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RESEARCH ARTICLE

A Proposed Mobile Based Health Care System for Patient Diagnosis using Android OS

Mr. Ketan D. Bodhe[1], Dr. R. R. Sawant[2], Mr. A. N. Kazi[3]

[1]M.E. Student, Department of CSE, KSIET, Hingoli, India

[2]Professor & Principal, KSIET, Hingoli, India

[3]Assistant Professor, Department of CSE, BNCOE, Pusad, India

[1] ketanbodhe@gmail.com [2] rrs1902@gmail.com [3] aihtesham.786@gmail.com

Abstract-

Recent technological advances in mobile communication and rule based expert system together enable new types of healthcare systems. Especially the availability of Android OS based more user friendly GUI and cheap smart phones gives new possibilities for a continuously monitoring of human health status such his/her BP, Glucose level and there physiological parameters data allows an early detection of diabetes that leads other potential dieses. Our proposed healthcare system mainly takes care of patients who suffer from chronic disease like diabetes such person can live normally when the health condition is stable, but in critical condition he/she needs desperate help of doctors and assistance to reduce the probability of deteriorating health conditions. Such chronic patients can perform some simple self healthcare and monitoring functions via mobile phones through our proposed system to know about the probable diseases.

Keywords: Android OS; ECG; Diabetes; JSON

I. INTRODUCTION

Due to the rapidly increasing of the mobile devices attached to the Internet. A lot of researchers had been developed to manage and maximize the benefit of such integration. The general consideration about mobile devices are user looking for various services offered by mobile device, But we are now interested to provide the such applications that will look forward Health care and provides the remote diagnosis to patient and patient monitoring. In this paper we proposed an idea that mobile device take care of the daily life Health care issues by taking various check-up either by patient or it's assistance that can able to take his /her medical check-up by using medical peripherals and upload the report by its mobile phone to server where expert system could suggest precautionary steps or diagnosis along with patient status. We have a lot of medical peripherals available around us that individually dedicated to some specific work like weight scale, blood pressure meter, pulse oximeter, sugar level meter, peak flow meter etc.

Now a days there lot of handled devices (e.g. Smart phone, Tablet PC) available that gives opportunity to add application to mobile device that can save a time of patient reporting to expert, (Doctors) as well as it will

provide rapid diagnosis to patient, consider scenario that you are at rural place where expert doctors are not available and you got to some serious situation and you have such system available then you can send symptoms' along with real check up values like sugar level ,blood pressure, even various sound like heart beat, lungs recording to the server where your expert or expert system immediately evaluate and send diagnosis remotely.

Our proposed healthcare system mainly takes care of diabetes patients who can live normally when the health condition is stable, while are in desperate need of help and assistance to reduce the probability of deteriorating health conditions. Such chronic patients can perform some simple self healthcare and monitoring functions via mobile phones through our proposed system when health condition is unstable.

In general, a healthcare scenario includes different roles such as patients and various healthcare providers. Analysis on information exchanged be implemented via providing diagnosis on mobile communication networks. Our mobile healthcare system provides a general information transmission service to achieve various intelligent healthcare functions.

The main objective of the work

• To implement Remote health care systems in the world the details of mobile based Health Care System under Development in rural India
• To assist doctors for various diseases associated with symptoms i.e. to be a home assistant for doctors.
• To help general practice doctors, nurses, nursing students etc and to assist the eye patients as first aid diagnosis
• To provide repository of information regarding various diseases.

II. LITERATURE REVIEW

[Jaesoon Choi, et. Al. 2005] This paper gives a web-based database system for intelligent remote monitoring of an artificial heart has been developed. It is important for patients with an artificial heart implant to be discharged from the hospital after an appropriate stabilization period for better recovery and quality of life. Reliable continuous remote monitoring systems for these patients with life support devices are gaining practical meaning. The authors have developed a remote monitoring system for this purpose that consists of a portable/desktop monitoring terminal, a database for continuous recording of patient and device status, a web-based data access system with which clinicians can access real-time patient and device status data and past history data, and an intelligent diagnosis algorithm module that noninvasively estimates blood pump output and makes automatic classification of the device status. The system has been tested with data generation emulators installed on remote sites for simulation study, and in two cases of animal experiments conducted at remote facilities. The system showed acceptable functionality and reliability. The intelligence algorithm also showed acceptable Practicality in an application to animal experiment data.

[Wail M. Omar and A. Taleb-Bendiab, 2006] This is the architecture designing conceptual model to hide the complexity of any model, the discussion of this paper shows how can we construct service oriented architecture that is essential for our proposed system. As providers, insurers, and users look for ways to manage the costs of high quality healthcare, they naturally look toward IT for solutions. But the extremely decentralized and fractured nature of healthcare services makes it difficult to develop a single IT system to serve all needs. Such a situation, however, is an ideal test case for service-oriented architectures (SOAs), which aim at offering a generic model for implementing large-scale enterprise applications. Hence, an SOA is simultaneously a model for hiding the complexity of distributed services from users and providing a
framework for service providers both characteristics of keen interest in healthcare circles.

