

## *Retraction*

# **Retracted: Multidimensional Sensor Data Fusion Processing System Based on Big Data**

### **Wireless Communications and Mobile Computing**

Received 13 September 2023; Accepted 13 September 2023; Published 14 September 2023

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

### **References**

- [1] Y. Yuan, "Multidimensional Sensor Data Fusion Processing System Based on Big Data," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 4388997, 7 pages, 2022.

## Research Article

# Multidimensional Sensor Data Fusion Processing System Based on Big Data

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Received 9 July 2022; Revised 2 August 2022; Accepted 16 August 2022; Published 25 August 2022

Academic Editor: Aruna K K

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In order to process data fusion, the author proposes a multidimensional sensor data fusion processing system based on big data. The author discusses the principle and basic steps of multidimensional sensor data fusion and analyzes the classification and common data fusion methods of data fusion. Then, the structure and training process of the DBN algorithm are emphatically expounded, experiments are carried out on the randomly collected multidimensional sensor datasets through the DBN algorithm, the validity of the algorithm is verified, and the algorithm is evaluated. The experimental results show that the number of hidden layers is 100, the number of nodes is 100, the weight matrix is a matrix of  $784 \times 100$ , the learning rate is 2, the momentum is 0.5, the number of samples is 100, and the iteration is 1 time. The average reconstruction error obtained by the MATLAB Deep Learn Toolbox is 65.7798. *Conclusion.* The method proposed by the author can effectively process multidimensional sensor data fusion.

## 1. Introduction

With the popularization of various IoT smart devices and various sensors, the improvement of the cost performance of cloud computing hardware, the improvement of computing and operation speed, the reduction of storage costs, and the optimization of data processing methods such as data storage, cleaning, mining, and analysis, especially the emergence of Hadoop, a distributed system infrastructure, the birth of the Hadoop distributed file system, the maturity of MapReduce, and the introduction of various technologies such as Spark, Storm, and Impala have provided support for massive data storage and massive data parallel computing; the development of new technologies has brought the dawn of big data. With the sharp increase in the number of various sensors in data acquisition terminal equipment, the scale of data generated by multidimensional sensors has expanded rapidly, including the amount of accumulated data in finance, transportation, energy, retail, telecommunications, catering, and other industries, it is becoming richer and more complex, and the traditional data management system and data processing mode can no longer meet the needs of new business [1], such as mul-

tidimensional data from a large number of sensors, multimedia data from smart terminals to take pictures and videos, Weibo and WeChat data, and scientific research multistructure data, accumulating massive data. The data to be processed by the mobile Internet is as high as 44 PB; the world sends an average of nearly 3 million emails per second and uploads an average of 30000 hours of videos to YouTube every day; the total amount of data generated by the Internet every day is enough to engrave 650 million DVDs [2]. Take e-mail as an example; if you read one e-mail in one minute, then, the e-mails generated in one day are enough for one person to read around the clock for 6 years; this shows that the amount of data is unprecedented; these all-encompassing and massive data are not only large in volume but also large in variety, including structured database system data and more unstructured reports, pictures, videos, images, and audio data; these massive amounts of data may be redundant data, fragmented data, and one-sided data, with a wide range of data sources, multiple dimensions, and various types. It is necessary to carry out data fusion technology such as data combination, integration, and aggregation to reflect objective things more comprehensively and objectively, so as to assist people to make correct

decisions. In this case, the data needs to be fused to reduce too much trouble. Therefore, in the environment of big data, establishing a multidimensional sensor data fusion processing system is the current top priority [3].

