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Research paper

Smart health monitoring system based on internet of things with big data analytics and wireless networks

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Abstract

The use of mobile application technologies and smart devices in the health sector has improved a lot. In this sense health monitoring has evolved using Internet of Things. Nowadays the food habits are changed because of our machine life. This paper mainly focuses on the problems occurring related to health because of food habits. This paper gives the idea for solving this problem by collecting the attributes from the human body. The attributes like cholesterol, calories, glucose, pulse, weight, Body Mass Index, water level, temperature are to be collected from the person by fixing the wearable sensor devices in the human body. After getting these attributes the analysis should be done with the existing database for giving the food recommendations. The food intake level is analyzed for providing health factors. The aim of the paper is to provide the architecture for healthy food recommendations to the persons using sensor data to the person's mobile application.

Keywords: *Food Recommendation System; Health Monitoring; Sensor Data.*

1. Introduction

The IoT is the fast growing technology which has sensors in wide variety of things. The use of IoT in all the fields is possibly creates the more importance to achieve the smart living. The internet connection may be wired or wireless. Using sensors many of the day to day activities can be captured and the received data will be analyzed to get the valuable information. The Big data is characterized by volume, velocity, veracity and variety. The big data is coming with the large volume is mixture of structured and unstructured information (variety) and arriving with high speed (velocity) and it can be uncertain. Data stream mining is the process of extracting knowledge for the continuous data.

Big data is nothing but passing big insights: gathers the data from different authorities and interpreting it for revealing the drifts that are not available in some other way. In all the monopolies that are discovering valuable things from big data analysis, wellness program has more probable to understand the biggest rebound [8].Big data gives an idea for wellness care bacons to increase utility and to enhance working performance, big data also has the ability to divulge drifts which can straightaway upgrade the people's wellness. In healthcare, the medical device and pharmacy use big data for improving the research and development works. The health insurance companies use it to determine patient specific treatment therapies foe getting best results. Big data helps to eliminate the healthcare challenges before they become real problems. Also it helps for doctors to analyze the medical history of every patient to provide the individual services for them, which depends on their medical conditions.

Nowadays the health of the person is mostly affected by the food habits. Depending upon the food they are consuming the health status of the particular person will be varied from bad to good. So they must very much concern about their food habits. We should definitely have the assistant or health advisor for doing these things. But it is the difficult and not affordable also. Here is the solution for doing this health advises. This system architecture will collect the data from the person's body using sensors and will send those data to the database mining system which extract the food recommendation for the particular person from the existing database. This system architecture will also give the health related reports and corresponding health related suggestions like exercises, changing food habits and also suggesting some foods. All these information will be communicated through the application which is installed by the users.

2. Related work

Gelogo and hwang proposed the concept of u-healthcare system for providing medical services to the patients based on the data received from the wearable devices. They have used the concept of Body Area Network for getting the information from the patients body and processed the information using intelligent medical server system. They have stored the data from the patients body to the medical server which can be seen by the doctor and the healthcare professionals. They have analyzed the emergency situations of the patients and based on that they have provided the emergency medical services to the patients [1].

Sajid Hussain and Sadia proposed the architecture for tele health system which gives the emergency services to the person who needs immediate attention. Based the IoT technology they have provided these kind of architecture .The system needs for the person who has heart failures, heart attacks, and Chronic Obstructive Pulmonary Disease (COPD) patients. The system analyses the heart rate, oxygen saturation and electrocardiogram data for predicting the heart failure of the patients [2].

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3. Application

The healthcare monitoring system takes the input from the wearable devices which is in the user's body. The data which taken from the body is taking into the system for giving health and food suggestions to the user. After that analysis have been done for giving suggestions. Nowadays the food consumption of the people is changed according to the lifestyle which causes most of the disease like cancer. The control in the food intake is not maintained which creates more health problems. Diagram beneath displays the conventional healthcare Idealogy Architecture. The system architecture is mainly divided into-

- Human Carcass Area Network (HAN)
- Wireless Carcass Sensor Network
- Intimate Auditing Devices
- Therapeutic Server

3.1. Human carcass area network (HAN)

In HAN system sensors are attached to the human body in to capture the information like blood pressure, body temperature, glucose level, cholesterol level, pulse and breathing. It is mainly divided into two parts i.e., WCSN and IAD.

