

Improved Health Care System in Fog Computing and WSN



Venkata Ranga Rao Kommineni, Pavan Kumar Kolluru, Razeena Begum Shaik,

Abstract: Fog computing is most widely used in many applications. This is the most advanced computing of the various services in the cloud. Fog is considered as another layer that is a distributed network and is similarly having an association with cloud computing and the internet of things (IoT). Health care is the one of the dominating domain in present world. The healthcare with IoT has some of the drawbacks such as limited storage, computing and accessing. To improve the performance the task scheduling algorithm is implemented. To overcome this, in this paper, the novel healthcare system with fog computing and WSN is implemented. Results show the performance of the proposed system.

Keywords: Fog computing, cloud, IoT.

I. INTRODUCTION

Fog computing (FC) is the most rapid field in the present world to provide services at any stage of domains such as E-health and telemedicine infrastructure that is used to address

the issues which are present all over the world. FC merging with the Wireless Sensor Networks (WSN) gives better results for the medical devices which are related to the various types of patients. This will provide a better medical signal process, energy-efficient computing, and privacy and security [1]. IoT is also part of this to get better results for the patients [2].

Nowadays many chronic diseases are affecting many people all over the world. Based on the age factors of the people the chronic diseases are becoming more and more nowadays and these are more priority for treatment agencies [3–4]. With the help of FC, many technological solutions are developing to solve various medical services. Many sensors are used to solve the cloud computing issues with the use of fog computing. With the help of WSN fog computing services are providing the better data transfer services from the sensors to cloud storage with the help of FC.

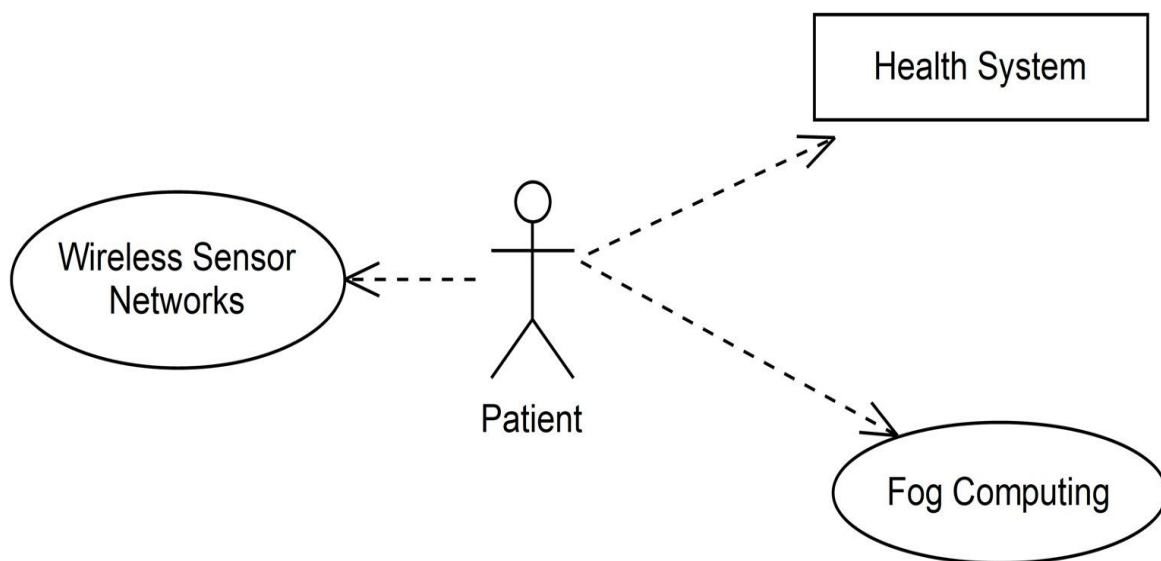


Figure: 1 integrated health system

In this paper, the improved E-health care system which is integrated with IoT,

fog computing and WSN. Every domain has its own properties all these are included and improve the E-health care system which works for more no of patients at a time. Every patient is considered as the task. This will support the multiple task at a time i.e will collect no of patients data and stored into the cloud.

