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Cloud computing for healthcare systems in covid19 era

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Abstract

In recent times, cloud computing services have appeared as a promising technology in the medical care sector, especially during the COVID-19 epidemic. In this epidemic, the size of the data developed from different resources is expanding, which requires advanced technology for the storage of the data. Cloud computing appears to be a poorly appreciated sector when it comes to healthcare because of its ability to provide new services at a reasonable cost. In addition, cloud computing gives a suitable environment for promoting collaboration among health workers, sick individuals, and other parties involved. It might be used to solve many issues in the medical sector, including storage capacity, affordability, and reforming resources. Cloud computing is also linked to enhanced accessibility, transfer, and recovery of health data, as well as quick availability of health records. In regard to decreasing the transmission of coronavirus 2, the utilization of cloud computing is regarded as an effective possible solution because the demand for online facilities has been expanding consequently. Nevertheless, cloud computing applications may have a continuous challenge in the area of security, as well as the accessibility of cloud applications, specifically for a medical care system that records and processes medical data. This paper will give an overview of cloud computing, its role in the medical care system by focusing on the coronavirus 2 pandemic, and its challenges in the medical care sector.

Keywords: Cloud computing; Healthcare system; COVID 19

1. Introduction

The phrase "cloud computing" is derived from the blend of the terms "cloud" and "computing." The term "cloud" is an abbreviation for "cloud," which is frequently utilized as a symbol to denote the internet. It is ascertained that a theoretical concept exists, such as data storage in unspecified locations, unknown physical systems, ubiquitous access, and outsourced administrations. Computing, also regarded as computation, is the course of reintegrating information technology schemes, coordination/temporal logic, and storage [1]. The utilization of the descriptive term "cloud" refers, predominantly, to a considerable collection of various resources, including hardware and software, that are easily available and can also be attained by virtue of the use of the internet as a way to access them. According to the National Institute of Standards and Technology in the USA, cloud computing is regarded as a model that permits access to a series of computing services such as storage, networks, services, servers, and applications in an appropriate and suitable manner. These cloud computing services are easy to provision and liberate with the help of administrative effort and interaction from access providers [1, 2].

Cloud computing is considered a relatively new technology, but it has had a huge impact on people living around the globe. It provides the accessibility of computing services and resources anywhere and anytime [3]. Until 2020, many organizations will have adopted cloud computing to improve the quality of their services [4]. The major benefits of cloud computing are effortless management, lower expenditure, continued services, and flexibility, which feature outcomes

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in the expanding usage of cloud services in different business sectors, especially in the medical and healthcare sectors [5]. In the last few years, various studies have described the role of cloud computing in the monitoring of patient health. Because the advancement of various cloud computing applications in the healthcare sector is occurring at a rapid pace, it is expected that a significant portion of medical health services will shift to cloud computing to improve the results of healthcare facilities [3, 6]. Statistical data analysis and data management in the medical health system are extremely crucial and require pertinent application to dispense high-quality assistance for patients. Nonetheless, while cloud computing can help with these issues, adoption in the medical care system is surprisingly low. In the retail sector, the rate of adoption of cloud computing is approximately 57%, while on the contrary, the healthcare sector has a low acceptance rate of 31%. Various applications, such as Google Health and HealthVault, are great illustrations of cloud computing for healthcare services [6]. COVID-19, or novel coronavirus 2 disease, is considered the most-heard phrase of the last few years across the globe and was recognized in 2019 in China [7, 8]. It was described as a microorganism causing flu infection and breathing complications, resulting in several mortalities, and then systematically disseminated around the globe [7, 9]. Significantly, individual hygiene, social distancing, restricted mobility, and vaccinations are effective against the transmission of the virus [10, 11].

