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Wireless Emergency Telemedicine System for Patients Tracking

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Abstract

Nowadays, remote human services frameworks have received increasing attention in the most recent decade, which explains why intelligent frameworks with physiological signal checking for e-medicinal services are a rapidly developing area of research and development. This examination thus receives a framework that incorporates consistent collection and assessment of various imperative signs, long haul medicinal services, and a cell association with a clinical focus in an emergency situation, and it moves all gained raw information by means of the internet in a typical situation. This framework is capable of continuously obtaining four distinct physiological signs, such as the ECG, SpO2, temperature, and circulatory strain, which can then be transferred to a clever information examination plan to analyse anomalous heartbeats for the purpose of investigating potential interminable illnesses.

In addition, the suggested framework includes a kind web interface that allows healthcare professionals to monitor prompt heartbeat signals for remote therapy while on the job. When an unexpected event occurs or the request for continuous presentation of basic signals is granted, every single physiological sign will be transferred to a distant clinical server as soon as possible over both mobile phone networks and the internet, as described above. Information may also be transferred to a relative's cell phone or a specialist's phone via the Global Positioning System (GPRS). A model of such a framework has been successfully developed and implemented, and it will provide our general public with exclusive expectations of human services at a far lower cost than is now the case.

1. Introduction

An improved healthcare system has been made feasible in the previous decade as a result of recent advancements in wireless and network technologies, which have been related to recent advancements in nanotechnologies and ubiquitous computing systems. In the field of medicine, the word telemedicine refers to the use of telecommunication technology for medical diagnosis, treatment, and patient care [1, 2]. Through current telecommunications (wireless communications) and information technology, the goal of telemedicine is to bring expert-based treatment to understaffed distant areas. One of the advantages of telemedicine is that it saves money on transportation costs since information is less costly to move than humans. Progress in medical technology has resulted in a rapid increase in the number of senior people in many countries, leading in a growing need for home health monitoring to guarantee that elderly patients can continue to live independently [2].

Many physiological signals can be measured from individuals in their living environments while they go about their daily activities, and these signals have the potential to be used to detect changes in health status in the early stages or to automatically alert paramedics in emergency situations [3, 4]. All of the studies that have been developed and are currently in use in this area, particularly for remote monitoring of physiological parameters, can be classified according to several factors, including the type of sensors used, the type of data communication used, the monitoring device used, and the signal processing/medical algorithms used [4]. As a result, these characteristics, as well as current research, will be presented in this section. For example, bio signal sensors, processing units, data transmission networks, and medical service centres are some of the most often used telemedicine system components in recent years, as seen in Figure 1.

The bio signal sensors are in charge of collecting physiological data (such as the patient's vital signs) and delivering it to the signal processing unit. Many studies have been undertaken solely to design these sensors to be small in size [5, retain patient mobility [6, and consume minimal operational power in order to minimise battery size in order to allow the sensors to operate for extended periods of time] [7]. Using a personal area network or body network [8, a collection of wearable medical sensors might interact with one another, and the sensors could even be incorporated into the user's clothing [9]. Every remote monitoring system has a sensor layer that is normally coupled to a processing device at the following step.

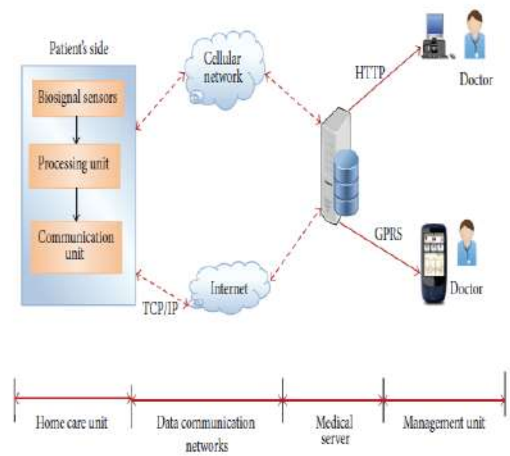

Figure 1: Main components of telemedicine system.