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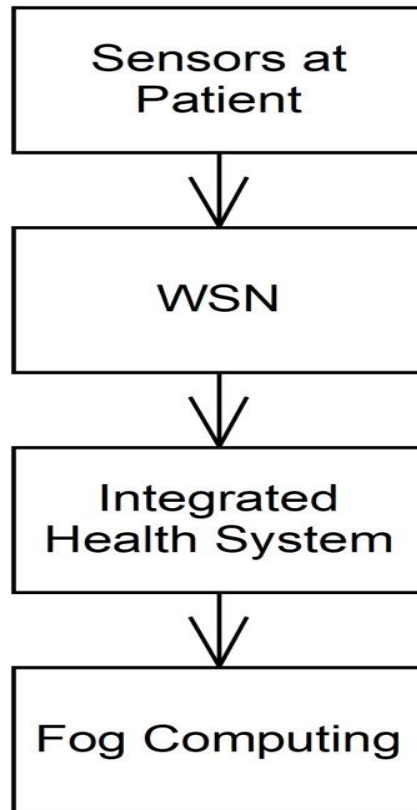


Figure: 2 system architecture

II. RELATED WORK

Since 2015 the survey on the IoT health care system is continuing with various algorithms that are described differently the services, applications. This includes security and standardization that require more research [7]. From the past few years, many technologies and traditional algorithms and methods are proposed.

Using the sensors in the drugs and public health [11], [12] domain is most widely integrated. Integrating the various medical devices used at hospitals, clinics, and homes, sensors give services to the patients and also provide the physiological and physical health states that are crucial to the detection, diagnosis, treatment and management of ailments.

Medical sensors mix transducers for detective work electrical, thermal, optical, chemical, genetic, and alternative signals with physiological origin with signal process algorithms to estimate options indicative of a person’s health standing [9]. Sensors on the far side those who directly live health state have additionally found use within the observe of drugs.

Behind the benefits of the cloud like flexibility, disaster recovery, automatic code updates, Work from anyplace, improved collaboration, Security, Environmentally friendly still it have limitations find it irresistible needs scores of information measure, security, integrity, procedure potency, storage potency, communication potency [10].

III. WIRELESS SENSOR NETWORKS (WSN)

With the sensor networks, many nodes, base stations, and access points are created. The sensors placed at the patients will take the data and transfer to cloud storage according to the tasks placed on the servers. There are many servers present in this system to transfer the data from various

places that are collected from the patients. By maintaining the data storage with very low cost, moveable size, less power consumption the device nodes have grownup hugely [8]

IV. IMPROVED E-HEALTH CARE SYSTEM

This health care system mainly integrated with sensors, cloud, and fog computing. Sensors collect all the data from the patients and saved into the fog with the cloud computing. Various types of data are collected by the sensors and these are also called as extrinsic and intrinsic values. Extrinsic values such as heat, place etc. Intrinsic values are such as blood pressure, blood glucose level, heartbeat, and so on that are collected by the patient’s wearable sensors.

The aim of the research is to schedule the task-based OCSA algorithm. This is the dynamic algorithm that is integrated with the cuckoo search algorithm (CSA) and Opposition based learning algorithm (OBLA).

Step 1: Start processing

Step 2: Various learning solutions

The unique solution op (z1 *, z2 *, z3 * , zn *).

$$Z_{ij} = a_i + b_i - z$$

Step 3: Calculate fitness

The fitness is the method that is used to calculate the cost, makespan, and resource of every task. Fitness is considered as the minimization capacity. Based on the various issues, the fitness calculation becomes better to compare with other parameters and this will totally be based on the number of iteration.

$$FFi = \sum_{i=1}^m T_i (\alpha \cdot cost + \beta \cdot Execution\ time)$$

Step 4: Based on the proposed algorithm the fitness is updated based on the CSA, the following are steps for the CSA:



$$S_i(k+1) = x_i + \alpha \oplus Levy(\lambda)$$

Step 5: Stop

V. EXPERIMENTAL RESULTS

In this section, the implementation is done using NetBeans 8.0.2 and JDK 1.8, MYSQL 5.22 with Windows 10 with a dual-core processor with 4 GB RAM. This will provide the better results with the integration of various algorithms.

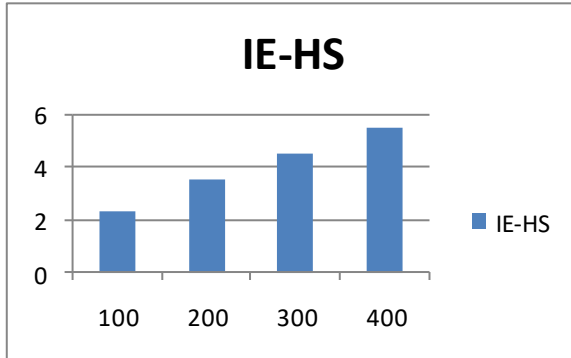


Figure: 3 Performance of the IE-HS such as total no of tasks in time (sec)

VI. CONCLUSION

This paper explains how the performance of e-health care system improved with the integration of the fog computing, cloud, IOT and wireless sensor networks. To improve the efficiency of the proposed system the task scheduling which is integrated with fog computing. This is most efficient in fog computing because of the performance of the proposed system. The accuracy of the task scheduling is shown in this paper.

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