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The Impact of Technology Trends on Healthcare Systems: A Study on Opportunities and Threats

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Abstract: *The importance of health in human lifestyles is considerable. The technologies advanced and the research on this area has brought about differences within the discipline of health as in all regions. The purpose of this have a look at is to observe the needs inside the area of health and to set the criteria for figuring out the most suitable technology. Inside the have a look at, three new technology tendencies in literature are examined. The principles of area computing, fog computing, and cloud computing have been evaluated inside the scope of the examination. The literature on those three concepts has been tested and the areas in which they can be desired inside the area of fitness offerings are presented. Further, at the cease of the examination, the need for Futurist Healthcare structures, on the way to cover all health services, is said.*

Keywords: Healthcare, Information and communication technologies, Infrastructure, Cloud computing, Fog computing, Edge computing

I. INTRODUCTION

The significance of fitness in human lives is undisputed. With the development of technology, great changes and traits have commenced within the area of health. Together with these changes, generation has taken its region amongst the necessary factors of the fitness subject. Programs and structures which can be modern in health have been developed. In this manner, changes that have touched the lives of humans have passed off. However, it is inevitable for the health sector to conform to those tendencies with the advancing technology. In the technological field, classical and conventional records centers had been used for decades ago. This phenomenon continues to be operating and serving the era of infrastructure. But, with the deficiencies and technological developments, the traditional statistics centers have been changed by one-of-a-kind technological infrastructures. Conventional facts centers these days seem to have been changed by way of cloud computing, fog computing, and aspect computing. The primary motives underlying this need for change are listed under.

- An elevated amount of statistics to be saved
- The want to percentage and transmit saved statistics
- The requirement to investigate stored records

The intention of this take a look at is to examine the technologies that can be used in health systems and health infrastructure. As a result of the exam, suggesting the most suitable infrastructure for the target will offer notable enhancements in health services. However, previous to the determination of the infrastructure this is maximum appropriate for the desires, it's miles important to identify the substructures that come with technological tendencies and to discover their benefits and disadvantages.

II. LITERATURE REVIEW

Earlier than the distinct observation of the research to be achieved, it ought to be referred to in the research performed in the beyond length inside the literature. To reveal the results of technological developments in the fitness discipline absolutely, the studies have been tested by giving a date variety to technological principles. To this degree, the surveys at the version of data and communique technology (ICT) to the discipline of fitness services have been evaluated to list more systematic and clear studies. It will now not be incorrect initially cloud computing, which is the maximum usually

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heard generation idea in this field. As seen within the literature studies, cloud computing is of top-notch importance within the subject of health offerings. Similarly, cloud computing continues to be the favored and used infrastructure [1-5].

Another famous technology developed in parallel with technological tendencies is the net of factors (IoT) [6]. On the idea of IoT, there's the creation of a global network structure with facts from physical gadgets. In this manner, its miles aimed to attach the physical devices via this community. Even though it was initially restrained with the aid of the radio frequency recognition (RFID) era, the currently spoken IoT has reached unique stages. In recent times, while the idea of IoT is pointed out, as not the most effective RFID era, however additionally global positioning gadgets (GPS), mobile devices and all devices linked to the network truly come to thoughts [6]. As noted earlier, no development may be left unresponsive to technological developments, and the healthcare area has now not been indifferent to this development. Research on the subject of healthcare offerings and research on IoT is to be had in the literature [2, 7-11].

Some other subject within the literature is massive facts. These days, the significance of large information has expanded. One of the essential reasons for this importance is the described IoT technology. Considering information from sufferers, doctors, diagnoses, treatments, and hospitals in the field of health, the massive information trouble in this vicinity is undisputed. Therefore, studies on the management of large statistics in the area of fitness have been conducted in the literature [2, 12-15].

Similarly, there are a lot of standards used in the area of healthcare with technological tendencies. Wi-fi frame location networks (WBAN) [16], Wi-Fi Sensor network (WSN) [17], system-to-system communication (M2M) [8], network technologies [2], 3D printing [18], robotics [19], social networks [20] and synthetic intelligence [21] troubles are out of scope.

In addition to cloud computing, some answers are an opportunity to cloud computing and the deficiencies in cloud computing are eliminated.