## 2. Literature Review

In recent years, big data has rapidly developed into a hot spot in the technology and business circles and even governments around the world. Alquraan et al. argue that data has permeated every industry and business function today, becoming an important production factor. People's mining and application of big data herald the arrival of a new wave of productivity growth and consumption surplus [4]. Kumar and others believe that big data is "the new oil of the future," the scale of a country's data and its ability to use data will become an important part of its comprehensive national strength, and the possession and control of data will become an important part of the nation and enterprise, a new focus of contention [5]. Big data has become a new focus of attention from all walks of life, and the "big data era" has arrived. Big data is a strong driving force for the new generation of information technology industry; the so-called new generation of information technology industry is essentially the information industry built on the third-generation platform, mainly referring to big data, cloud computing, mobile Internet (social network), and so on. From a socioeconomic perspective, big data is the core connotation and key support of the second economy [6]. The concept of the second economy was proposed in 2011, which pointed out that processors, links, sensors, actuators, and economic activities running on them form a second economy outside the well-known physical economy (the first economy) and economy (not a virtual economy) [7]. The essence of the second economy is to attach a "neural layer" to the first economy, so that national economic activities can become intelligent, which is the biggest change since electrification 100 years ago and also estimated the scale of the second economy; in 2030, the size of the second economy will approach the first economy. The main support of the second economy is big data, because big data is an inexhaustible and constantly enriching resource industry [8]. With the help of big data, the competition in the future second economy will no longer be labor productivity but knowledge productivity. Multidimensional array database systems are suitable for scientific and engineering applications, and there are several array database systems such as T2, ArrayDB, and the newer SciDB. Each cell of a multidimensional array is 1 tuple and may have multiple properties, such as temperature and humidity. A multidimensional array is logically equivalent to a database table (A1, A2, ..., Ak, D1, D2, ..., Dd), where A1, ..., Ak means that each cell has k attributes, and D1, ..., Dd represents that an array has d dimensions. Therefore, multidimensional array systems still adhere to the relational model [9]. Data in IoT applications is often uncertain and inaccurate due to possible errors in sensors and observations. Uncertainty distributions between cells in an array are usually correlated [10]. For example, the temperature property may be related to other array cells (random variables in each cell). According to this characteristic of the data in the array model, the closer the units are, the stronger the cor-

relation and vice versa. In many applications, in order to correctly describe the uncertainty of the data, the correlation between tuples needs to be encoded [11]. Ignoring such dependencies, or assuming tuples as independent data often results in incorrect or invalid query results. However, modeling attribute correlations between groups of cells is not a simple task, since there are a large number of tuples in the array with arbitrary correlations with each other [12]. Based on the above research, the author proposes a multidimensional sensor data fusion processing system based on big data. The system is mainly based on multidimensional sensor fusion algorithm; by analyzing the reconstruction error of the algorithm and the theory and principle of the algorithm and retrospectively analyzing the simulation experiment of the algorithm, it can better use multidimensional sensors for data fusion.

## 3. Research Methods

*3.1. Principles and Basic Steps of Data Fusion.* The working principle of the sensor is as follows (1):

$$E = k_1(\lambda - \lambda_0) + B_1(\lambda_{t1} - \lambda_{10}) + k_2(\lambda - \lambda_0)^2 + B_2(\lambda_{t1} - \lambda_{10})^2 + C + a(S - S_0). \quad (1)$$

Data fusion of data generated by multidimensional sensors can generate more accurate, complete, and reliable data than a single source of information. Data fusion is divided into two steps: preprocessing and data fusion as follows:

### 3.1.1. Preprocessing

- (1) External correction is to remove the influence on the result data caused by external noise such as external terrain, weather, air pressure, wind speed; the purpose of external correction is mainly to remove the influence of external random factors on the consistency of measurement data results
- (2) Internal correction is to remove the influence on the result data caused by the differences in the sensitivity, resolution, and other parameters of each sensor; the purpose of internal correction is to eliminate the data differences obtained by different sensors

*3.1.2. Data Fusion.* According to different data fusion purposes and levels of data fusion, appropriate data fusion algorithms are selected to synthesize the extracted features or multidimensional data to obtain a more accurate representation or estimate than a single sensor.

*3.1.3. General Steps of Data Fusion.* Data fusion generally includes the following six steps: connecting multisource databases to obtain data, for researching and understanding the obtained data, for cleaning and sorting the data, for data conversion and establishment of the structure, for multidimensional data combination, and for the establishment of analysis datasets. The general steps of data fusion are shown in Figure 1 [13].