3.1.1. Wireless carcass sensor network

The Wireless Carcass Sensor Network is formed of wireless sensors in our body. The sensors fetches needed information from sufferer's body and broadcasts to the health monitoring system in the form of low prevalence electromagnetic waves.

3.1.2. Intimate auditing devices

The sufferer's intimate auditing Devices will act as a personal computer or a cell phone or PDA device. It will get information from WCSN by the various devices like Bluetooth. IAD contains algorithm to examine whether to send this message to the server (IMS) or not. IAD communicates with the server through Internet. The IMS server will act as the utility provider and the sufferers IAD will act as the utility requester.

3.2. Therapeutic server

The therapeutic Server fetches the message from the HAN. It acts as pivot between the victim and hospital. It is the grit of the whole setup and is proficient of diagnosing suffering's definite verge. The structure rules whether a person is in a critical condition based on data acquired from the HAN System. If it is diagnosed that they are taking food wrongly, the data is transferred to the setup for executing food endorsements steps, immediately after being stored in then therapeutic server system. If they are following the food habits correctly, the data is merely hoarded in the therapeutic server [7]. For data stored in the therapeutic server, necessary data is regularly saved to the central index of the System. These real-time data will be erased after a particular duration of time unless they are following wrong food habits. Data stored in the therapeutic warehouse is available to the authority.

3.3. Application management

The third area is a application management system. The data which is retrieved, changed, updated and deleted by admin will be sent to the application. Depending on the therapeutic server or food recommendations will take the precautionary or remedial measures for the analogous persons.
The application should be installed in the user mobile are personal computer to get the food suggestions through the medical server system.

4. System architecture

4.1. Sensed attributes

The wearable device which is mounted on the person body will sense the following attributes like temperature, glucose level, water level, cholesterol, blood pressure and calories etc., the system will take these attributes as the input the system [4].

4.2. Data collection

In the process of collecting data, we use ARM cortex M3 Processor to monitor blood pressure, heart beat rate, body temperature and body position. And to monitor the cholesterol and Sugar we use Fiber Optic Biosensor and CGM (Continuous Glucose Monitoring) [3].

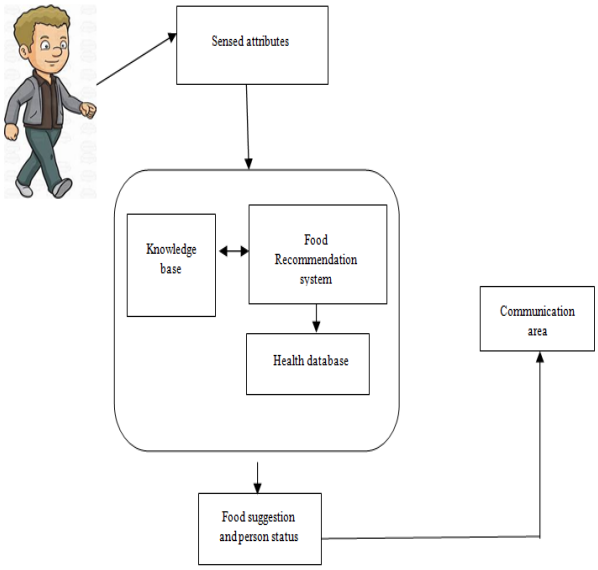


Fig. 1.1: Smart Health Monitoring System.

4.3. Medical server system

4.3.1. Knowledge base and analysis

This knowledge base is the technology will store the structured and unstructured data used by the computer system. This will include the technology called big data to analyze the given data using the big data applications like hadoop. If the number of attributes are high and the number persons are also high means the normal analysis will not be effective so that only we switch over to the big data technology. The data analysis will takes place in the hadoop server for effective food recommendations for the user whose health data has been taken. The unstructured data from the sensors are directly taken for the analysis.

4.3.2. Food recommendation system

After the analysis of attributes of the patient data it will generate the structured data will given to the input to the food recommendation part. This food recommendation database can be downloaded from the repositories which contain the food suggestions for the given health data.

