



REVOLUTION OF INDUSTRY 5.0: THE HUMAN FOCUSED SOLUTIONS FOR SUSTAINABLE GROWTH AND DEVELOPMENT

K. SRIDHAR

DEPARTMENT OF MECHANICAL ENGINEERING, LENDI INSTITUTE OF ENGINEERING AND TECHNOLOGY, Vizianagaram, Andhra Pradesh, 535005

Dr Ashutosh Dwivedi

Professor, School of Business (Department of Commerce and Management), SHEAT College of Engineering, Varanasi

Oluwadare Joshua OYEBODE

Civil and Environmental Engineering, Afe Babalola University Ado-Ekiti, Ekiti State, Nigeria

Dr. N. Shanmugapriya

Associate Professor, Department of Computer Science and Engineering, School of Engineering and Technology, Dhanalakshmi Srinivasan University, Trichy, Tamilnadu, India

Fernando Flores-Benitez

Research Professor, Department of Education, Central University of Ecuador Quito, Ecuador

Roberto Toscano-Noroña

Research Professor, Department of Vice Chancellor, High Technological Institute, Proyecto 2000, Cayambe, Ecuador

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Abstract

A more prominent level of robotization for functional efficiency and productivity is alluded to as Industry 4.0, otherwise called the fourth modern revolution, by coordinating the virtual and actual universes in an industry. The expression "Industry 5.0" was made to address individualized creation and enable people in assembling processes since Industry 4.0 couldn't answer and satisfy the rising craving for personalisation. The meaning of Industry 5.0 and what characterizes the compromise of individuals and robots have been likely to banter since the term's beginning. This fills in as the motivation for this article, which utilizes text mining strategies and procedures to find and break down the numerous points and examination patterns of what Industry 5.0 is doing. For this purpose, 196 published articles containing the keyword 'Industry 5.0' in the IEEE, Science Direct and MDPI databases were reconstructed.

Text mining techniques such as key phrase extraction and retesting, information cleaning and preprocessing were employed before further investigation. Unexpected subject mining, or unaided AI, was utilized to additionally investigate the information.

Keyword: Revolution, Industry, Human Focused, Growth development

1. INTRODUCTION

The primary modern revolution (Industry 1.0), which occurred in the eighteenth hundred years, achieved a huge change by permitting machines to make merchandise utilizing strategies and procedures that had been concocted. Toward the finish of the eighteenth hundred years, It spread from England to the United States and began in 1760. Businesses such as mining, materials management, agriculture, and glass are being impacted by Industry 1.0, which sees a shift from an artisanal economy to one dominated by machines. Somewhere in the range of 1871 and 1914, the modern area went through a further progress known as Industry 2.0, which worked with the fast trade of individuals and imaginative thoughts. This revolution is a period of financial development, and as organization efficiency rises and robots replace producing representatives, joblessness rates will take off.

1.1 The industry 5.0 revolution

The modern area is turning out to be more useful thanks to human work and widespread mechanical technology. Every one of the assembling organization's leader groups should lay out the creation line, then, at that point, stick to the KPIs and make sure that the methodology is all completed effortlessly. Assembling of modern robots and robots is the eventual fate of industry 5.0. The assembling industry is progressing rapidly, and organization effectiveness is rising, because of the development of man-made reasoning and mental figuring advancements. Notwithstanding the benefits for the assembling area, industry 5.0 likewise enjoys benefits for supportability since it endeavors to make an economical framework fueled by sustainable power. The representatives should appropriately draw in with the machines and administrators for organizations to carry out industry 5.0. The Felds have comprehension of advanced mechanics and man-made brainpower Making decisions in light of perplexing conditions is the groundwork of the corporate association's capability. Since creation doesn't need to end while laborers get preparing, firms should help their staff through virtual instruction to save costs. It offers safe preparation so the representatives will not be presented to superfluous issues all through the instructional courses. Intuitive information conditions

further develop correspondence and staff inspiration. Occupations that include speaking with mechanical and man-made brainpower frameworks are accessible. Robots that work in groups are being created for regular human connection. Industry 5.0 innovation requires an extension of the computerized twin. Using visual representations of products, cycles and creations allows for better understanding and testing. The modern world is currently undergoing rapid change with the advent of rapidly growing computer-aided innovations and artificial intelligence-based systems. The issue for makers all through the globe is to help efficiency while keeping individuals informed in the creation cycle. This attempt gets progressively more testing when new innovations like mind machine connection points and headways in computer-based intelligence make robots more fundamental for the creation cycle. The following modern revolution, known as Industry 5.0, can deal with these issues. More or less, the expression "Industry 5.0" insinuates cooperative participation among individuals and robots.