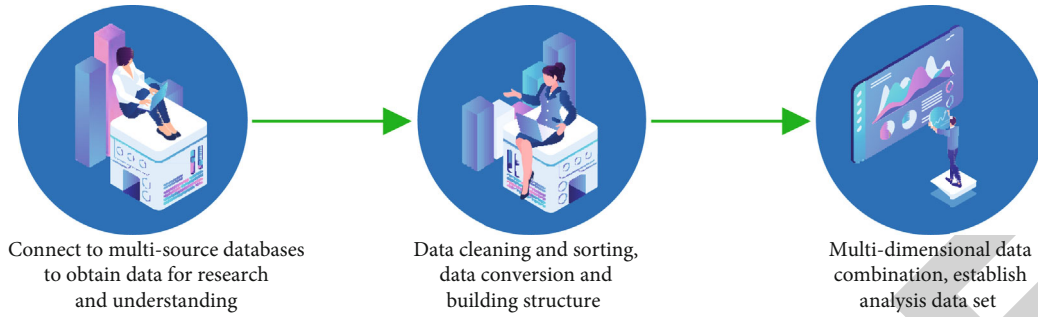


FIGURE 1: General steps of data fusion.

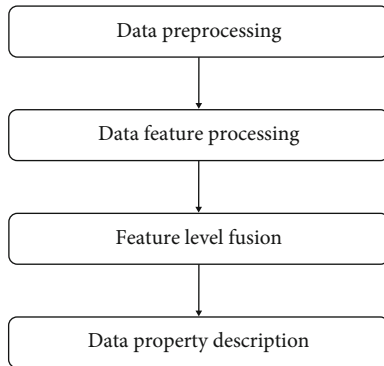


FIGURE 2: General steps of feature-level data fusion.

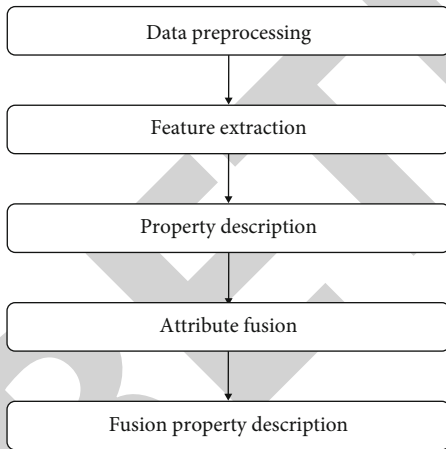


FIGURE 3: General steps for decision-level data fusion.

**3.2. Data Fusion Classification.** According to the information content of the data before and after data fusion, data fusion can be divided into lossy fusion and lossless fusion. Redundant data is removed in lossless fusion, and all data details are preserved. Lossy fusion compresses the amount of data and reduces the amount of transmission by reducing the amount of stored data, reducing data resolution, etc., but the premise is that the fused data retains all the required information. According to the operation object level of data fusion, it is divided into the following: decision-level fusion, feature-level fusion, and data-level fusion [14].

**3.2.1. Data-Level Fusion.** The operation object is the front-end data, and processing the raw data collected by the sensor is the bottom-level fusion. In image object recognition, this level of fusion is to fuse the original image pixels. The data volume of the fusion processing is particularly large, the data processing cost is high, the processing time is long, and the real-time performance and anti-interference performance are poor. Since the processing is the first-hand data of the sensor, due to the instability and uncertainty of the data collected by the sensor, the data fusion is required to have a certain error correction ability. Commonly used data-level data fusion methods include the following: wavelet transform method, algebraic method, and Kans-Thomas transform.

**3.2.2. Feature-Level Data Fusion.** Feature-level data fusion is oriented to the fusion of monitoring object features and extracting feature information from the original data collected by sensors to reflect the attributes of things for comprehensive analysis and processing, which is the intermediate link of data fusion [15]. The general process of feature-level data fusion is as follows: firstly, preprocess the data, then, perform feature extraction on the data, then, perform feature-level fusion on the data after feature extraction, and finally, describe the attributes of the fused data. The general process of feature-level data fusion is shown in Figure 2.

**3.2.3. Decision-Level Data Fusion.** On the basis of the underlying two-level data fusion, feature extraction, data classification, and logical operations are performed on the data to provide assistance for managers to make decisions. The required decision is data fusion at the highest level. This level of data fusion is characterized by fault tolerance and good real-time performance, and decisions can still be made when one or several sensors fail. The general process of decision-level data fusion is as follows: preprocess the data, then, extract features from the data, describe the attributes of the features, fuse the attributes, and finally, describe the fusion attributes. The general process of decision-level data fusion is shown in Figure 3.

