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HEALTHCARE MONITORING MOBILE APPLICATION USING WEARABLE SENSORS

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Abstract: *Health care is a prime issue of every human being. The doctors, consultants and physiotherapist play an important role keeping our society healthy, happy and rich. But for every emergency all these experts are not at service of people. To overcome this practical problem various computer based automated health care monitoring systems are in place.*

By using existing system, the drawback is that the data can only be analysed by the doctor, but sometimes that may take long time for sending results to the patient. Sometimes that may be harmful to user (patient).

In this paper, we are going to explore the implementation of the healthcare monitoring android mobile application. The basic idea behind the healthcare systems is to monitor the human parameters using some wearable devices (sensors). Existing systems provide the monitoring of data using sensors and that data is sent to android mobile application using some wireless communication techniques like (Bluetooth or Wi-Fi). And that data is sent to the cloud based storage for further operations. Doctors can download that data from cloud anytime, analyse that data and send suggestions to the user (patient).

In the proposed system implementation, this drawback is recovered using some advancement. In this system, the data collected from human body using some devices(sensors) is directly sent to the android mobile application through wireless communication (like Bluetooth). This data is analysed by system server as well as the doctor. This will help the user (patient) to take some immediate action. System server will analyse that data and send to user as well as the doctor. This will also reduce the workload of doctor. System server uses some data mining algorithms to analyse the human body parameters. This will help to doctors as well as the user (patient).

Keywords**:** *bio-sensors, cloud data, mobile API, web application, data mining*.

1. INTRODUCTION

The tracking of health data (pulse, humidity temperature, blood pressure, diabetes) for patients at home or outside home becomes critical problem because these patients have one or more additional diseases co-occurring with a primary disease.

It is known that chronic diseases like heart disease, diabetes, have significant negative effects on quality of life of the people. The actions in case of chronic disease are designed to manage and prevent a chronic condition using systematic approach to cure it and potentially employing multiple treatment modalities. About 50% of general consultations are for chronic diseases, 50% of hospital beds are occupied with patients suffering from chronic diseases and their complications. For supporting the healthcare and for improvement of patients monitoring task it can be used wearable electronic devices for health monitoring along with smartphones for receive data by wireless transmissions (Bluetooth) from sensors. Wearable devices based on IOT technology and cloud computing have the potential to change the way in how we monitor our personal health, take our medication, communicate with medical staff, and it could effectively assist the elderly living alone.

The capacity of sensing and receive data about non-electrical measures is derived by hardware (bio-sensors) that can measure physical quantities, such as the temperature, humidity, vibration or magnetic field. The data received from bio- sensors can be received by Bluetooth (ZigBee). Bluetooth is a mid-range wireless technology that works within a 10-meter range and transfers data at a rate of 2Mbps, this make Bluetooth a good alternative for data transfer.

The temperature and also humidity sensors play an important role for direct use in health monitoring systems or for making the correlations between values received and diseases.

2. RELATED WORKS

2.1 Existing System

Existing systems provides the monitoring of data using sensors and that data is sent to android mobile application using some wireless communication techniques like (Bluetooth or Wi-Fi). And that data is sent to the cloud based storage for further operations. By using existing system, the drawback is, data can only be analysed by the doctor, but sometimes that may take long time for sending results to the patient. Sometimes that may be harmful to user (patient).Some of the systems do not provide cloud storage for accessing data to doctor. Doctor can access data through PC using web application. They do not provide mobile application for accessing patient disease details from anywhere to take emergency decisions or treatments.

Existing system [Fig. 1] may fail to keep backup of the patient disease details on device in case of network failure. If right data is not sent at right time to doctor, it may be harmful to the patient's health.