1.2 Data and Preprocessing

Finding and removing information from distributed research distributions from scholastic data sets was a stage in the information assortment strategy. While these datasets span a wider range of sources than others, when listing the 'top' diaries in this area, the industry 5.0-focused distribution may not be memorable, so This is important [9]. Another consideration in selecting authorized sources and limiting reviews to modified works is the limitation of journalists' recording permissions. I searched the metadata using the keyword "Industry 5.0" and found a decentralized distribution that maintains an Industry 5.0 theme. This applies to all articles that contain the phrase "Industry 5.0" in their title, structure and keywords. This is because Industry 5.0 is still a relatively new idea and it is not yet clear whether there are more significant terms or equivalent terms. These distros will be distributed between 2016 and 2022, with the main references to Industry 5.0 appearing in 2016. Data compiled for each restored distribution included distributor, title, year of distribution, and dynamic information. . The data was then coordinated by the data set it was taken from and changed into an.xlsx record for additional examination. Subsequent to being arranged, the information was marked to show the distributor, title, and conceptual of each recovered distributed article.

2. REVIEW OF LITERATURE

This study by Nahavandi (2019) examines the industrial potential. It is analyzed from a human-driven perspective. It shows how Industry. seeks to combine the benefits of computerization and cutting-edge innovation, with a focus on personal prosperity, job creation and sustainable development. The creator underlines the need of injecting human abilities into the modern climate representing things to come, for example, inventiveness and navigation.

Vinitha, K. Prabhu's (2020) paper provides a timeline of industrial growth from Industry 1.0 to Industry 4.0 with a focus on the role of industrial mathematics and materials. Despite not focusing on Industry 5.0 specifically, it offers useful information on the advancements and challenges brought on by automation and digitalization in the context of sustainable growth and development.

In this gathering paper, Madsen, E.S., Bilberg, and Hansen, D.G. (2016) underscore the information and capacities expected in the time of Industry 4.0. It underlines the need of reasonable modern designing and vocation related abilities in crossing over the information hole among scholastics and genuine industry requests, regardless of the way that Industry 4.0 is the significant subject of the article. The gave experiences could likewise be important for the progress to Industry 5.0. In this article by Rada (got to on 3 February 2022) the shift from virtual to actual frameworks is analysed with regards to Industry 5.0. Regardless of not being a logical source, it gives an industry master's perspective on the thought and possible impacts of Industry 5.0.

The creators of this study Skobelev, P.O., and Borovik, S.Y., investigate the change from Industry 4.0 to Industry 5.0 with an emphasis on the progress from computerized creation to the development of a computerized society. It investigates the potential impacts of state-of-the-art innovations on cultural advancement and next modern frameworks, including computerized reasoning and the web of things. This exploration by Müller, J. (2020) gathers the decisions of a studio with Europe's driving technologists, with an emphasis on the empowering innovations for Industry 5.0. The paper probably assesses the innovative progressions and forward leaps important to accomplish Industry 5's goal, regardless of whether the report's items are not given.

3. RESEARCH METHOD AND ANALYSIS

Text mining is the most common way of finding new or beforehand unseen data by separating information from different printed sources. It is otherwise called shrewd text investigation, text information mining, and text information revelation. By seeing examples in reports from many sources, text mining assists with uncovering new information and information. Different strategies, like Normal Language Movement (NLP), data recovery, grouping, record characterization, web mining, data extraction, and idea extraction, might be utilized notwithstanding text mining. Scientists have come to comprehend how valuable text digging has become for looking at distributed material and distinguishing points and examples inside a specific field. For example, Namugera et al. Bach and colleagues used text mining to focus on the web-based entertainment use of traditional media houses in Uganda to understand the issues these media houses are talking about and We determined whether they were strongly or negatively related. Aureli discusses the benefits of using text mining in the currency domain for financial transaction expectations, adequacy of text digging [14] for focusing on social and environmental reports from associations, and the distributed It demonstrates the use of text mining for document research and analysis. The diagram illustrates the transition to Industry 5.0. The illustrated text mining system is used. This investigation distinguishes significant expressions that are in many cases utilized as well as the subjects into which Industry 5.0 exploration might be classified utilizing the text information recovered.