**3.3. Data Fusion Algorithm Based on the Deep Belief Network.** Similar to traditional neural networks, deep belief networks are probabilistic generative models based on the joint distribution between observed data and labels. There are hidden layers in the network, the neurons between the hidden layers are fully connected, and there is no connection between the

neurons in the hidden layers. The top two layers include label neurons, and there are undirected connections between the two layers, which are called associative memory layers; except for the joint memory layer, the other layers have directed connections, the top-down is a generative model, and the bottom-up is a decision model [16]. The DBN is a neural network of machine learning, and the model obtains the weights between each neuron through training, so that the entire network can obtain the training data with the maximum probability. The DBN has a wide range of use and strong network scalability, it is one of the commonly used learning algorithms, it is often used in language recognition, image recognition, and other fields, and it can be used for supervised learning and unsupervised learning.

**3.3.1. DBN Structure.** The top layer of the DBN is the joint memory layer, the lower layer is the hidden layer, and the lower part is the restricted Boltzmann machine; the RBM is a neural network model invented in 1986 based on the probability distribution of dataset learning. Training DBN is carried out layer by layer. In each layer, the data vector is used to infer the hidden layer, and then, this hidden layer is used as the data vector of the next layer. The process of training RBM is actually the process of finding the best weights.

**3.3.2. DBN Training Process.** The training process of the DBN algorithm is as follows: first, the first RBM is trained, the weights and offsets of the first RBM are fixed, and the state of its hidden neurons is used as the input of the second RBM [17]. Then, train a second RBM and stack the second RBM with the first. Next, it is trained in multiple loops, along with the neurons representing the labels, with the corresponding neuron on being set to 1 and 0 otherwise. The training process of the DBN is shown in Figure 4.

**3.4. Batch Data Processing System.** Using batch data to mine suitable patterns, derive specific meanings, make informed decisions, and ultimately make effective responses to achieve business goals is the primary task of big data batch processing. The batch processing system of big data is suitable for scenarios where the data is stored first and then calculated, the real-time requirements are not high, and the accuracy and comprehensiveness of the data are more important.

#### 3.4.1. Characteristics and Typical Applications of Batch Data

**(1) Features of Batch Data.** Bulk data usually has 3 features. First, the volume of data is huge. Data jumped from terabytes to petabytes. The data is stored in the hard disk in a static form, is rarely updated, has a long storage time, and can be reused; however, such a large amount of data is not easy to move and back up. Second, the data accuracy is high. Batch data is often the data precipitated from the application, so the accuracy is relatively high, and it is part of the valuable wealth of enterprise assets. Third, the data value density is low. Taking video batch data as an example, in the continuous monitoring process, the data that may be useful is only a second or two. Therefore, reasonable algorithms are needed to extract useful values from batches of data [18]. In addition, batch data processing is often time-

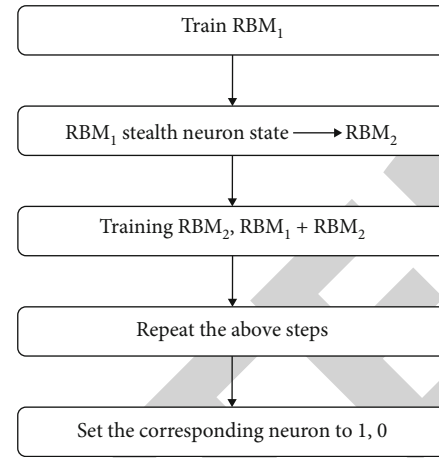


FIGURE 4: DBN training process.

consuming and does not provide a means for users to interact with the system, so when the processing results are found to be very different from expected or previous results, a lot of time is wasted. Therefore, batch data processing is suitable for large and relatively mature jobs.