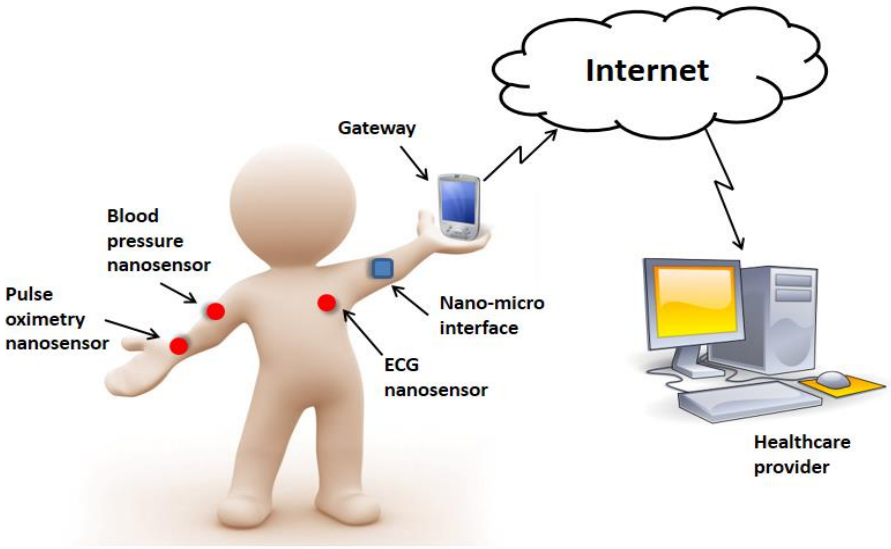

Fig 1. Existing system model

2.2 Taxonomy Chart

TEXONOMY CHART							
survey Papers Features	Author & Publication Date	Web Based	Disease sensed	Cloud Storage	Android Based	Offline notifications	Server Suggestion
Wearable Sensors for Remote Healthcare Monitoring System	Narendra Kumar, 2012	✓	✗	✗	✗	✗	✗
A Hospital Healthcare Monitoring System Using Wireless Sensor Networks	Hamid Reza Nazi, 30 jan 2013	✓	✗	✗	✗	✗	✗
Using Wearable Sensors for Remote Healthcare Monitoring System	Henry O. Nyongesa, 31 march 2011	✓	✓	✓	✗	✗	✗
Mobile Application for Tracking Data from Humidity and Temperature Wearable Sensors	Aileni Raluca Maria, 27 jan 2015	✓	✓	✓	✓	✗	✗
Proposed System		✓	✓	✓	✓	✓	✓

Fig. 2 Taxonomy Chart

3. PROPOSED SYSTEMS

In the proposed system, the data collected from human body using some devices (sensors), is directly sent to the android mobile application through wireless communication (like Bluetooth). The data is analysed by system server as well as the doctor. This will help the user to take some immediate action. System server will analyse that data and send it to user as well as the doctor. This will also reduce the workload of doctor.

If suddenly network fails on patient's or doctor's device then the system will store the backup on the mobile device along with the previously collected data. This data will help patient to take some emergency action at that point of time and after network access resumes the new data will updated on device which will be useful for next emergency cases.

In this system the server is the main entity which keeps the details of clients with their basic information, occupation and disease related information. When the server receives data from patient it will analyse and generate the report and send report to both patient and doctor and keep this information on cloud to be accessed by both.