Signal collecting, processing, and analysis, as well as data formatting, are all performed before data is transferred to the communication layer. The processing unit may assess the current medical state of the patient as well as trends in the patient's medical condition. In addition to PCs and mobile phones, embedded systems (microcontroller, DSP processor, and FPGA) are also available [12]. Many medical algorithms have been established in recent telemedicine research to aid in patient diagnosis [13] and the early identification of cardiovascular illnesses [14], among other applications. Pulse evaluation has long been a study topic of interest in the realm of physiology since the pulse represents a person's overall health [15] and is one of the most important vital signs. An extensive body of research has suggested monitoring systems capable of measuring a variety of bio signals and providing QRS detection and arrhythmia classification [14], real-time ECG classification algorithm [13], and heart rate variability measurement [14]. In addition, recent advancements in wireless and network technology

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have made it feasible to construct a wireless telemedicine system that provides a cost-effective way of delivering healthcare services to patients on a remote basis.

Generally speaking, telemedicine systems may be classified into two types of operation: real-time mode, in which patient data is available at the server end immediately after capture, and store-and-forward mode, in which the data is accessible at a later time. Vital signs are communicated to a central server in both modalities, and they do so using computer networks [16], mobile networks [17], public telephone networks [18], or cable television networks [19]. An expert is anticipated at locations where he or she can access the server for analysis of vital signs data, and a patient is expected to be at a fixed location such as their house or healthcare facility where a PC is equipped for transferring these data, according to these system models. The usage of PCs that are linked to a wired network restricts the amount of flexibility that physicians and patients have to move about. The worldwide system for mobile (GSM) communication mobile phone network was utilised to link the server in order to increase the mobility of the doctor [20]. Hung and Zhang developed a wireless application protocol (WAP)-based telemonitoring system, which was published in [21]. Doctors may read the monitored data on WAP devices while in store-and-forward mode [22], since it made use of WAP devices as mobile access terminals. Patient movement is significantly reduced in such systems as compared to the doctor's system, according to the study.

2. Review of the literature

Previous telemedicine systems used sensor units that comprised of an electrocardiogram data collection circuit, an A/D converter, and a storage unit, among other things. This device was fitted with an indoor, wireless transmitter for transmitting the monitored data to a network-connected PC in order to accommodate the patient's restricted mobility [18, 21]. [23] describes the use of a GSM modem connected to a PC for real-time transmission of ECG data from a moving ambulance truck [24]. Rachid and Woodward [24] proposed the use of a Bluetooth-enabled processing unit that communicates monitored data to a Bluetooth-enabled mobile phone, which then transmits the monitored data to a server over the GSM/GPRS (general packet radio service) network. Engin et al. [25] on the other hand, utilised a cell phone to send the recorded ECG signal in real time, which was a first in the field. The patients' mobility was increased as a result of these designs [24, 25]. ECG analysis is not conducted at the location where the ECG is obtained; instead, it is performed at the server end, where the ECG is analysed, as an example. In reality, there is a loss of efficiency in the usage of the GSM/GPRS network since regular ECGs are also sent, resulting in a large cost for the network operator to bear. An innovative mobile patient monitoring system, developed by Lin and colleagues [26], blends personal digital assistant (PDA) technology with wireless local area network (WLAN) technology to communicate a patient's vital signs in real time to a distant central management unit. The method was based on a small-sized mobile ECG recording equipment that communicated with the cell phone through wireless transmission of measurement data [27]. The received data is evaluated on the mobile phone, and if any irregularities are discovered within the measurement data, the data will be forwarded to a server for further analysis. However, due to the limitations of the processing units included inside the mobile phone, the total performance was seldom operated at an optimal condition [28]. It is possible that a delay in data transmission may cause problems with data processing and measurement. All telemedicine systems produced may be classified into numerous categories based on the components of the system that have been mentioned.

Table 1: Set of telemedicine studies along with aspects which each study concerns.

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Reference number	Biosignal sensors	Communication technology		Medical algorithm	Comments
		GSM/GPRS	Internet		
[29]	ECG, BP, HR TEMP.	√	√		WSN, type of localization method for patients and an energy efficient transmission strategy, video streaming
[3]	HR, SPO2, TEMP., RESP.	√			Implement a prototype of telemedicine system based on wireless technology using GSM and GPS.
[4]	Weight, activity, BP	√	√		Android application for monitoring and using Bluetooth enabled sensors.
[5]	BP, HR, TEMP.	√	√		Design of sensors to reduce power consumption using VLSI and FPGA.
[6]	ECG, HR, SPO2, TEMP., RESP.		√		Wearable belt; high quality and flexible modules for signal conditioning are designed and assembled together.
[9]	ECG, BP, HR TEMP., PPG		√	√	Small rang RF transmission, smart wearable vest, deriving BP and HR from ECG.
[14]	ECG		√	√	QRS detection algorithm, extraction of heart rate variability, implemented in the PDA and GPS.
[13]	ECG	√	√	√	A real-time ECG classification algorithm, GPS, and a real-time R wave detection algorithm.
[15]	Pulse signal		√	√	Intelligent data analysis scheme to diagnose abnormal pulses for exploring potential chronic diseases.
[22]	ECG, HR, SPO2, TEMP., RESP.		√		Vital signals are acquired from the monitor using the RS232 interface and transmitted through the internet.
[23]	ECG, BP, HR TEMP.	√	√	√	Commercial monitors are used for the acquisition of biosignals and Huffman algorithm for ECG signal compression, GSM, GPRS, POTS, or satellite.

