



## A Proposed Framework for Uninterrupted Health Care Monitoring System for Critical Patients Using Ubiquitous Computing

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### ABSTRACT

The health care sector is expecting lots of support from the digital computing sector to provide its maximum possibility of best service to their patients. The critical patient's life span is managed under continuous surveillance to keep them safe. The existing methods were providing the basic level of service in the health care sector, but growth of the digital computing sector is in need to concentrate on the health care sector to improve the service which are providing by the health care management to their patients. The proposed framework contains four modes and those modes are fulfil the expectations of heal care managements. The proposed framework is a concept model which was designed to surveillance the critical patients in the uninterrupted manner. And also, it was designed to maintain the continuous connectivity between the critical patients and their health care undertaken hospitals to provide the treatment and first aids at the happenings of unexpected situations.

**KEYWORDS:** Ubiquitous Computing, Health care Monitoring System, Wireless Network, Network Surveillance, Health care Management

## **INTRODUCTION**

The critical patient's health is in-need to undergo for continuous monitoring to avoid the happening of unexpected things. There are many monitoring systems are used in the health care system, but those things are concentrating on the patient at the required place. Whenever the patient is unable to reach the regular health check-up hospital, there will be some risk faced by that patient due to the unavailability of his/her health-related data. In this proposed, it is focusing on major areas to keep the patient health in safe mode at any kind of circumstances. The proposed system is included Hospital Monitoring Mode, In-House Monitoring Mode, Emergency Transit Monitoring Mode and Anywhere Monitoring Mode. These different modes are explained below.

The Ubiquitous computing is a model in software engineering and computer science where the computing is made to appear anytime and everywhere concept. The proposed framework is using cloud storage to store and process the patient's related data. The cloud storage will help the patients to manage their data in safe and also they can easily able to access the data at the needed time. The cloud storage is synchronized with the all modes of operations. This will lead to improve the patient's data accessibility and also it will bring the transparency in the patient's data management.

## **LITERATURE REVIEW**

Mahesh et al proposed a prototype of a smart gateway and it is an interconnection and services management platform for WSN health care systems at residence based atmosphere. By building a bridge between a WSN and public communication networks, and being compatible with an onboard data decision system and a lightweight database, the proposed smart gateway system was enabled to make patients' health state decisions in low-power and low-cost and also get faster response time [1]. This model is defined in this research paper as Existing Model One for comparison with the proposed framework.

Praveen et al proposed a model that will help the medical staff to manage the overall state of monitored patients in autonomous, real-time and remotely way. The application of the healthcare wireless Sensor networks to these scenarios could perform this work. Through a network it is possible to reach each one of the patients' nodes anytime and at anywhere as long as a network terminal is accessible. The idea of the proposed work is a reliable continuous monitoring solution of hospitalized patients based on a healthcare wireless sensor network with mobility support [2]. This model is defined in this research paper as Existing Model Two for comparison with the proposed framework.

Sunil et al presented the system Architecture for smart Healthcare using Wireless Sensor Network with GSM Module and Microcontroller. The proposed model presents the monitoring system to monitor the physiological parameters such as Blood Pressure (BP), ECG, Body Temperature and Respiration etc. The coordinator node has attached on body of patients for collecting the signal from wireless sensors. The system can detect abnormal condition of patients and send the SMS or e-mail to the physician [3]. This model is defined in this research paper as Existing Model Three for comparison with the proposed framework.

The India's constitution guarantees free healthcare for all its citizens [4], but in practice the private healthcare sector is responsible for the majority of healthcare in India and most healthcare expenses are paid out of pocket by patients and their families, rather than through insurance [5].

## **METHODOLOGY**

The methodology of the proposed framework is named as Continuous Health Care Monitoring System for Critical Patients. The proposed model contains four modes of operations and they are;

- Hospital Monitoring Mode
- In-House Monitoring Mode
- Emergency Transit Monitoring Mode
- Anywhere Monitoring Mode.
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Fig.1 shows the proposed model. In this research work the four modes of operations, designing and simulation related information are explained. The Anywhere Monitoring Mode also will be taken into consideration for future extend. The fig.1 explains the framework model of Continuous Health Care Monitoring System for Critical Patients.

