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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

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თანამშრომლობითა და მისი პატრონაჟით

ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

ТБИЛИСИ - НЬЮ-ЙОРК

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GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией и Международной академией наук, образования, искусств и естествознания (IASEIA) США с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения.

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GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

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При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

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2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

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In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

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2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

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6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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LARGE-SCALE DATA IN HEALTH CARE: A CONCEPT ANALYSIS

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Introduction. Large-scale data or big data are relatively new concept in the era of technology [1]. These terms are used interchangeably to describe the accelerating growth of structured, semi-structured, and unstructured data which are huge and complex to be managed using the traditional data processing applications [2]. Moreover, large-scale data or big data are new concepts in the health care field [3]. Large-scale data shed the light on the large dataset of information that is stored in Electronic Health Records (EHRs) which are coming from different origins [4]. Furthermore, in the health filed domain, there is a huge amount of data that require advanced methods for analysis [5]. Nowadays, there are different analytical models known as data mining and machine learning algorithms [2 6].

The infancy of the big data concept was in the 1970s [7]. The shape of big data starts to formulate since the time of sharing information at huge rates via the internet in 1989 [8]. In 1997, the development of numerous technological innovations took place including areas of machine learning algorithms and big data analytics including relational databases and open sources providing an easy way to retrieve and store a large amount of data [9]. More acceleration of big data concepts was impacted in the 21st century to include the 'Vs' to define the characteristics and properties of big data[10]. With the big data revolution that transforms our lives, works, and thinking, it becomes a necessity to cope with this large amount of data [11].

Clear and accurate conceptual and operational definitions of large-scale data in the health care field are still needed [12]. Hence, the purpose of this paper is to do a concept analysis of 'large-scale data or big data in the health care field by identifying their antecedents, attributes, and consequences. Developing a clear definition of large-scale data will add to the body of knowledge, which will assist health care professionals to utilize, analyze, and predict patterns of collected information in their research.

Materials and methods. A search was conducted in health databases including CINAHL, MEDLINE, Research Gate, and Science Direct. The terms included in the search are "large-scale data", "big data", "healthcare providers", " health technology", and "data analytical techniques". Inclusion criteria were: papers published between 2015 and 2021, original research, conferences paper, systematic review, and books that have large-scale data or big data terms in the context of health care. Any paper that has quantitative, qualitative, or mixed study designs and is published in the English language was included in the analysis. Titles and abstracts are checked to remove the duplicated papers and eliminate the irrelevant articles that did not meet the inclusion criteria. Full-text articles were retrieved and reviewed to assess if the contextual data are consistent with the large-scale data concept. Furthermore, references were reviewed for additional sources of information about the concept. (Figure 1)

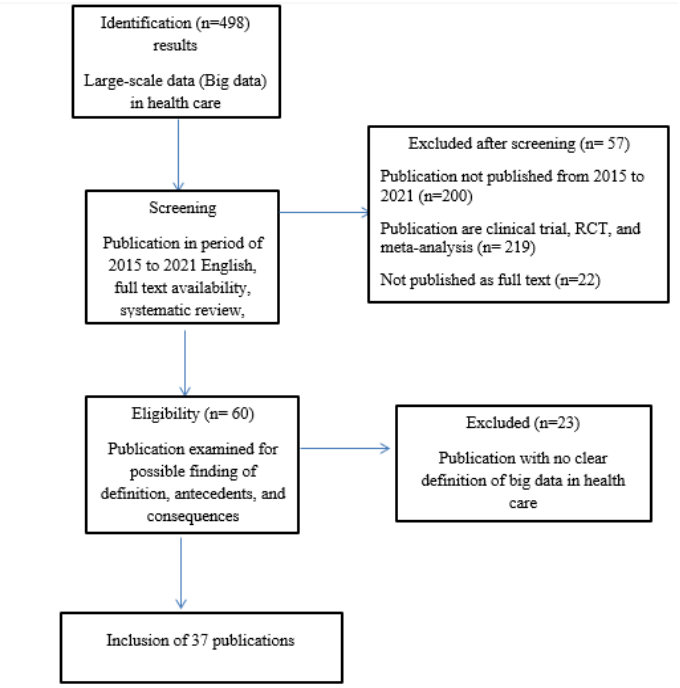

Fig. 1. Flow chart of the study selection process.

Walker and Avant [13] ENREF_23 method was applied in this concept analysis to get a deep understanding of the concept of large-scale data in health care. Concept analysis is a crucial step in theory development as it transfers science and professional expertise into new stages of development [14]. The concept analysis process explores the clarity of the concept systematically and logically that is composed of seven steps: select the concept, determine the aims of analyzing the concept, identify all use of the concept, determine the defining attributes, construct a model case, identify antecedents and consequences, and define empirical referents [13]. Health systems are rapidly evolving due to the advancement in health technologies [15]. However, no clear definition of large-scale data or big data in different disciplines exists [16].