elements include: the kind of sensors used, the type of connection used between sensors, the monitoring/processing device, data transfer technology, and the signal processing algorithms used in the system Table 1 outlines a collection of telemedicine research conducted over the previous few decades, as well as the components of each study that were investigated.

3. The system that has been proposed

Here, we propose an integrated sensor unit, processing unit, and communication unit in one chip that is attached to the patient's body, which we refer to as the Wireless Telemedicine System (Wireless telemedicine system).

A mobile health-care unit. During the monitoring period, this will increase the patient's mobility and will have no effect on his or her active everyday life. Only anomalous readings are broadcast in order to reduce the cost of utilising the GPRS network, and as a result, the suggested system functions in two modes: store-and-forward mode and real-time mode. Store and forward mode allows the care unit to capture and send patient vital signs to a server via the internet while using a computer with a web browser. When an aberrant heartbeat is identified that the doctor is concerned about, the care unit communicates the information to the server over the GPRS network in real time.

If required, the doctor on the server might contact with the patient by SMS if that was the most convenient method. Also included is a user-friendly web-based interface for medical personnel to monitor immediate vital signs for remote treatment, which will allow for greater mobility for medical professionals in their daily activities. The rest of this work is arranged in the following manner: Section 2 contains a description of the system. A mobile-care unit and a server are the components of the proposed system. The mobile-care unit's hardware and software designs are explained in detail in Section 2.2 of this document. The system has been developed and tested. It is ready for use. Last but not least, Section 3 provides some observations and conclusions.

4. System Design (also known as system architecture)

The design of the system, which incorporates physiological sensors, signal processing, embedded systems, wireless communication, and World Wide Web technologies, is described in depth in this part. The architecture of the suggested system is shown in Figure 2. Section 2.1 provides a high-level overview of the overall system design. Section 2.2 discusses the components of the system as well as the specifics of how the system operates. System Architecture (section 2.1). Designing and implementing a telemedicine system with intelligent data analysis on the basis of physiological sensors, embedded

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systems, and other technologies is the goal of this project.

Vital signs monitoring, patient diagnosis, and home care are all made possible by wireless connectivity and the World Wide Web. Illustration of the suggested system's architecture is shown in Figure 2. It is composed mostly of the following sections.

One kind of mobile-care unit is one that can be attached to a patient's body and collect real-time or periodic vital signs information without interfering with the patient's routine activities. A smart data analysis scheme is then applied to identify abnormal pulses, and the data is then transmitted to a remote server via wireless communication, either through the internet in store and forward mode for the normal case, or through cellular networks in real-time mode for the abnormal case, as described above. In addition to being able to operate manually, the transfer of patient data in real time is also possible. Whenever the user feels uneasy, he or she may submit his or her current vital signs to the management unit for guidance or a physical examination. Because only aberrant signals are broadcast, the cost of utilising the GPRS network is reduced as a result of this practise. The raw data may be kept in the mobile-care unit's extended secure digital flash memory, which can be used for long-term storage and forwarding operations.

Second, the remote server stores the received vital signs in a human physiology database and displays the physiology signals to medical personnel through an application programme for diagnosis. (3) The local server: it stores the received vital signs in a human physiology database and displays the physiology signals to medical personnel through an application programme for diagnosis. Additionally, it provides caregivers and clinicians with remote access to vital signs through a web-based interface via the internet, allowing them to monitor these data on their mobile and wearable devices. Following an examination of the vital signs data, the doctor may send a feedback MMS message to the patient via mobile phone. In addition to medical advice, the message may include a list of control orders to be sent to the mobile-care equipment in order to resend the abnormal case's vital signs data. In addition, the remote server may notify a family member in the event of an abnormal situation and contact emergency services to take the patient to the closest medical facility.