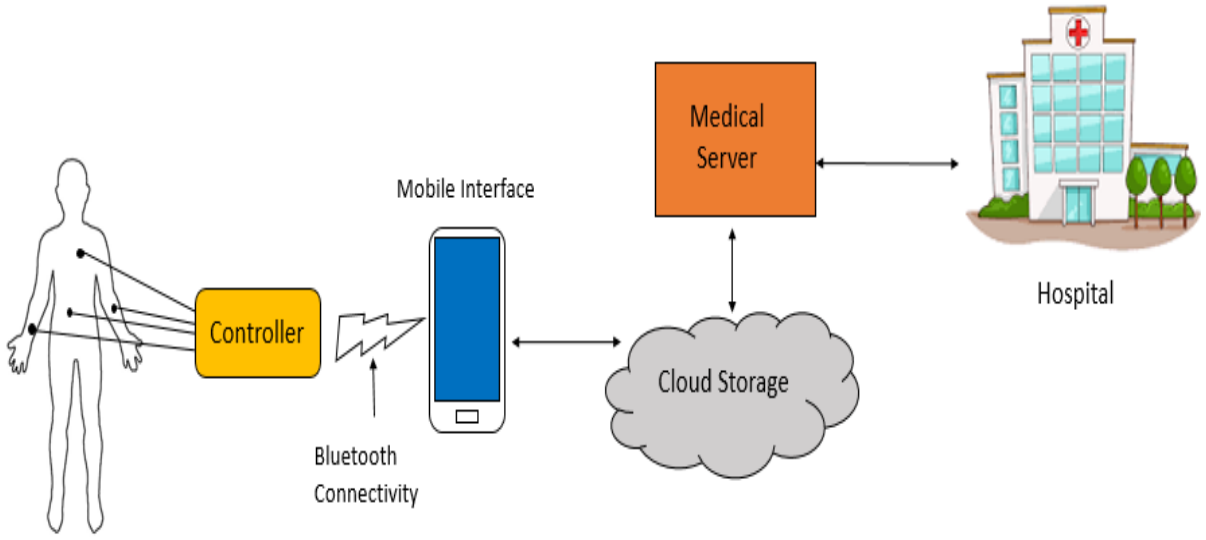

Fig 3. Architecture of Purpose system

4. WORKING OF PURPOSE SYSTEM

In the purpose system, patient can check temperature, Humidity, blood pressure, diabetes by using mobile app and some sensor. Client can have required registering their information on the system server to get login ID and password. By using this login ID and password they logged in to the mobile app. Patient can attach the sensor to the body, and start the mobile

app. The sensors are activated and send data to the mobile app through controller by using Bluetooth connectivity. This data will be sent to the medical server for further processing.

The medical server will access this data and analyse it by some computation and generate report. Report contains sensor parameter related to disease and some suggestion for the patient to take immediate action. This report will be sent to the patient as well as doctor and this information is also stored on cloud storage and server's database. Doctor will access patient details anywhere from medical server on his application and send his suggestion to the patient. Patient will use this report to take medical action. All this information backup is also store on mobile device locally so that application can access the data in case of network problem**.**

5. ADVANTAGES AND LIMITATION

Advantages

1. With the Healthcare monitoring system Doctors can easily monitor the patient with his/her home or outside the home.
2. The system can also be used in rural areas.
3. Possible to monitor the health in real time.
4. 4. The patient can also be easily analyzed by the doctor at his home.

Limitation

1. If Micro controller fails then it leads to catastrophe.
2. Bio-sensors are costlier.
3. Complexity in setting up the system.