For the first time, the entire world was shut down. This has terrified the whole world for two major reasons: mortality and unemployment. Every individual was afraid of another. Approximately 120 nations were affected by this deadly virus, which was also linked with the worldwide recession. On the contrary, the sector that has come out stronger than ever is the cloud computing sector. With the quick transmission of coronavirus 2, the utilization of cloud computing may decrease the spread of the virus by providing online facilities that permit people to remain indoors or at the very least reduce their movement. Cloud computing appears to be a poorly appreciated sector when it comes to healthcare because of its ability to provide new services at a reasonable cost. Hence, the position of services like cloud computing is important for the healthcare system [6]. This paper will give an overview of cloud computing, its role in the medical care system by focusing on the coronavirus 2 pandemic, and its challenges in the medical care sector.

2. Cloud computing in the medical and healthcare sectors

Due to the change in the distribution of people at various life stages in the global population, the medical sector gives the impression of being under pressure in the coming times, which causes an expansion in the requirement for healthcare services. In addition, the accessibility of patient health records at any moment is considered a major restriction in medical care services, specifically in medical emergencies, in which access to health records is important. Cloud computing gives a suitable environment for promoting collaboration among health workers, sick individuals, and additional involved parties [6, 12]. It might be used to solve many issues in the medical sector, including storage capacity, affordable cost, and reforming resources [7, 13], or training of emergency care provider [14].

Cloud computing is also linked to enhanced accessibility, transfer, and recovery of health data as well as quick availability of health records [15]. Yoo et al. flourished to collaborate with 400 virtual machines and virtualization technology to establish cloud computing in a Korean hospital to manage and provide easy access to hospital medical data from cellphone devices in the healthcare units [16]. Contrastingly, hospitals handle huge amounts of health data that must be recorded. In the long run, even following the treatment of patients, in light of this complication, the utilization of cloud computing applications in medical care systems can settle the challenge of large amounts of data analysis. These exceptional qualities have been utilized for the treatment of individuals suffering from cardiac diseases and diabetes. However, cloud computing takes care of the challenges such as security, reliability, and confidentiality, which increase apprehension among health workers and patients [6].

3. Cloud computing and COVID-19

The coronavirus 2 epidemic as a worldwide issue has resulted in several complications in healthcare organizations, where these are not efficient enough to integrate many COVID-19 patients. In regard to decreasing the transmission of coronavirus 2, the utilization of cloud computing is regarded as an effective possible solution because the demand for online facilities has been expanding consequently. During the coronavirus 2 pandemic, the debut of many virtual hospitals, such as the Daktarbhai Telemedicine Program and HelloDoc23, was promoted by a telecommunications health system. Healthcare organizations can utilize cloud computing to execute coronavirus-2-related functionality, including consultations, monitoring, and diagnostics. Another application called "Pathao Health" can be used to check the signs of coronavirus 2 online with the help of a cellphone and online consultations. Individuals can also get medical prescriptions and buy medicines via this mobile application [6, 17, 18].

4. Challenges of cloud computing in the healthcare sector during the COVID-19 era

Regardless of the increasing demand for cloud computing applications [19], There is a continuous challenge in the area of security, as well as the accessibility of cloud applications, specifically for a medical care system that records and processes medical data [6]. Medical personnel can take additional steps to ensure secure access and data storage; they should focus more on disaster recovery websites and backups for medical data protection. Furthermore, increasing user awareness of the risks associated with the use of unsecured devices can help to resolve this issue. There are many possible opportunities for services like cloud computing to display their role in the medical sector, especially in the coronavirus-2 pandemic situation. Further studies related to cloud computing in the medical system should be performed on a few major issues such as security facts, Internet speed, and enhanced data [6,20].

5. Conclusion

The utilization of cloud computing services has significantly increased in the medical sector, especially during the coronavirus 2 epidemic. In this epidemic, the amount of data developed from different resources is expanding, which requires advanced technology for the storage of data. With this technique, the utilization of cloud-based medical services will become extremely popular for the management and analysis of medical data. Nevertheless, cloud computing applications may have a continuous challenge in the area of security, as well as the accessibility of cloud applications, specifically for a medical care system that records and processes medical data.

Compliance with ethical standards

Disclosure of conflict of interest

There is no conflict of interest between the authors.

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