4.3.3. Health database

It contains the information about the persons health details based on the information assessed from the knowledge base. It stores all the information of all the persons. If the problem exist in the person's food habits the suggestion will be provided to the particular person otherwise the data will be stored into the health database.

4.3.4. Food suggestion and person status

The person's food suggestion and the status of the person is the output from the medical server module. This information will be forwarded to the person's mobile application. Otherwise this information will be forwarded to the person's mobile number as the message.

5. Tiers of smart monitoring system

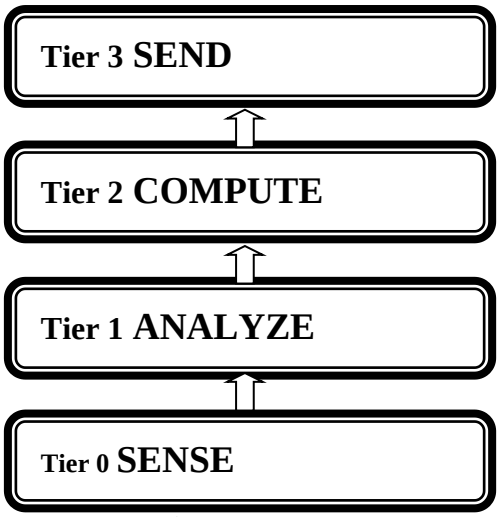


Fig. 2.1: Tiers of Smart Health Monitoring System.

In our studies, we have provided the categories of smart health monitoring idealogy. Initially, in the category 0, the sensor from the body percepts the data and passes it to the centralized medical server. The medical server is capable of processing the data received from the sensors and analyze the collected message in Tier 1.The Medical server will compute the data to be send in Tier 2.The Medical server will analyze and figure out the collected grasping knowledge and bring about keywords to store into the knowledge base and transmit to the food recommendation system. The food recommendation system is placed in Medical server. With the Internet of Things (IoT), big data technology and wireless networks this smart health monitoring system is possible [5]. These data will be filtered by using the meanings as shown in Fig 2.1. Regional analysis is achieved using hadoop equipped in system. Cyberspace renders provocative food recommendation message as result to the locomotive wellness patron application.

6. Conclusion

The Big data and wireless sensor network can be used in clinical care for providing suggestions to the user, where the modern world people who is consuming the foods without caring about the health. This system requires the sensors for collecting physical health information from the person's body and uses analysis tools for analyzing the information's received. Also to implement these things we need wireless technology. The eventual trails of this research covers the exhaustive layout schema works and implementation details.

References

[1] Kartik Moudgil, Ria Maheshwari, "Cloud-based secure smartcard healthcare monitoring and tracking system", Second International Conference on Electrical, Computer and Communication Technologies (ICECCT) 2017. https://doi.org/10.1109/ICECCT.2017.8117869.

[2] Himadri Nath Saha, Debasmita Paul and Shreyaasha Chaudhury, "Internet of Thing based healthcare monitoring system", Information Technology, Electronics and Mobile Communication Conference (IEMCON), 2017 8th IEEE Annual" https://doi.org/10.1109/IEMCON.2017.8117245.

[3] Uttara Gogate. Jagdish W. Bakal," Smart Healthcare Monitoring System based on Wireless Sensor Networks", IEEE, 2016.

[4] Indrakshi Ray, Bithin Alangot, Shilpa Nair," Using Attribute-Based Access Control for Remote Healthcare Monitoring", IEEE, 2017. https://doi.org/10.1109/SDS.2017.7939154.

[5] Mohammad-Parsa Hosseini, Dario Pompili, Kost Elisevich, and Hamid Soltanian-Zadeh, "Optimized Deep Learning for EEG Big Data and Seizure Prediction BCI via Internet of Things", IEEE transactions on big data, 2017.

[6] Sajid Hussain and Sadia Majid Dar," Architecture for Smart Sensors System for Tele-health", IEEE.

[7] Neha R.Pandya,Vitthal K.Bhosale, Rajesh M.Autee," Wireless Sensor Based Handy Patient Monitoring System Advanced Computing" IEEE(2016).

[8] M Yunianto et al," Design of a Fiber Optic Biosensor for cholesterol detection in Human Blood ", IOP Conf Ser:Mater.Sci.Eng 176012014(2017).