**(2) Typical Application.** The Internet of things, cloud computing, the Internet, and the Internet of vehicles are all important sources of big data; currently, batch data processing can solve many decision-making problems in the aforementioned fields and discover new insights. Therefore, batch data processing can be applied to many application scenarios. This section mainly introduces three typical application scenarios, namely, the application in the Internet field, the application in the security field, and the application in the public service field. In the Internet field, the typical application scenarios of batch data processing mainly include the following: (1) Social network—Facebook, Sina Weibo, WeChat, and other human-centered social networks generate a large amount of data in different forms such as text, pictures, audio, and video. Batch processing of these data can analyze social networks, discover implicit relationships between people or the communities that exist within them, recommend friends or related topics, and improve user experience. (2) E-commerce—E-commerce generates a large amount of data such as purchase history records, product reviews, number of visits to product pages, and residence time. By analyzing these data in batches, each store can accurately select its hot-selling products, thereby improving merchandise sales. These data can also analyze the consumption behavior of users and recommend relevant products for customers to increase the number of high-quality customers. (3) Search engines—use Google and other large Internet search engines and Yahoo! The specialized advertising analysis system based on the system is used to improve the delivery effect of advertisements through batch processing of advertisement-related data to increase the number of clicks of users [19]. In the security field, bulk data is mainly used for fraud detection and IT security. Fraud detection has been a constant focus in financial services and intelligence agencies. Through the processing of batch data, customer

transactions and spot anomalies can be judged, so as to give early warning of possible fraudulent behaviors. Enterprises, on the other hand, process machine-generated data to identify patterns of malware and cyberattacks, allowing other security products to decide whether to accept communications from these sources. In the field of public services, the typical application scenarios of batch data processing mainly include the following: (a) Energy—for example, batch sorting and sorting of data from deep ocean earthquakes may lead to the discovery of submarine oil reserves. Through batch processing of user energy data, public and private data on weather and population, historical information, geographic data, etc., power services can be improved and users can save as much investment in resources as possible. (b) Healthcare—healthcare provides semantic analysis services through batch processing and analysis of patients’ past lifestyles and medical records, provides answers to patients’ health from doctors, nurses, and other relevant persons, and assists doctors to better provide patients with diagnosis. Of course, batch processing of big data is not only applied to these fields but also to fields such as mobile data analysis, image processing, and infrastructure management. As people realize the value contained in data, there will be more fields to mine the value through batch processing of data to support decision-making and discover new insights.

**3.5. Features of Streaming Data Processing Systems.** Generally speaking, streaming data is an infinite data sequence, each element in the sequence has a different source and a complex format, and the sequence often contains timing characteristics or has other ordered labels (such as sequence numbers in IP packets). From the database point of view, each element can be regarded as a tuple and the characteristics of the element are analogous to the attributes of the tuple. Streaming data often manifests different characteristics in different scenarios, such as the flow rate size, number of element characteristics, and data format, but most of the streaming data have common characteristics, and these characteristics can be used to design the general streaming data processing system. The following is a brief description of the characteristics common to streaming data.

First, tuples of streaming data usually have timestamps or other in-order properties. Therefore, the same stream of data is often processed sequentially. However, the arrival sequence of data is unpredictable, and due to the dynamic changes of time and environment, the consistency of the sequence of data elements in the playback data stream and the previous data stream cannot be guaranteed. This causes the physical order of the data to be inconsistent with the logical order. Moreover, the data source is not controlled by the receiving system and the generation of data is real time and unpredictable. In addition, the flow rate of data often fluctuates greatly, so the system needs to have good scalability, can dynamically adapt to the uncertain incoming data flow, and have strong system computing capabilities and the ability to dynamically match big data traffic [20]. Second, the data format in the data stream can be structured, semistructured, or even unstructured. The data stream often contains erroneous elements, spam, etc. Therefore, the processing system

TABLE 1: The main parameters of the experiment.

Parameter	Numerical value
Number of hidden layers	100
Number of nodes	100
Weight matrix	$784 \times 100$
Learning rate	2
Momentum	0.5
Number of samples	100
Number of iterations	1