[Ren-Guey Lee et. Al. 2007]This paper shows how Hypertension and arrhythmia are chronic diseases, which can be effectively prevented and controlled only if the physiological parameters of the patient are constantly monitored, along with the full support of the health education and professional medical care. The discussion of paper show, a role-based intelligent mobile care system with alert mechanism in chronic care environment is proposed and implemented. The roles in this system include patients, physicians, nurses, and healthcare providers. Each of the roles represents a person that uses a mobile device such as a mobile phone to communicate with the server setup in the care center such that he or she can go around without restrictions. For commercial mobile phones with Bluetooth communication capability attached to chronic patients, we have developed physiological signal recognition algorithms that were implemented and built-in in the mobile phone without affecting its original communication functions. It is thus possible to integrate several front-end mobile care devices with Bluetooth communication capability to extract patients' various physiological parameters [such as blood pressure, pulse, saturation of haemoglobin (SpO2), and electrocardiogram (ECG)], to monitor multiple physiological signals without space limit,

and to upload important or abnormal physiological information to healthcare center for storage and analysis or transmit the information to physicians and healthcare providers for further processing. Thus, the physiological signal extraction devices only have to deal with signal extraction and wireless transmission. Since they do not have to do signal processing, their form factor can be further reduced to reach the goal of microminiaturization and power saving. An alert management mechanism has been included in back-end healthcare center to initiate various strategies for automatic emergency alerts after receiving emergency messages or after automatically recognizing emergency messages. Within the time intervals in system setting, according to the medical history of a specific patient, our prototype system can inform various healthcare providers in sequence to provide healthcare service with their reply to ensure the accuracy of alert information and the completeness of early warning notification to further improve the healthcare quality

[Yutaka Hata, et.al. 2009] In this paper, authors describe a human health management system scheme and its practical applications. Specifically, it focuses on health management, medical diagnosis, and surgical support system of systems engineering (SoSE). The application domains discussed here are broad and essential in health management and clinical practice. Firstly, they describe a system of systems (SoS) in human health management. Within it, a notion of health management is introduced and discussed from the viewpoint of SoS. Human health management is the first level of daily monitoring for a healthy human. The discussion in this paper is important to understand the term "Daily Health care" that will helpful to avoid the health diseases by taking precautionary steps like doctors early advices.

[Watcharachai Wiriyasuttiwong and Walita Narkbuakaew, 2009] This research proposes design and development of a medical knowledge-based system (MKBS) for diagnosis from symptoms and signs. This system was developed to support a knowledge construction and an inference engine. The knowledge construction was based on a concept of production rules, which was performed in tree structure. The inference engine used interactive forward chaining technique to infer a diagnostic result. The proposed system was designed to interact with user by using question forms of symptoms, and it was able to support text and picture information. This paper gives more practical approach for development of expert system for Medical domain that is required for our proposed system.

[Jim Basilakis et.al. 2010] Telehealth is the provision of health services at a distance. Typically, this occurs in unsupervised or remote environments, such as a patient's home. We describe one such telehealth system and the integration of extracted clinical measurement parameters with a decision-support system (DSS). An enterprise application-server framework, combined with a rules engine and statistical analysis tools, is used to analyze the acquired telehealth data, searching for trends and shifts in parameter values, as well as identifying individual measurements that exceed predetermined or adaptive thresholds. An overarching business process engine is used to manage the coreDSS knowledge base and coordinate workflow outputs of the DSS. The primary role for such a DSS is to provide an effective means to reduce the data overload and to provide a means of health risk stratification to allow appropriate targeting of clinical resources to best manage the health of the patient.
[P.R. China, 2012] The importance of health and being medically fit is goal for every human being. Unhealthy situations of human beings are of course very disadvantageous and disastrous to our society. Some public hospitals in Ghana comprising of Korle Bu Teaching Hospital (KBTH), Komfo Anokye Teaching Hospital (KATH), 37 Military Hospital, Ridge Hospital as well as Tema General Hospital are notable hospitals that do their maximum best to provide health needs to Ghanaians. The facilities of these hospitals however, find it difficult to meet the enormous requirements of patients that daily attend hospitals for minor or major treatments as well as check-ups and birth delivery. Various private hospitals have sprung up in Ghana to support and relieve pressure of enormous patient numbers the public hospitals. In addition to limited health facilities, Medical Doctors in both private and public hospitals in Ghana are always under a lot of stress and intense pressure to perform accurate diagnosis and prescriptions for so many daily patients through medical consultancy. Through Artificial Intelligence (AI) techniques, literature review and design-based research methodologies, this paper focuses on how Medical Doctors in Ghana can use a designed Expert System through mobile technology to speed up diagnosis, confirm their own diagnosis, provide advice on found diagnosis and provide advice on certain diseases when diagnosed on a patient. The above paper gives real life problems that occurs in Ghana while providing medical facilities to Ghanaians when the patient was huge as compare to available experts, so they uses the expert system for diagnosing the patient to reduce the time.