5. RESULTS

Here some pictures of android application of Healthcare System

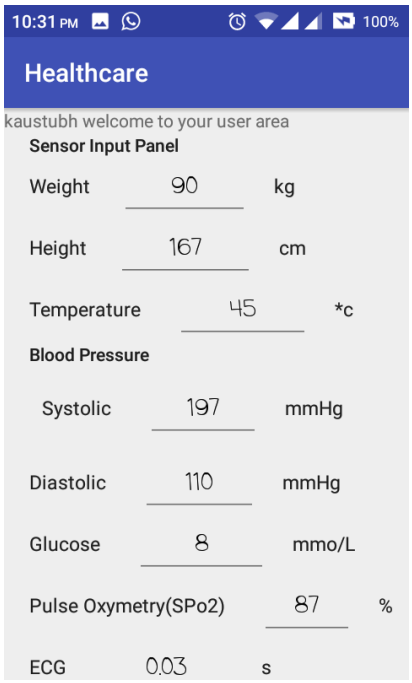

Fig. 3 Input from sensors

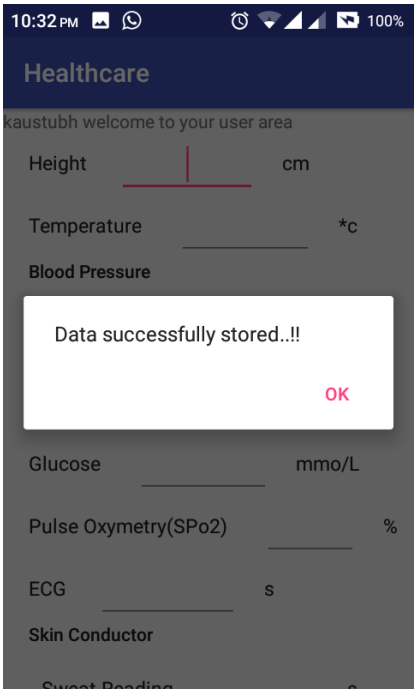

Fig. 4 Data Stored Successfully

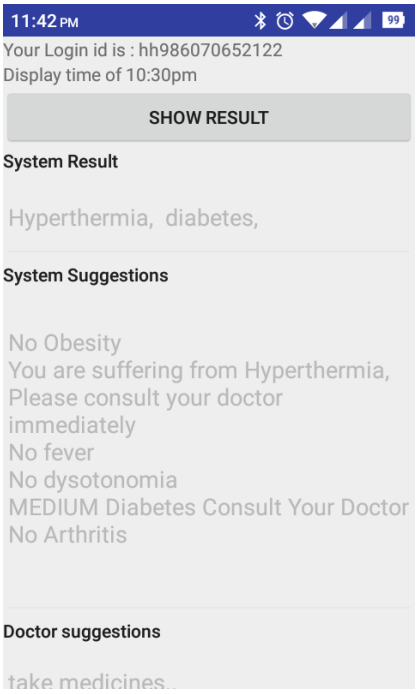

Fig. 5 System Results

Here some pictures of website of Healthcare system.