Results. ***Definition of the concept***. According to the Cambridge English dictionary, large-scale data are also known as big data which is defined as "very large sets of data that are produced by people using the internet, and that can only be stored, understood, and used with the help of special tools and methods" [17]. The European Commission defines large-scale data as "large amounts of different types of data produced from various types of sources, such as people, machines or sensors"

[18]. This data include climate information, satellite imagery, digital pictures and videos, transition records or GPS signals" [4]. Likewise, the National Science Foundation (NSF) in the United States denotes the large-scale data as "large, diverse, complex, longitudinal, and/or distributed data sets generated from instruments, sensors, Internet transactions, email, video, click streams, and/or all other digital sources available today and in the future"[19].

Raghupathi and Raghupathi [20], stated that large-scale data in health care is the digitalization of information that is vast and complex, which is not easy to be managed by traditional software or hardware application, thus it needs conventional methods and analytical tools. Baro, et al. [21] asserted that big data in health care has been set with log (n*p) ≥ with high speed and a variety of attributes. Cheung, et al. [22], pointed out to large-scale data in health care is "large datasets that are collected routinely or automatically, and stored electronically" [22]. Alwan and Ku-Mahamud [23] refer to large-scale data as any dataset that has a large amount of information and complex data that need special processing to be managed and it was exist in many subjects such as business, government, and sciences, transport, and health care.

Defining attributes. Concluding the information that is reviewed in the literature, the defining attributes of large-scale data were a volume which refers to the large quantity of data, the velocity refers to the speed of data during the handling of information and in data generation, the variety that means the range of data and different sources of information, and veracity that refers to quality and origin of data [23,24].

MODEL CASE

Collecting data from the Electronic Health Records (EHRs) at Jordan's health institutions for all patients with heart disease over the past five years. The data include the patients' demographical data, reports, laboratory results, diagnostic procedures, radiological studies, and histories as taken by patients. The estimated number is between one million and one million and a half. Special software programs will be used to analyze the hidden pattern of the disease. This will help in analyzing the huge amount of data to predict individuals who may get heart disease as early as possible, cardiovascular complications prevention, and improve population health by utilizing large-scale data analysis techniques effectively.

Volume in the above case refers to the enormous amount of information. Velocity refers to the unprecedented speed at which data are generated and received, that cannot be handled using the traditional software application. Variety refers to diversity in data type to include images such as radiological studies, the numeric flow of information such as laboratory results, and free-text notes such as histories taken from families and patients. Veracity refers to the quality and accuracy of collected data that are stored in the EHRs to get accurate predictions of chronic health conditions such as cardiovascular diseases.

ANTECEDENTS.

Many antecedents of large-scale data, as well as, big data were identified; namely data, technology, people, and health care organization. Firstly, data that build up large-scale data are heterogeneous by nature including structured, semi-structured, and unstructured data. Thus, large-scale data are composed of multiple data from multiple sources. Furthermore, the centralization of data is envisioned to ensure that all information is easily accessible to be analyzed and enable data operation [25]. Secondly, technology or process technology is an important requirement of large-scale data to manage the heterogeneous amount of information for analysis. Since the large data in volume is meaningless as with volume. It has its meaning, insight, and positive impact with technical processes such as large-scale data analytical techniques, e.g. data mining, artificial intelligence that utilizes machine learning algorithms, which transform such data into actionable sources of information, and appropriate decisions based on data analysis. It is known as precision medicine that includes clinical care tailored to individuals' characteristics leading to data enrichment that could be used as diagnostic and prognostic to provide high-quality services [26]. Health care organizations had a direct influence on large-scale data quality by providing easily accessible patient data, and providing encouragement to utilize such data in experimentation to offer discovery of hidden patterns of collected data in EHRs. To sum up, large-scale data quality could be judged based on data discovery, compatibility, and operation [27].

CONSEQUENCES.

Utilizing large-scale data effectively is a crucial step toward the integration with the evolution of health care technology, especially with the rapid advancement in technology and the availability of multiple huge sources of data. Many positive impacts of large-scale data will be reflected on individuals, families, healthcare professionals, and healthcare institutions. Initially, effective use of large-scale data can improve clinical-decision-making through early detection of chronic health conditions, and cost reduction by reducing the number of unnecessary hospital admissions and re-admissions. In addition, it could improve the performance of both health care providers and patients by focusing on patient-centered care and improving the quality of health care by extracting the hidden pattern of data extracted from the large dataset of EHRs.

On the other hand, many challenges of utilizing large-scale data in health care could be related to data security, privacy, confidentiality, and duplication of data in the system. The second challenge is related to the lack of standardization of data documentation due to language barriers, medical terminology, and global sharing. Thirdly, storage and transformation of data include expensive storage, lack of skills of users, and the transmission of data from one place to another [28].

