a competitive advantage While machine learning driven by advancements in artificial intelligence has made great strides it has not been able to surpass a number of challenges that still prevail in the way of better success Such limitations as the lack of better methods deeper understanding of problems and advanced tools are hindering progress Challenges and Applications of Data Analytics in Social Perspectives provides innovative insights into the prevailing challenges in data analytics and its application on social media and focuses on various machine learning and deep learning techniques in improving practice and research The content within this publication examines topics that include collaborative filtering data visualization and edge computing It provides research ideal for data scientists data analysts IT specialists website designers e commerce professionals government officials software engineers social media analysts industry professionals academicians researchers and students **Intelligent Systems in Healthcare and Disease Identification using Data Science** Gururaj H

L, Radhika A D, Divya C D, Ravi Kumar V, Yu-Chen Hu, 2023-10-10 The health technology has become a hot topic in academic research. It employs the theory of social networks into the different levels of the prediction and analysis and has brought new possibilities for the development of technology. This book is a descriptive summary of challenges and methods using disease identification with various case studies from diverse authors across the globe. One of the new buzzwords in the healthcare sector that has become popular over years is health informatics. Healthcare professionals must deal with an increasing number of computers and computer programs in their daily work. With rapid growth of digital data, the role of analytics in healthcare has created a significant impact on healthcare professionals' life. Improvements in storage, data, computational power, and parallelization have also contributed to uptake of this technology. This book is intended for use by researchers, health informatics professionals, academicians, and undergraduate and postgraduate students interested in knowing more about health informatics. It aims to provide a brief overview about informatics, its history, and area of practice, laws in health informatics, challenges, and technologies in health informatics, application of informatics in various sectors, and so on. Finally, the research avenues in health informatics along with some case studies are discussed.

Resilience in the Digital Age Fred S. Roberts, Igor A. Sheremet, 2021-02-19 The growth of a global digital economy has enabled rapid communication, instantaneous movement of funds, and availability of vast amounts of information. With this come challenges such as the vulnerability of digitalized sociotechnological systems (STSs) to destructive events: earthquakes, disease events, terrorist attacks. Similar issues arise for disruptions to complex, linked natural and social systems from changing climates, evolving urban environments, etc. This book explores new approaches to the resilience of sociotechnological and natural social systems in a digital world of big data, extraordinary computing capacity, and rapidly developing methods of Artificial Intelligence. Most of the book's papers were presented at the Workshop on Big Data and Systems Analysis held at the International Institute for Applied Systems Analysis in Laxenburg, Austria, in February 2020. Their authors are associated with the Task Group Advanced mathematical tools for data-driven applied systems analysis, created and sponsored by CODATA in November 2018. The worldwide COVID-19 pandemic illustrates the vulnerability of our healthcare systems, supply chains, and social infrastructure and confronts our notions of what makes a system resilient. We have found that use of AI tools can lead to problems when unexpected events occur. On the other hand, the vast amounts of data available from sensors, satellite images, social media, etc. can also be used to make modern systems more resilient. Papers in the book explore disruptions of complex networks and algorithms that minimize departure from a previous state after a disruption, introduce a multigrammatical framework for the technological and resource bases of today's large-scale industrial systems, and the transformations resulting from disruptive events, and explain how robotics can enhance pre-emptive measures or post-disaster responses to increase resiliency. Other papers explore current directions in data processing and handling and principles of FAIRness in data, how the availability of large amounts of data can aid in the development of resilient STSs, and challenges to overcome in doing so. The book also

addresses interactions between humans and built environments focusing on how AI can inform today's smart and connected buildings and make them resilient and how AI tools can increase resilience to misinformation and its dissemination

Recent Advancements in ICT Infrastructure and Applications Manish Chaturvedi, Pankesh Patel, Ramnarayan Yadav, 2022-06-11 This book covers complete spectrum of the ICT infrastructure elements required to design develop and deploy the ICT applications at large scale Considering the focus of governments worldwide to develop smart cities with zero environmental footprint the book is timely and enlightens the way forward to achieve the goal by addressing the technological aspects In particular the book provides an in depth discussion of the sensing infrastructure communication protocols computation frameworks storage architectures software frameworks and data analytics The book also presents the ICT application related case studies in the domain of transportation health care energy and disaster management to name a few The book is used as a reference for design development and large scale deployment of ICT applications by practitioners professionals government officials and engineering students

Research Anthology on Big Data Analytics, Architectures, and Applications Management Association, Information Resources, 2021-09-24 Society is now completely driven by data with many industries relying on data to conduct business or basic functions within the organization With the efficiencies that big data bring to all institutions data is continuously being collected and analyzed However data sets may be too complex for traditional data processing and therefore different strategies must evolve to solve the issue The field of big data works as a valuable tool for many different industries The Research Anthology on Big Data Analytics Architectures and Applications is a complete reference source on big data analytics that offers the latest innovative architectures and frameworks and explores a variety of applications within various industries Offering an international perspective the applications discussed within this anthology feature global representation Covering topics such as advertising curricula driven supply chain and smart cities this research anthology is ideal for data scientists data analysts computer engineers software engineers technologists government officials managers CEOs professors graduate students researchers and academicians

Handbook of Research on Pattern Engineering System Development for Big Data Analytics Tiwari, Vivek, Thakur, Ramjeevan Singh, Tiwari, Basant, Gupta, Shailendra, 2018-04-20 Due to the growing use of web applications and communication devices the use of data has increased throughout various industries It is necessary to develop new techniques for managing data in order to ensure adequate usage The Handbook of Research on Pattern Engineering System Development for Big Data Analytics is a critical scholarly resource that examines the incorporation of pattern management in business technologies as well as decision making and prediction process through the use of data management and analysis Featuring coverage on a broad range of topics such as business intelligence feature extraction and data collection this publication is geared towards professionals academicians practitioners and researchers seeking current research on the development of pattern management systems for business applications

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