The concepts of side computing and fog computing could be studied in this take look at. There also are investigations and investigations on these issues within the health care literature [2, 22-24]. The standards of cloud computing, which has emerged as a phenomenon on this subject with fog computing and edge computing within the discipline of health services, had been determined as the scope of this examination.

III. TECHNOLOGY TRENDS

Cloud computing, fog computing, and aspect computing topics can be tested on this heading. The architectures, advantages, and drawbacks of those 3 standards might be described. A good way to pick the maximum appropriate provider kind inside the discipline of health, these standards want to be certain.

3.1 Cloud Computing

Cloud computing is the well-known call of internet-based IT offerings for computer systems and other devices, providing computer assets that can be used at any time and shared among users [25]. Inside the literature, there is the research associated with cloud computing-primarily based packages and services in the subject of fitness offerings [3, 4, 25-27]. The studies within the literature were examined and the highlights are indexed below [3, 4, 25-27].

1. Using cloud computing can develop and improve healthcare quarters, and also carry critical opportunities.
2. The transmission of all facts over the net causes concerns approximately the safety and confidentiality of patient statistics and facts management. Research is nevertheless continuing in this area.
3. Cloud computing strength can be used in the selection of support mechanisms in healthcare. Cloud computing makes it easier to process huge statistical analyses within the fitness discipline.
4. Excessive bandwidth requirements due to information transfers required. Another hot topic in the literature is IoT and cloud computing is insufficient in this era which is a big problem [28].
5. Cloud computing is disadvantageous in phrases of integrating with the sorts of services it affords inclusive of software program as a carrier (SaaS), Platform as a service (PaaS), and Infrastructure as a carrier (IaaS) [29].
6. Storing documents in the cloud in distributed garage structures [30].
7. Problems in reading massive records because of allotted documents or statistics shape [31].

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3.2 Fog Computing

Fog computing is the architecture that indicates that clever devices must be analyzed first at a local point and sent to primary servers, as adversarial to the structure that lets the information be despatched and processed to a valuable server [32, 33]. The approach primarily based on fog computing is filtering, processing, and storage operations through organizing an intermediate layer just before all facts are kept on the cloud.

As of 2020, the variety of IoT gadgets within the international is estimated to be five.63K [34]. As may be seen in the estimates, it's far certain that IoT will continue to be a hot subject matter for a long time. Developments in the IoT era will make this technology desired in the fitness sector properly. Therefore, it is vital that the technological trend, which will be the subject of choice within the subject of fitness, be in keeping with the IoT technology. In response to IoT problems in cloud computing, the proposed gadget presents answers to IT problems. For clearer know-how of the concept of fog computing, an exemplary structure from a take look is shown in figure 1 [35].

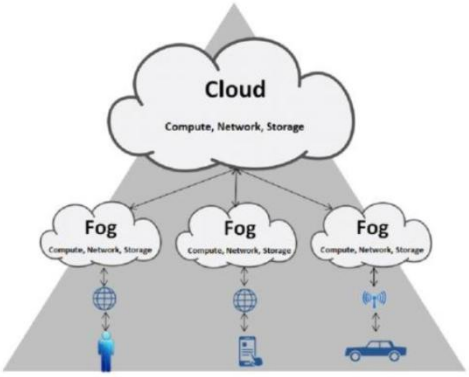

Figure 1: Sample fog computing architecture [35]

The studies about fog computing in the literature were tested and the highlights are indexed below [23, 36, 37].

1. Fog computing is appropriate for actual-time applications in healthcare offerings with low latency and high reaction time.
2. It is suitable for use with IoT generation used in healthcare services and programs.
3. It presents big facts evaluation with its processing electricity and storage area with its local architecture.
4. It offers higher scalable architecture than cloud computing.
5. More powerful allotted processing thanks to nearby processing strength.
6. Safer and fault-tolerant architecture thanks to local operations.