(3) Pervasive devices: These include laptop computers, personal digital assistants (PDAs), and mobile phones, among others. Family members and clinicians may get a wealth of information on healthcare receivers through these terminal devices, which can be accessed from any location and at any time. System Components (section 2.2). The system components of the proposed emergency telemedicine system for patient monitoring and diagnosis are described in depth in this section. Unit de soins ambulatoires (mobile-care unit) 2.2.1. The mobile care unit in the proposed system was intended to be portable and lightweight, which means it is simple to transport and simple to operate, requiring patients to do absolutely nothing. In general, there are three parts that make up the mobile-care unit. Most of them

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are vital-sign signals collection modules, data control and processing modules (MCUs), and data communication modules, among other things. As a result, it may capture essential bio signals like as a three-lead ECG, heart rate, blood pressure, and oxygen saturation (SpO2), all of which are considered vital indicators. Additionally, it may analyse the patient's state as well as trends in the patient's medical condition, and it may issue an emergency warning if the patient's condition becomes serious. Furthermore, it should enable wireless communication and be compatible with a global positioning information system, which would allow emergency personnel to pinpoint the patient's location. Figure 3: A diagram of the human body

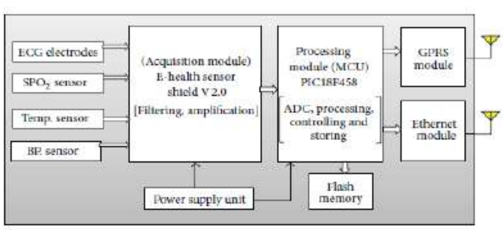

FIGURE 3: Mobile-care unit.

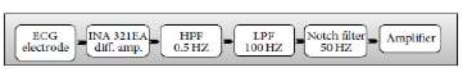

Figure 4: Block diagram of ECG acquisition hardware.

An illustration of the mobile-care unit in block diagram form Additionally, the mobile care unit has local data storage, which is useful for capturing raw data as well as storing the outcomes of signal processing.

(1) The Acquisition Module for Vital-Sign Signals. The vital-sign signals acquisition module is in charge of collecting vital signs and sending them to the processing module for ADC, processing, and anomalous detection, among other functions. The e-health sensor shield V2.0 has been chosen to serve as the vital-sign signals acquisition module for this application. As illustrated in Figure 3, this module is capable of continually collecting physiological indicators such as the ECG, SpO2, body temperature, and blood pressure. All of the vital signs readings will be taken noninvasively.. Noninvasive measurement of vital signs has unquestionably an advantage over its invasive counterpart, owing to the simplicity with which it may be performed and the absence of hazards associated with such measures.

Sensor for electrocardiogram (ECG). An ECG is a bioelectric signal that records the electrical activity of the heart as a function of time. The ECG is acquired by detecting the electrical potential between two places on the body with the use of a conditioning circuit that is customised to the patient's needs. The ECG signals from the electrodes are amplified with a gain of 300 in the proposed mobile-care unit and filtered with cut-off frequencies of 0.5Hz in the high pass filter and 100Hz in the low pass filter in the proposed mobile-care unit. In most cases, the ECG signals are 1 mV peak-to-peak; an amplification factor of 300 is required to make the signal acceptable for heart rate monitoring and to provide an accurate morphological reproduction. A differential amplifier with a gain of 20 prevents noise from overwhelming the ECG signals; this is accomplished by using an instrumentation amplifier (INA321EA) with a CMRR of 100 dB, followed by an operational amplifier (Analog AD8625) with a gain of 15 to enhance the signal. Following the initial stages of amplification, the ECG signals are confined to a frequency range of 0.5–100Hz by utilising second order Butterworth high pass and low pass filters following the first stages of amplification. An adjustable 50 Hz notch filter filters off power line interference from the ECG signal, which prevents the loss of the 50 Hz component of the ECG signal from occurring. The ECG signal is then transferred into the analogue input of the processing unit, where it is

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digitalized and analysed. Figure 4 depicts a block schematic of the system.

hardware for the collection of ECG signals

Sensor for measuring temperature. The body temperature of a healthy individual is around 37 degrees Celsius; it may slightly or momentarily rise in a hot environment or during physical exercise; with intense exertion, the temperature may rise significantly. The ability to accurately monitor one's body temperature is very important in medicine. A variety of disorders are associated with distinctive fluctuations in body temperature, which is the cause behind this. Similar to this, the progress of some disorders may be tracked by taking the patient's body temperature, and the effectiveness of any treatments administered can be assessed by the physician. It was decided to use an industrial CMOS integrated-circuit temperature sensor, as shown in Figure 5(a), which was coupled to a signal conditioning circuit, as depicted in Figure 5(b), in order to calibrate and amplify the signal before it was sent to the processing unit.