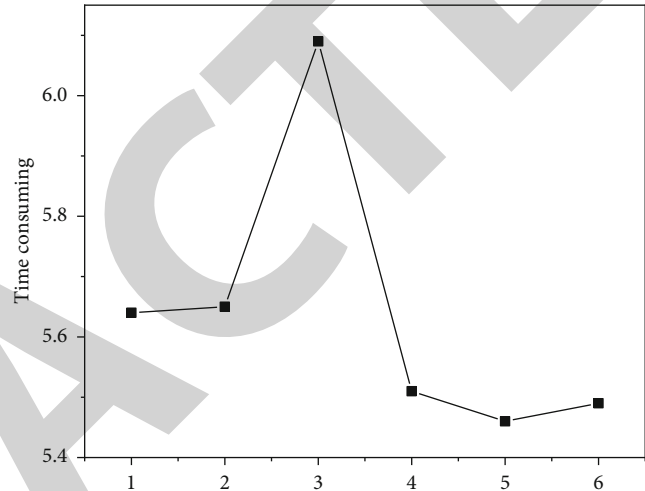


FIGURE 5: Time consumption chart of each period.

TABLE 2: Time-consuming parameter table of each time period.

Period	Time consuming
1	5.6413
2	5.6679
3	6.0995
4	5.5119
5	5.4578
6	5.5002

of streaming data must have good fault tolerance and heterogeneous data analysis capabilities and can complete dynamic data cleaning and format processing. Finally, streaming data is active (disposable) and grows over time, which is different from the traditional data processing model (storage, query), which requires the system to be able to perform calculations based on local data and save the data stream. For this feature, the streaming system should provide a streaming query interface, that is, submit dynamic SQL statements and return the current results in real time.

## 4. Results and Discussion

The authors conducted a retrospective analysis of the experimental results. In the experiment, the MATLAB Deep Learn

Toolbox was used to fuse the collected random data, the DBN parameters were initialized in the experiment, the DBN network was trained, and the main parameters of the experiment are shown in Table 1. In the experiment, the number of hidden layers is 100, the number of nodes is 100, the weight matrix is a matrix of  $784 \times 100$ , the learning rate is 2, the momentum is 0.5, the number of samples is 100, and the iteration is 1 time. The average reconstruction error obtained by the MATLAB Deep Learn Toolbox is 65.7798. The time-consuming diagram of each time period is shown in Figure 5, and the time-consuming parameter of each time period is shown in Table 2.

## 5. Conclusion

The author proposes a multidimensional sensor data fusion processing system based on big data. In the context of big data, the system uses the multidimensional sensor data fusion algorithm to fuse big data. Experimental results show that the number of hidden layers is 100, the number of nodes is 100, the weight matrix is a  $784 \times 100$  matrix, the learning rate is 2, the momentum is 0.5, the number of samples is 100, and the iteration is 1 time. The average reconstruction error obtained by the MATLAB Deep Learn Toolbox is 65.7798. It shows that this method can effectively perform data fusion processing on big data and achieve the purpose of simplicity.

## Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

## Conflicts of Interest

The author declares that they have no conflicts of interest.

## Acknowledgments

The study was supported by “the 2018 demonstration professional construction project of industry-education integration talent cultivation by the Education Department of Ningxia Hui Autonomous Region”, Project no: 2018SFZY40.

