**Chapter 3**

**System Overview and Architecture**

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3.1 System Overview

The proposed system consists of five principal parts. These are Microcontroller (Arduino Board), Patient device, Server, Big data analytical tools and Doctor device as shown in figure-1.



Figure 3.1: System Overview

* Arduino Board: The Arduino board with sensors and Bluetooth module is used to get the patient current health status in the patient’s device.
* Patients Device: The patient’s end device contains an Android phone. After getting the data from Arduino circuit board in the android phone, then the data is send to the server using an Android Application.
* Server: The is the main processing unit that store the data, analyse the data and make a decision to send notification to the doctor under some condition of patient’s physical parameters. The sensor also notify the patient about his/her condition.
* Doctor Device: The doctor’s end device is an Android phone with and Android Application through this App the doctor can monitor the patient’s health and can communicate with the patient.

3.2 System Architecture

Figure 1 depicts the block diagram of the proposed system client-server architecture of the system for a remote health monitoring. The major components of the architecture are discussed below. There are three blocks which are the patient block, server block and the doctor block. These blocks consist of the many components and has specific functionality.

*Data Acquisition:* It is performed by multiple wearable sensors that measure physiological biomarkers, such as ECG, body temperature, Heart rate and blood pressure. The sensors connect to the Arduino uno microcontroller which sends data periodically to Android Application via the Bluetooth module.

*Data Transmission***:** The data transmission components of the device (Android Application) are responsible for transferring patient records in a safe, anonymity, preferably almost in real time from the patient's home (or any remote location) to the server.

*Cloud Processing***:** Server is the core of this project. The system is designed for long term storage of patient’s biomedical information in MySQL database as well assisting health professionals with diagnostic information. We have designed a server to handle the data transmission between the patient and the doctor. To analyse the data sent by the patient we have designed an API (Application Programming Interface) that check the data stored in the database and make decision to send a notification to the doctor about the patient’s physiological condition. The server sends a notification to the doctor Application about the patient’s health condition whenever there is abnormality in the database. Every message with notification is saved in the server database. The doctor may ask to do further test through the android application.

Decision for treatment

Doctor’s phone

Database

Server (observing data)

Big data analytical tool

Sensors

Microcontroller

Smart phone

no

Abnormal data

Require any test?

yes

Figure 3.2: System Architecture

Big data analytical tool is a part of the server block. Health care big data and analytical tools are the main focusing part. Different types of big data tools are used to extract useful information by providing the big data and required program to the Hadoop system.