EMPIRICAL REFERENTS.

Big or large-scale data implies dealing with a huge heterogeneous amount of information that is difficult to be managed using traditional software applications. However, many tools can be used to handle large-scale data such as Hadoop, MapReduce, and Spark [29].

Hadoop is known as an open-source software solution that is designed to work with large-scale data. This tool helps in processing the load that is required to process a huge amount

of data across a few hundred thousand separate computing nodes. Hadoop can vastly speed the rate of information that can be processed which is considered a flexible, cost-effective data processing model that could scale as data volume increases in size which enhances the ability to predict the likelihood of patient readmission and take the appropriate preventive measures to reduce the readmission rates [30].

MapReduce is popular data processing engine for utilizing large-scale data effectively [31]. MapReduce performs two main functions including compiling and organizing data sets to be reduced to a smaller and organized dataset that could respond to quires and tasks. It is introduced to be a state-of-the-art for query processing, data mining as well as data processing [32].

Spark is known as a substantial combined analytical engine of comprehensive data processing and machine learning algorithms that are widely accepted as an open-source project from the Apache foundation [33]. It is characterized by ultra-fast processing applications that can stand alone to be used in large health care institutions to put large-scale data in effective utilization use.

It is concluded that many tools can be used to analyze large-scale data, which are characterized by its potentials such as being open source, portability, easy to use, and most importantly integrated data quality to improve the health quality of patients and health care, professionals.

Discussion. The large-scale data concept is relatively new in healthcare field. However, it is popular in other disciplins such as education, manufacturing industuries, and advanced technology [34]. Many challenges face health care providers in taking benefits from the large-scale data and to apply it in academic research. Thus, it is crucial to explore the accurate meaning of large-scale data in order to develop a collective and clear framework to be used in the research network. This study shed the light on the main attributes of large-scale data definition which are known as the "Vs", volume, velocity, variety, and veracity. Furthermore, many studies presented different definitions for large-scale data and its componenet as as structured, semi-structured, and unstructured [4 35 36]. These studies have shown that large scale data are produced from different EHR and other technological devices that need special tools to deal with such large amounts of data. On the other hand, different studies agree that large-scale data or big data concept has a flexible cultural meaning that has different implications in psychology, sociology, industry, and technology [4]. Surprisingly, it was discussed that not all forms of big data literature share the same attributes, which depends on the form of the data and the field that has been utilized in its applications [37].

Conclusion. Large-scale data (big data) is described as a huge amount of data that is beyond managing, storing, and analyzing with traditional software applications. The main characteristics of big data are volume, velocity, variety, and veracity. Besides, it has many antecedents and different consequences. Hadoop, MapReduce, and Spark were the most technical tools that were used to analyze large-scale data effectively. Choosing the most appropriate tool depends on the availability of special characteristics such as open-source, portability, easy to use, and improved health quality.

REFERENCES

1. Dash S, Shakyawar SK, Sharma M, Kaushik S. Big data in healthcare: management, analysis and future prospects. Journal of Big Data. 2019;6:1-25.
2. Efficient large-scale medical data (ehealth big data) analytics in internet of things. 2017 IEEE 19th Conference on Business informatics (CBI); 2017. IEEE.
3. Mehta N, Pandit A. Concurrence of big data analytics and healthcare: A systematic review. International journal of medical informatics. 2018;114:57-65.
4. Favaretto M, De Clercq E, Schneble CO, Elger BS. What is your definition of Big Data? Researchers' understanding of the phenomenon of the decade. PloS one. 2020;15:e0228987.
5. Yousuf H, Zainal AY. Quantitative Approach in Enhancing Decision Making Through Big Data as An Advanced Technology. Adv Sci Technol Eng Syst J. 2020;5:109-16.
6. Stergiou C, Psannis KE. Recent advances delivered by Mobile Cloud Computing and Internet of Things for Big Data applications: a survey. International Journal of Network Management. 2017;27:e1930.
7. Mayer-Schonberger V, Cukier K. Big Data: A Revolution That Will Transform How We Live, Work, and Think, translated by Sheng Yangyan and Zhou Tao. Zhejiang People's Publishing House 2013.
8. Ali S, Poulova P, Yasmin F, Danish M, Akhtar W, Usama Javed HM. How big data analytics boosts organizational performance: The mediating role of the sustainable product development. Journal of Open Innovation: Technology, Market, and Complexity. 2020;6:190.
9. Roh Y, Heo G, Whang SE. A survey on data collection for machine learning: a big data-ai integration perspective. IEEE Transactions on Knowledge and Data Engineering. 2019;33:1328-47.
10. Cappa F, Oriani R, Peruffo E, McCarthy I. Big data for creating and capturing value in the digitalized environment: Unpacking the effects of volume, variety, and veracity on firm performance. Journal of Product Innovation Management. 2021;38:49-67.
11. Zhu R, Han S, Su Y, Zhang C, Yu Q, Duan Z. The application of big data and the development of nursing science: a discussion paper. International Journal of Nursing Sciences. 2019;6:229-34.
12. Nanayakkara S, Zhou X, Spallek H. Impact of big data on oral health outcomes. Oral diseases. 2019;25:1245-52.
13. Walker LO, Avant KC. Strategies for theory construction in nursing: Pearson/Prentice Hall Upper Saddle River, NJ, 2005.
14. Fitzpatrick JJ, McCarthy G, RNYT R. Nursing concept analysis: applications to research and practice: Springer Publishing Company, 2016.
15. Aceto G, Persico V, Pescapé A. The role of Information and Communication Technologies in healthcare: taxonomies, perspectives, and challenges. Journal of Network and Computer Applications. 2018;107:125-54.
16. Suvarnamukhi B, Seshashayee M. Big Data concepts and techniques in data processing. International Journal of Computer Sciences and Engineering 2018;6:712-14.