Figure 1: Analytical framework for Industry 5.0 abstract

3.1. Frequently Used For Data

The purpose of word extraction and retesting is to identify key terms within each group of text. Scientific methods, such as calculating relative word repetitions among records in a collection, can help you better understand the information presented by a message. A common technique for evaluating word bindings is the Opposite Documentation Recurrence (IDF) metric. . The main advantage of IDF is the ability to identify the repetition of terms in the report and the number of occurrences in the dataset. This helps assess the impact of terms on a particular set of datasets. Low grade for "low" and "high" applications. system Innovation 2022, 5, 27 An IDF score of 6 out of 14 indicates words that are less insightful and present in more archives. On the other hand, a higher grade indicates a phrase that is more useful and appears in fewer records. For this review, a review was conducted to identify the most important terms relevant to the industry.

Table 1 shows the 20 most common terms in the data and their corresponding frequencies.

Table 1. Top 20 terms from the database of Industry 5.0.

Terms Usage Identified	Term Frequency
industrial revolution	48
artificial intelligence	45
supply chain	39
big data	32
digital transformation	30
machine learn	28
industry technology	26
digital twin	24
recent year	22

cloud compute	20
thing iot	18
sustainable development	16
future research	14
intelligence ai	16
smart manufacture	14
digital technology	16
fourth industrial	15
manufacture industry	15
production system	16
manufacture system	15

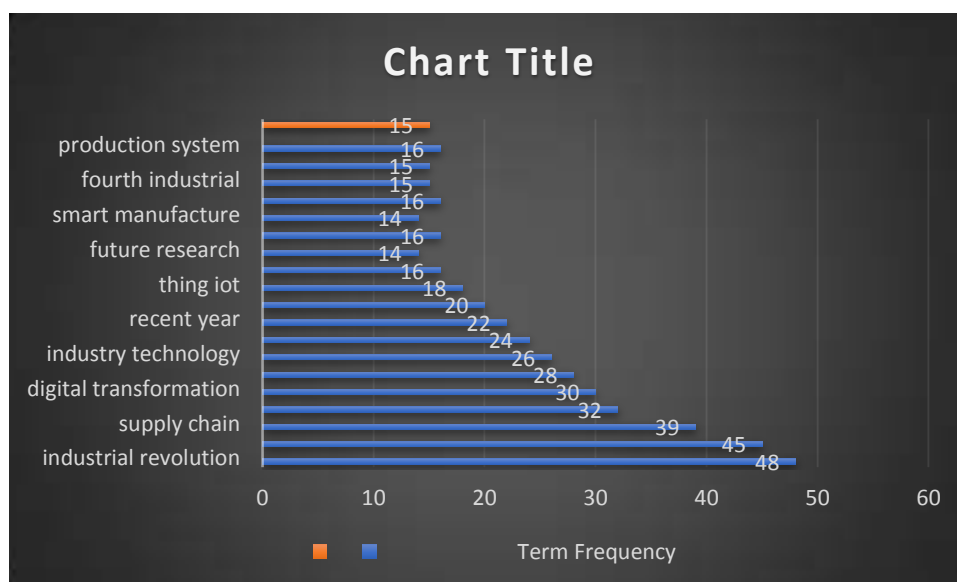


Figure 2: Top 20 terms from the database of Industry 5.0.

Standard admittance to cloud assets and administrations, as well as to information accumulated by outside brilliant sensor organizations, ought to likewise be important for the advanced change for Industry 5.0. The expressions "make industry," "creation framework," and "assembling framework" are utilized essentially with regards to the examination local area's discourse on the progress from Industry 4.0 to Industry 5.0 in the assembling and creation designing space for the suitability of complex human machine interfaces for better coordination and mechanization.