III. PROPOSED SYSTEM DESIGN

This system consisting of a client side Android mobile application connecting to the remote server, server mainly responsible for running expert system program as well as it also stores all the other information about patient like its food details, glucose level, BP, Medication and exercise information etc.

For detection of diabetes questioner module asks questions to patient and sends this to server where it tested against the decision support system (Rule based system). And resulting output is again sending back to client.

Other patient information can use for management of diabetes this is mainly analyze by the expert/doctor and it then they may suggest how to control it in many respect like what diet ,exercise and medication can helpful for controlling diabetes.

For detection of diabetes score Accumulation method is use to calculate severity of causing diabetes this consisting of different questioner where each question having different score values that is given after the analysis of symptoms like primary symptoms, classic symptoms and others.

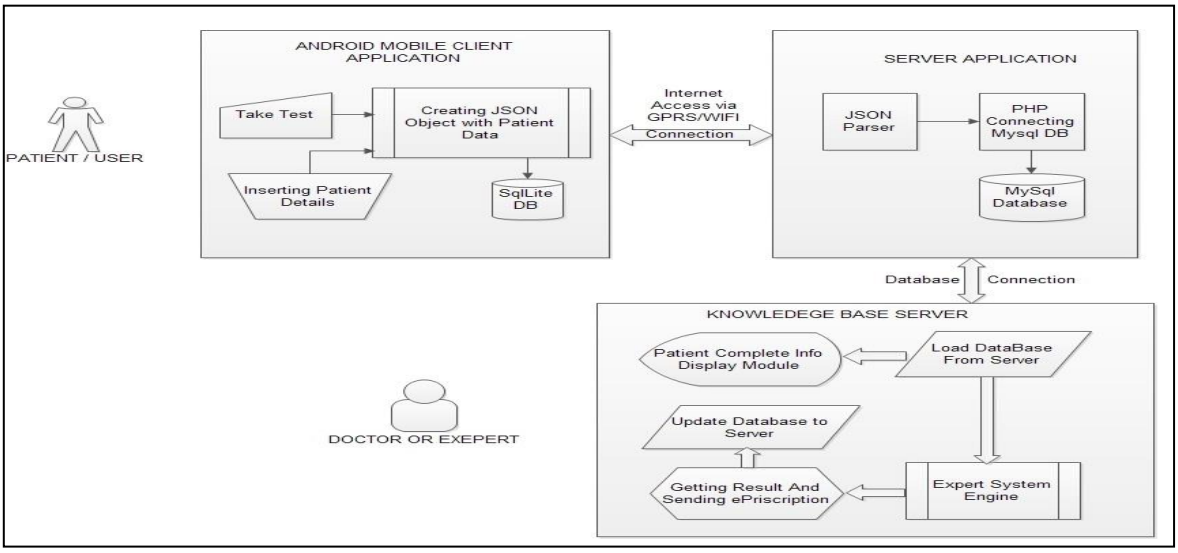

Figure 1 : Complete architecture of Proposed System

Figure 1 shows the brief system overview.

The following algorithm shows how it working:

```
Declration Var float Fat,Protein,Gulcose,carbohadrates,insulin
Declration Var int Height,Age,SynchID
START
//CLIENT MODULE
USER INPUT:
        Get Details
        Solve Questioner
Process:
if(SynchID==null)
{
        Synchronisation_with_server()
        {
```



```
                Creating JSON Object;
        //              Send to mHealthServer;
                WriteChanges_to_Server();
        }
}
//DATABASE SERVER MODULE
Process:
        Read JSON object;
if(SynchID==null)
{
        Encode Parameters;
        Update_Into_DataBase();

        Synchronisation_with_client()
        {
                WriteChanges_to_client();


        }
}
//KNOWLEDGEBASE SERVER MODULE
Declaration
        float score;
        String test_result,ePricecription;
Process:
while(1)
{
        //Runninng knowledge base server
Run()
        {
                Read_Database();

                Read_table_test_quetion()
                {
//evaluate with knowledge base program
                        Evaluate_Test();
                        return test_result;
                }

        }
}

Write_ePriscription_Database();
```

STOP

IV. CONCLUSIONS

This work proposes a new mobile healthcare system for diabetes patients. This application accept the relevant information from the patient and transfer this information to expert system and make ease to get rapid diagnosis for remote area patients.

The goal of this application is to implement and design a prototype mobile healthcare system consisting of three parts : a records data from a patient in real-time, an android mobile phone that forwards the received data to a central server and finally a server responsible to store and analyze that data by expert system.

According to the answer the system will make judgment about the possibility of illness, how much severe it is like slight chance, moderate chance, high chance, very high chance, diabetic or not.

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