3.3 Edge Computing

Side computing and fog computing have similarities due to the fact they provide nearer information processing and information collection. However, although there are similarities among those standards, they have very important differences. The principle difference between this generation trait is wherein the calculation and processing strength are placed. Sis computing includes processing on the local location community (LAN). In comparison, edge computing is based totally on the location of computing and processing electricity into devices. Fog computing uses side gadgets over LAN. The need for the development of part computing is IoT technology, just as in the case of fog computing. In the literature, the research associated with the part calculation is tested and the essential factors are indexed under [22, 38, 39].

1. In e-healthcare or telemedicine applications and services, extensive affected person records are obtained thru wi-fi sensors. In such cases, side computing can respond to this need.
2. It's far completely well suited and suitable for the IoT era.
3. Value is higher than cloud computing.
4. It is appropriate to be desired in packages with low latency lengths.
5. It's miles required to have the storage ability and processing capacity of the devices it includes.

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IV. SUGGESTIONS

The effect of technology developments on healthcare structures has been examined. Cloud computing, fog computing, and area computing fields, which are certainly one of the newest trends in technology, have been included in the observation. Reputedly it is not feasible to speak about an unmarried technology fashion for every health device. Consequently, fitness regions are classified according to their wishes. As a result of this take a look at, the following pointers were provided.

4.1 Traditional Health Systems

Cloud computing systems meet the needs of modern conventional health structures. Cloud computing systems are inherently more value powerful than traditional records centers. In-depth records go with the flow to be had inside the systems used in fitness offerings. Therefore, the bandwidth requirement of this machine is sizeable. Within the fitness care machine, affected person information, and personal records about the patients, are to be had. Storing those statistics inside the cloud brings to mind the protection trouble. It is said that there is research in the literature on this challenge.

4.2 IoT-Based Health Systems

IoT is one of the new tendencies of the era. IoT research is also carried out within the field of fitness offerings. The IoT generation is inherent in its common sense and it gets data from all area gadgets. Given the information flowing from those devices, the number of records reaches large dimensions. The use of facet computing in such fitness applications is considered appropriate. However, at all aspect factors, statistics processing and garage desires value.

4.3 Real-Time Application-Based Health Systems

The use of cloud computing in fitness systems in which real-time offerings are available may not be considered very suitable as it can motivate a lack of time and bandwidth compression. Actual-time programs are important systems that are inherently in want of immediate response. In such structures, fog records or side computing can be desired according to extra certain wishes. In this way, it's far more feasible to switch statistics independently from the internet and bandwidth.

4.4 Futurist Health Care Systems

The issue cited in this category is to provide the most excellent answer protecting all health structures. The targeted answer should consist of both fog computing, side computing, and cloud computing primarily based on the infrastructure needed. Real-time applications can speak thru cloud computing and traditional fitness packages through the fog and side computing. However, there is a need for a whole structure and framework that may meet this want.

V. CONCLUSION

In this study, new technology developments in health services systems and programs are tested and suggestions are supplied. The developing era influences all regions of our lives. However, every technological fashion and idea may not be suitable for each software. Therefore, fog, edge, and cloud computing technology that could be used in fitness devices are examined and tips are provided as a result of examinations. Beneficial research has been brought for new systems to be developed and new programs to be developed in the subject of health. It became additionally determined that there turned into a want for a framework where all these technologies have been introduced together.

REFERENCES

[1]. Leavitt, N., Storage Challenge: Where Will All That Big Data Go? Computer, 2013. 46(9): p. 22-25. 31. Talia, D., Clouds for Scalable Big Data Analytics. Computer, 2013. 46(5): p. 98-101.

[2]. Aazam, M., S. Zeadally, and K.A. Harras, Offloading in fog computing for IoT: Review, enabling technologies, and research opportunities. Future Generation Computer Systems, 2018. 87: p. 278-289.

[3]. Zhang, P., M. Zhou, and G. Fortino, Security and trust issues in Fog computing: A survey. Future Generation Computer Systems, 2018. 88: p. 16-27.

[4]. Research, G.V., Fog Computing Market Analysis By Solution, By Hardware By Application, By Region, & Segment Forecasts, 2018 - 2025. 2017. p. 100.

[5]. Al Hamid, H.A., et al., A Security Model for Preserving the Privacy of Medical Big Data in a Healthcare Cloud Using a Fog Computing Facility With Pairing-Based Cryptography. IEEE Access, 2017. 5: p. 22313-22328.