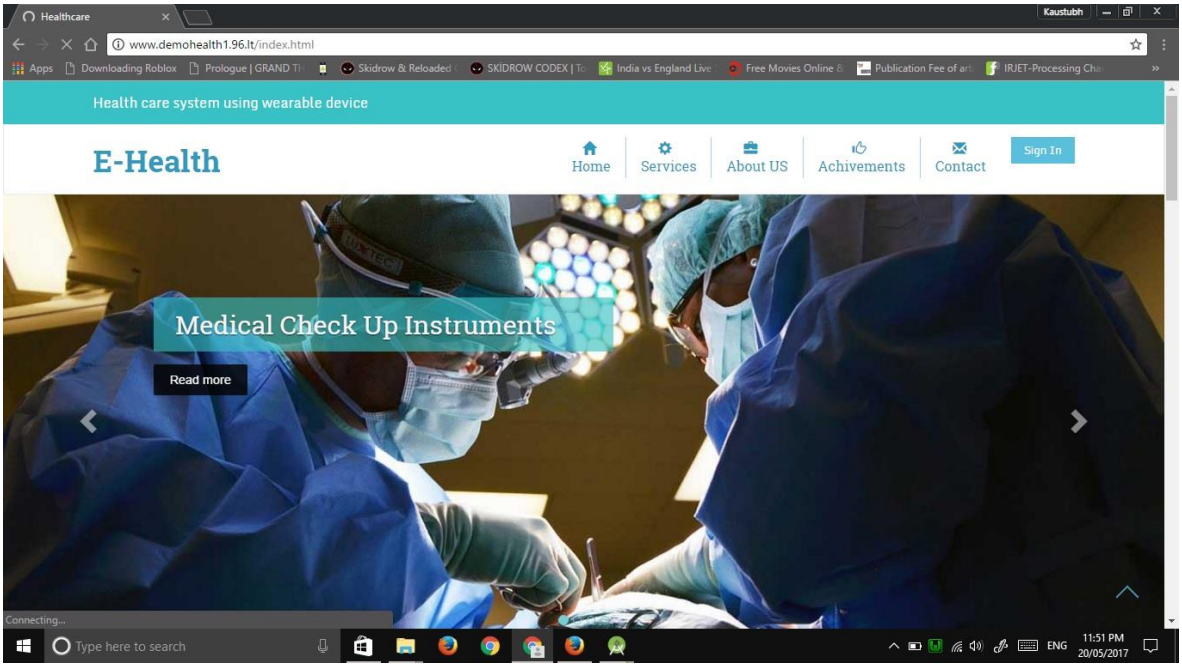

Fig. 5 Home Page of Healthcare system

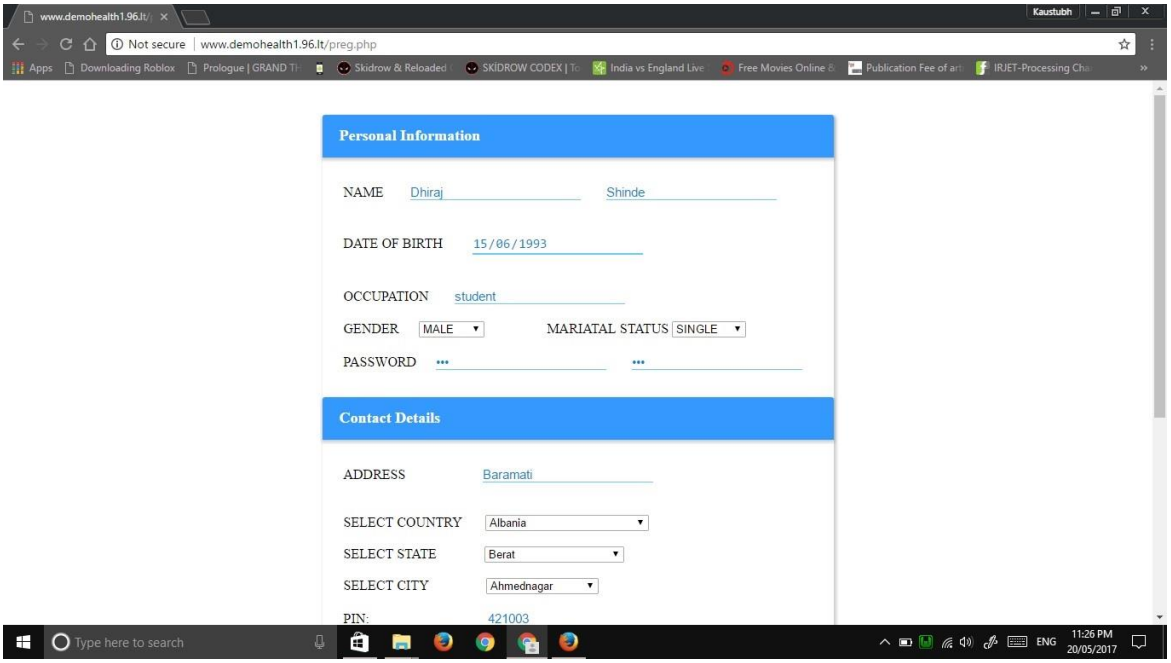

Fig. 6 Registration Page of Healthcare system

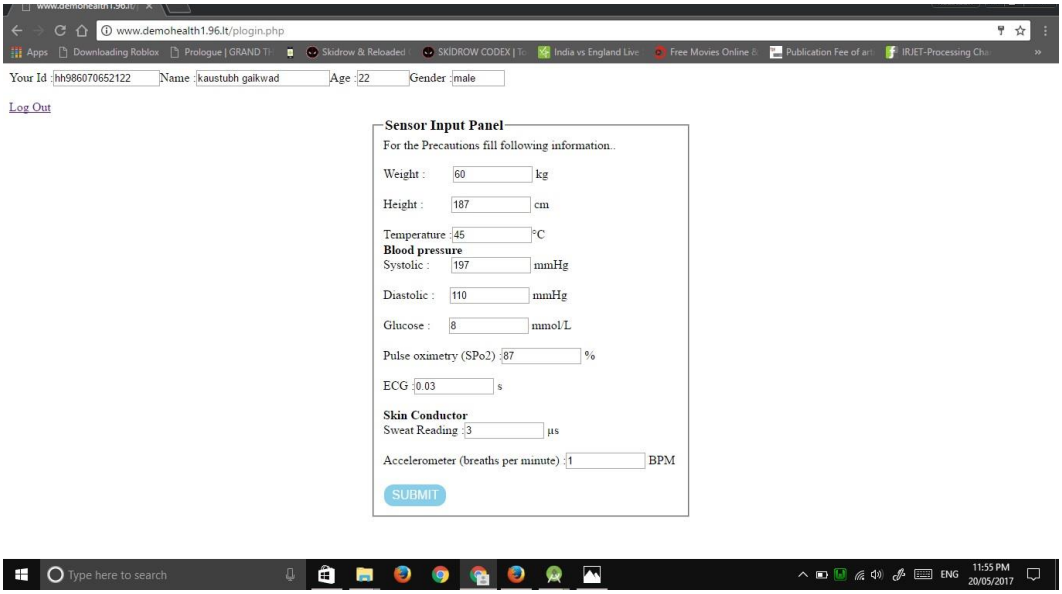

Fig. 7 Input from the android application user

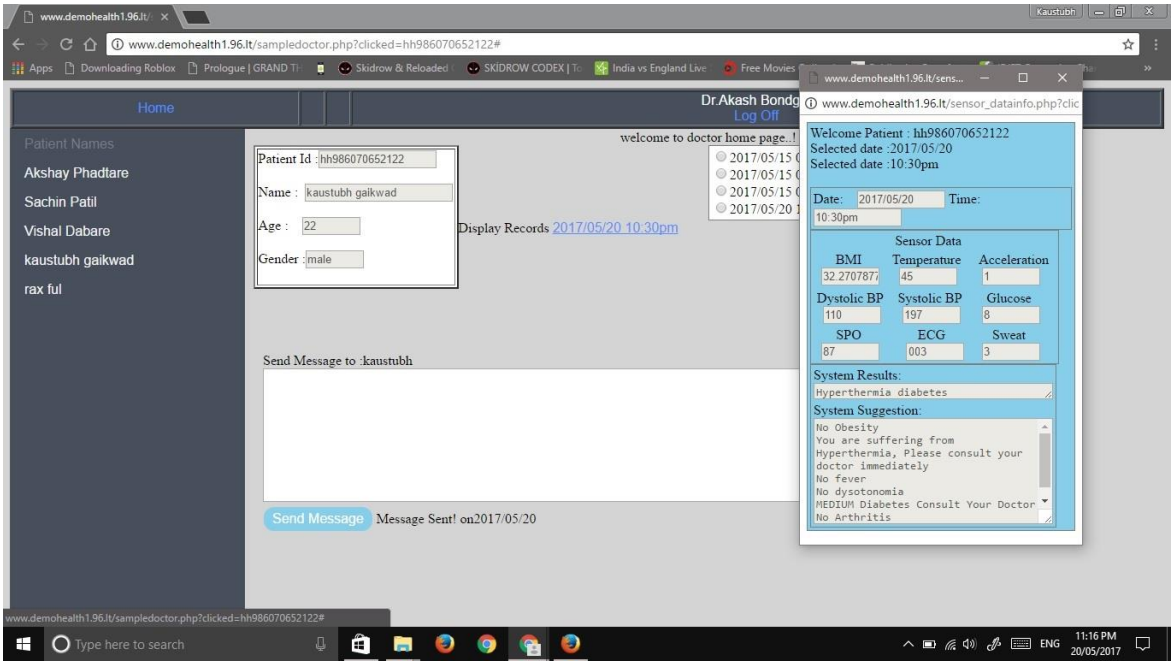

Fig. 8 Doctor Portal

6. CONCLUSION

The advantages of the health care monitoring based system on sensors and software for health care are:

Fig. 1. Quick data visualization and big data storage.

Fig. 2. Data and services virtualized through cloud computing.

The Software application health monitoring can also be used in e-Learning processes by medical students and doctors for analyzed data and make correction for diagnostics based on clinical trial data.

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