### **Hospital Monitoring Mode**

This is the first place where the patient is brought under continuous monitoring system. The patient related information will be made as a record and all the health care information of that patient will be updated in the patient's record. While the patient revisiting the hospital for a periodic check-up or further treatment, that time the stored record will be used. These records will be made as a digital record and that will be stored at cloud storage, so it is convenient to view the patient health records at anywhere and at any time by hospital team, by patient or by a doctor.

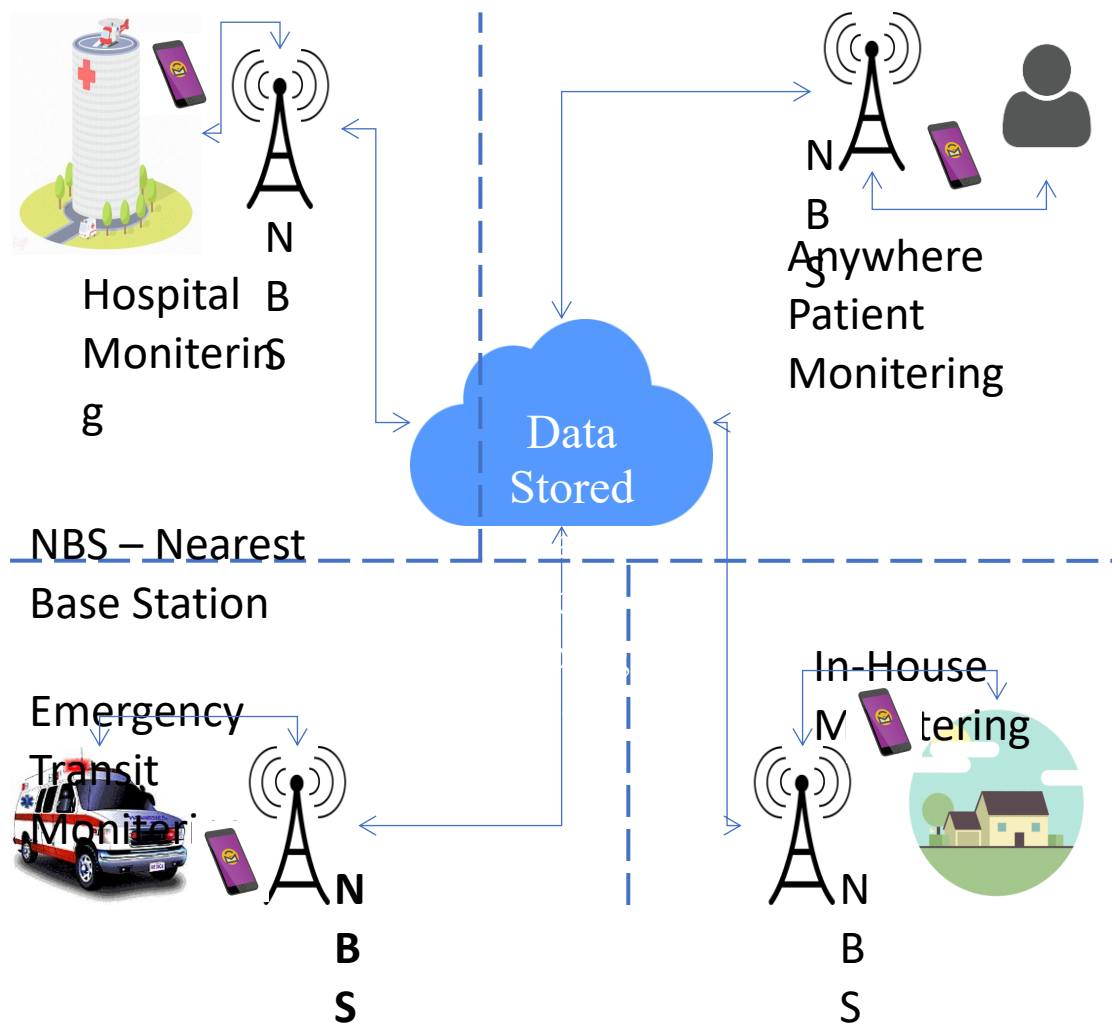


Fig.1 Continuous Health Care Monitoring System for Critical Patients Framework

### **In-House Monitoring Mode**

The In-House Monitoring Mode is used to monitor the patient's health condition continuously. Some patient needs hospital assistance at any time due to their major treatment. So this mode is used to monitor and provide the health assistance to that patient under on-demand structure.