3.2. Frequency Analysis

The catchphrases that were disengaged from the entire informational index took into consideration a superior comprehension of the terms that the specialists tending to the industry 5.0 worldview were more focused on. The scientists show the general utilization of expressions after some time on a line chart involving a proportion of recurrence for the recognized terms to find use designs. The accompanying terms were picked for investigation in light of the terms removed comprehend the pattern on investigating the utilization of advanced twins in empowering Industry 5.0 "information" — to investigate the pattern on utilizing large information, or an assortment of different noteworthy information, to engage Industry. to comprehend the pattern on utilizing man-made reasoning to help Industry to understand the pattern on recognizing cloud-based advancements and distributed computing as an empowering agent of Industry 5.0; (e) "IoT" — to grasp the pattern on recognizing IoT as an empowering agent for Industry 5.0; and "machine" — to appreciate the conversation on the use of shows the patterns in the previously mentioned expressions' utilization all through the earlier years.

Table 2: Terms usage trends in the context of Industry 5.0.

Year	Frequency
2018	26
2019	31
2020	45
2021	54
2022	35
2023	62

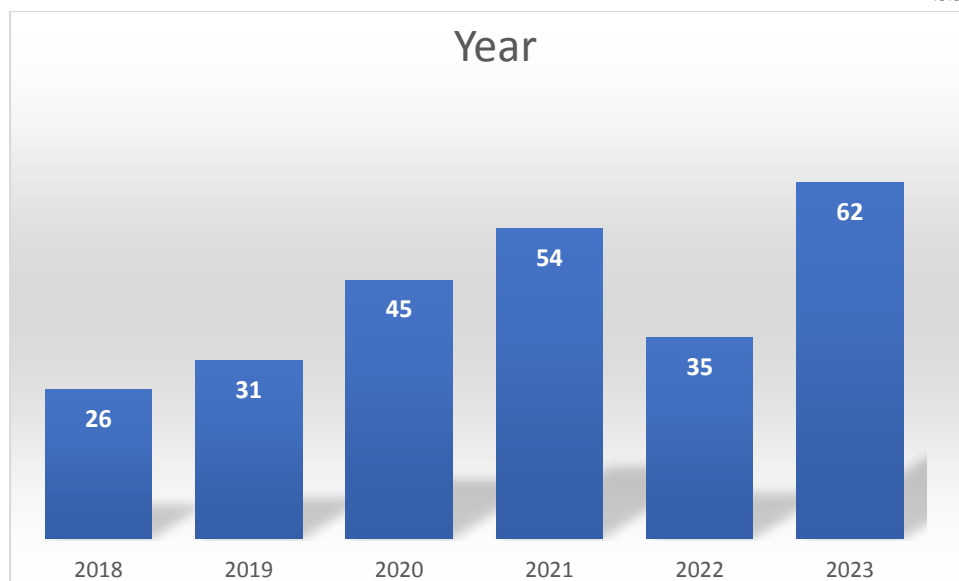


Figure 2: Terms usage trends in the context of Industry 5.0.

4. CONCLUSIONS

This study attempts to capture and categorize Industry 5.0 in terms of decentralized research distribution over the period from the appearance of the term Industry 5.0 to 2016-2022. This is considered through the possibility of text mining computations. To achieve the goals of the work, the most frequently occurring words in theoretical textual information collected from deliverables related to Industry 5.0 were resolved using a term extraction approach. The most frequently used terms were "big information," "network of locations," "advanced change," and "AI." This is in line with the impression of Industry 5.0, which uses artificial thinking and AI to support human intelligence while easing the cycle of boredom. The vast amount of information and computerized change is also expected to generate an information-rich data scene that can be used for ongoing asset management and control. The thematic part of distributed contributions on Industry 5.0 was determined using a point survey approach. Five specific thematic components were identified throughout the scene. Most of it involved brilliant and controllable creation, then human-machine correspondence, and finally harmony. It is even more evident that prominent researchers are increasingly interested in the potential of Industry 5.0 as an extension of human-machine connectivity and competition. A brief overview of the 10 most important information handouts that characterize the topic is also provided to help the audience better understand the perspective and significance of the topic. By reviewing the data touted, we can determine future research directions and what Industry 5.0 means for our modern climate in the years to come. 196 edited works extracted from the information make up all of the findings. It should be emphasized that these results may

change as the number of digests used for analysis increases and the extension libraries used for information extraction are expanded.

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