## References

- [1] A. Anwar, Y. Cheng, H. Huang, J. Han, and A. R. Butt, “Customizable scale-out key-value stores,” *IEEE Transactions on Parallel and Distributed Systems*, vol. 31, no. 9, pp. 2081–2096, 2020.
- [2] X. B. Jin, X. H. Yu, T. L. Su, D. N. Yang, and L. Wang, “Distributed deep fusion predictor for a multi-sensor system based on causality entropy,” *Entropy*, vol. 23, no. 2, pp. 219–227, 2021.
- [3] A. Alquraan, A. Kogan, V. J. Marathe, and S. Al-Kiswany, “Scalable, near-zero loss disaster recovery for distributed data stores,” *Proceedings of the VLDB Endowment*, vol. 13, no. 9, pp. 1429–1442, 2020.
- [4] C. Lin and F. Jiang, “Research of multidimensional optimization of leach protocol based on reducing network energy consumption,” *Journal of Electrical and Computer Engineering*, vol. 2021, Article ID 6658454, 9 pages, 2021.
- [5] K. Kumar, E. N. Zare, R. Torres-Mendieta, S. Wacawek, and R. S. Varma, “Electrospun fibers based on botanical, seaweed, microbial, and animal sourced biomacromolecules and their multidimensional applications,” *International Journal of Biological Macromolecules*, vol. 171, no. 1, pp. 130–149, 2021.
- [6] C. Liu, M. Lin, H. Rauf, and S. Shareef, “Parameter simulation of multidimensional urban landscape design based on nonlinear theory,” *Nonlinear Engineering*, vol. 10, no. 1, pp. 583–591, 2021.
- [7] M. Silva, J. M. Kaesler, T. Reemtsma, and O. J. Lechtenfeld, “Absorption mode spectral processing improves data quality of natural organic matter analysis by fourier-transform ion cyclotron resonance mass spectrometry,” *Journal of the American Society for Mass Spectrometry*, vol. 31, no. 7, pp. 1615–1618, 2020.
- [8] H. Zhang, G. Hua, and Y. Xiang, “Enhanced time-frequency representation and mode decomposition,” *IEEE Transactions on Signal Processing*, vol. 69, pp. 4296–4311, 2021.
- [9] J. Chen, J. Liu, X. Liu, X. Xu, and F. Zhong, “Decomposition of toluene with a combined plasma photolysis (CPP) reactor: influence of UV irradiation and byproduct analysis,” *Plasma Chemistry and Plasma Processing*, vol. 41, no. 1, pp. 409–420, 2021.
- [10] P. B. Holden, A. J. Rebelo, and M. G. New, “Mapping invasive alien trees in water towers: a combined approach using satellite data fusion, drone technology and expert engagement,” *Remote Sensing Applications Society and Environment*, vol. 21, no. 1, pp. 100448–100457, 2021.
- [11] S. S. Richard, U. Benjamin, and S. Jane, “Multimodal deep learning for biomedical data fusion: a review,” *Briefings in Bioinformatics*, vol. 2, pp. 2–11, 2022.
- [12] Z. Guo and Z. Xiao, “Research on online calibration of lidar and camera for intelligent connected vehicles based on depth-edge matching,” *Nonlinear Engineering*, vol. 10, no. 1, pp. 469–476, 2021.
- [13] F. D’Isanto, G. Barone, and M. R. Masullo, “Gender discrimination and well-being: the case of physics inside the science, technology, engineering, and mathematics sector in Italy,” *Open Journal of Philosophy*, vol. 11, no. 4, pp. 444–465, 2021.
- [14] M. Bradha, N. Balakrishnan, A. Suvitha et al., “Experimental, computational analysis of butein and lanceoletin for natural dye-sensitized solar cells and stabilizing efficiency by IoT,” in *Environment, Development and Sustainability*, vol. 24, no. 6pp. 8807–8822, Development and Sustainability, 2022.
- [15] G. Li, D. Yang, B. Wan, K. Li, and S. Zeng, “Design and construction of power range channel for the third generation reactor nuclear instrumentation system,” *Nuclear Engineering and Design*, vol. 376, no. 1, pp. 111099–111104, 2021.
- [16] V. Ranta, L. Aarikka-Stenroos, and J. M. Visnen, “Digital technologies catalyzing business model innovation for circular economy –multiple case study,” *Resources Conservation and Recycling*, vol. 164, no. 1, pp. 105155–105162, 2021.
- [17] M. Fan and A. Sharma, “Design and implementation of construction cost prediction model based on svm and lssvm in industries 4.0,” *International Journal of Intelligent Computing and Cybernetics*, vol. 14, no. 2, pp. 145–157, 2021.

- [18] A. M. Gülölu and M. R. Murty, "The Paley graph conjecture and diophantine  $m$ -tuples," *Journal of Combinatorial Theory Series A*, vol. 170, no. 2, pp. 105155–105167, 2020.
- [19] P. Ajay, B. Nagaraj, R. Arun Kumar, R. Huang, and P. Ananthi, "Unsupervised hyperspectral microscopic image segmentation using deep embedded clustering algorithm," *Scanning*, vol. 2022, Article ID 1200860, 9 pages, 2022.
- [20] G. Veselov, A. Tselykh, A. Sharma, and R. Huang, "Special issue on applications of artificial intelligence in evolution of smart cities and societies," *Informatica (Slovenia)*, vol. 45, no. 5, p. 603, 2021, <http://www.informatica.si/index.php/informatica/article/view/3600>.

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