17. Dictionary C. Big data 2021.
18. Commission E. Big data. 2021.
19. Techniques C. Technologies for Advancing Big Data Science and Engineering (BIGDATA). URL: http://www. nsf. gov/funding/pgm_summ. jsp 2012.
20. Raghupathi W, Raghupathi V. Big data analytics in healthcare: promise and potential. Health information science and systems. 2014;2:1-10.
21. Baro E, Degoul S, Beuscart R, Chazard E. Toward a literature-driven definition of big data in healthcare. BioMed research international. 2015;2015.
22. Cheung K-S, Leung WK, Seto W-K. Application of Big Data analysis in gastrointestinal research. World journal of gastroenterology. 2019;25:2990.
23. Big data: Definition, characteristics, life cycle, applications, and challenges. IOP Conference Series: Materials Science and Engineering; 2020. IOP Publishing.
24. Leland RW, Murphy R, Hendrickson BA, Yelick K, Johnson J, Berry J. Large-Scale Data Analytics and Its Relationship to Simulation: Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 2016.
25. Antecedents of big data quality: An empirical examination in financial service organizations. 2016 IEEE International Conference on Big Data (Big Data); 2016. IEEE.
26. Muibideen MA. Prediction of Heart Disease using Bayesian Network Model, 2019.
27. Taleb I, Serhani MA, Bouhaddioui C, Dssouli R. Big data quality framework: a holistic approach to continuous quality management. Journal of Big Data. 2021;8:1-41.
28. Kruse CS, Goswamy R, Raval YJ, Marawi S. Challenges and opportunities of big data in health care: a systematic review. JMIR medical informatics 2016;4:e38.
29. Foster I, Ghani R, Jarmin RS, Kreuter F, Lane J. Big data and social science: A practical guide to methods and tools: crc Press, 2016.
30. Jain VK. Big Data and Hadoop: Khanna Publishing, 2017.
31. Maitrey S, Jha C. MapReduce: simplified data analysis of big data. Procedia Computer Science. 2015;57:563-71.
32. Kim J-J. Data Summary Techniques based on Mapreduce in Bigdata. International Information Institute (Tokyo). Information. 2018;21:723-32.
33. Apache spark: A big data processing engine. 2019 2nd IEEE Middle East and North Africa COMMunications Conference (MENACOMM); 2019. IEEE.
34. Liu Y, Mai F, MacDonald C. A big-data approach to understanding the thematic landscape of the field of business ethics, 1982–2016. Journal of Business Ethics. 2019;160:127-50.
35. Arena F, Pau G. An overview of big data analysis. Bulletin of Electrical Engineering and Informatics 2020;9:1646-53.
36. Big data impacts and challenges: a review. 2019 IEEE Jordan International Joint Conference on Electrical Engineering and Information Technology (JEEIT); 2019. IEEE.
37. De Mauro A, Greco M, Grimaldi M. A formal definition of Big Data based on its essential features. Library Review 2016.

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Abstract. This paper aims to conceptually analyze "large-scale data" in the healthcare field to improve its clarity in the literature. Thematic analysis was applied to avoid the haphazard results in recognizing the attributes, antecedents, and consequences of the concept analysis. Large-scale data is a huge heterogeneous amount of data characterized by high volume, velocity, variety, and veracity. large-scale data analysis supports the early prevention measures through the prediction of chronic diseases, reducing the cost, and unnecessary admission and re-admission of hospitalization. Large-scale data is a huge amount of data that is beyond managing, storing, and analyzing with traditional software applications.

Keywords. Large-scale data, big data, concept analysis, health care, data mining, disease prediction.