### **Emergency Transit Monitoring Mode**

Due to some emergencies, patients may transit to the hospital by using ambulance or other vehicles. That time it may take some time to reach the hospital, due to the availability of transit facility and the distance between the patients' locations to hospital location. At that time the golden minutes of that patient may lapse, so this mode will help to the patient who is under transit. Once the patient faced emergencies, then the person who is near to the patient will

inform that incident to the hospital. Under this mode some emergency first-aid instructions will pass to the person who is with that patient. Also, while the person is under transit to the hospital, the nursing assistant in that transit vehicle (if it is ambulance) will check-up that patient's current status and what kind of treatment is needed by that patient related intimations will pass to the hospital. Based on those intimations, the further treatment arrangements will be made available at the hospital to assist that patient.

### **Anywhere Monitoring Mode**

The patient may trip to some places, at that time if that patient faced or needed any health-related assistance from his/her hospital directly is impossible. This mode will bring that impossible into possible. If patient faced any kind of problem and that patient is in need of assistance from his under treatment hospital, the patient first need to go the nearest hospital to get the assistance. From that hospital, the patient's health record will be accessed from the actual hospital cloud storage to view the history of that patient by using the accessing rights of that patient. So the doctor in that hospital will give the correct treatment to that patient with the help of that health report. Accessing the health report at the right time will help to save that patient's life.

### **Simulating Scenario**

The Network Simulator 2 i.e. NS-2 is going to be used to simulate the proposed Framework. The simulation will be going to be done separately for all the modes proposed in framework. The sample data packet will pass between the source node and the destination node through the available and nearest base stations.

## **RESULTS AND DISCUSSION**

Some of the features and functions of the proposed model will extend with updated design without difficulty. The features of the proposed framework's Hospital Monitoring Mode, In-House Monitoring Mode and Emergency Transit Monitoring Mode and Anywhere Monitoring Mode were shown the possibility of implementing this model in real time. But coming to the reality, the proposed framework must give better features than the existing models. For that purpose, three existing models were taken into consideration for the comparison purpose with the proposed framework. Those comparison shows that the proposed framework contains some essential features than the existing models. The Table 01 shows the comparison chart between the proposed model with the existing models.

Sl. No.	Features	Existing Model 01	Existing Model 02	Existing Model 03	Proposed Framework
01	Storing Record in Cloud	<i>Not Available</i>	<i>Not Available</i>	<i>Not Available</i>	<i>Available</i>
02	Continuous Monitoring	<i>Not Available</i>	<i>Not Available</i>	<i>Not Available</i>	<i>Available</i>
03	Using Digital Record	<i>Not Available</i>	<i>Not Available</i>	<i>Not Available</i>	<i>Available</i>
04	In-Transit Monitoring	<i>Not Available</i>	<i>Not Available</i>	<i>Not Available</i>	<i>Available</i>
05	Data Security for Medical Record	<i>Not Available</i>	<i>Not Available</i>	<i>Not Available</i>	<i>Available</i>
06	Accessing Medical Data from Outside	<i>Not Available</i>	<i>Not Available</i>	<i>Not Available</i>	<i>Available</i>
07	Anywhere Patient Monitoring	<i>Not Available</i>	<i>Not Available</i>	<i>Not Available</i>	<i>Available</i>

Table.1. Comparison Chart of Existing model Vs. Proposed Model

## CONCLUSION AND FUTURE ENHANCEMENT

The proposed framework features are showing that this implementation of the model in real time is possible and also if the proposed framework model will able to provide the better service that the existing methods. The proposed framework needs to get into implementation to verify its possibility level to provide its better service. The framework needs to maintain under updating in certain time intervals, because the digital sector is introducing new technologies each and every day. Those technologies need to be incorporate with this framework top provide the better service for ever.

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