Heart rate and SpO2 (Saturated Pulse Oxygenation) measurements Heart rate-related oxygen saturation in the blood (SpO2) is a measure of oxygen saturation in the blood that may be used to determine how well the blood is being pumped from the heart to other regions of the human body. It is expected that as the heart pumps and relaxes, there would be a difference in the absorption of light at a thin place of the human body. Increased absorption of infrared light waves by oxygenated haemoglobin and increased transmission of red light waves are the results of increased oxygenation. Although haemoglobin that has been deoxygenated (or decreased) absorbs more red light waves than normal haemoglobin, it permits more infrared light waves to pass through. Because of the unique feature of haemoglobin in relation to red and infrared light waves, it is possible to measure oxygen saturation without the need of intrusive methods. A simple but accurate way of measuring oxygen saturation is pulse oximetry, which would otherwise need the use of invasive procedures to get the desired results. The colours red (660 nm) and orange (660 nm)

(a)

(b)

Figure 5: (a) Temperature sensor. (b) Signal conditioning circuit.

Figure 6: SpO2/HR sensor.

2) Data Control and Processing Module (also known as DCP). In the medical care unit, the data control and processing module serves as the nerve centre. The primary function of this module can be divided into two parts: in the first, the algorithm that has been developed synchronises, controls, and ensures the accurate operation and communication of all of the other modules; and in the second, the algorithm that has been developed ensures the accurate operation and communication of all of the other modules. In the second section, the algorithm that has been built

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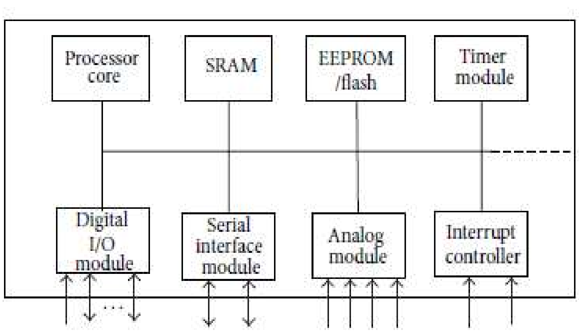
digitises and analyses the collected vital-sign signals in order to determine whether or not their respective values are more than or equal to the predefined limit. If any or all of these values are greater than their respective critical levels, an alert is triggered and the situation is documented. After then, all of the data that has been processed is delivered to the communication layer.



The following are the primary roles of the MCU in the proposed system, as summarised by the author.
First and foremost, it gathers and digitises the data collected by vital sign sensors.
(2) It is in charge of controlling the functioning of all linked modules, as seen in Figure 8.

(3) It processes the incoming signals using a variety of various processing methods and algorithms, as described above.

(4) It establishes a connection with a distant server and communicates to it the results of the analysis as well as raw data obtained via the use of communication mechanisms.

(3) It keeps the findings of the analysis as well as the raw data in flash memory. Components of the Processing Unit that are software-based. The MCU is a microcontroller unit.

All actions of the mobile-care unit are controlled and coordinated by this person. The workflow for the mobile-care unit is shown in Figure 9. The software used to mimic the MCU and its components was created in the C programming language. There are many notions that underpin it.

(1) The sensor and module initialization component is in charge of beginning, initialising, and configuring the medical care unit. (2) The sensor and module initialization component

(2) The vital signs perception component obtains the values of vital signs from sensor nodes. (3) The vital signs perception component

Three-dimensional (three-dimensional) vital signs processing component: This component performs data translation and processing, as well as patient diagnosis by assessing the patient's health condition.

Fourth, the information transmission component: this component is responsible for facilitating data interchange between the mobile-care unit and the computer server.

Table 2: Specification of various physiological parameters monitored.

Physiological parameter	Specifications	Typical values for average healthy person
ECG	Frequency: 0.5 HZ–100 HZ Amplitude: 0.25–100 mv	R-WAVE amplitude: >4.5 mv QRS complex: (0.04–0.12) msec
Heart rate (HR)	40–220 beats per minute	60–100 beats/minute
Body temperature	32°C–40°C	About 37.5°C
Blood pressure	Systolic: 50–300 mmHg Diastolic: 40–140 mmHg	Systolic: less than 120 mmHg Diastolic: less than 80 mmHg
Blood oxygenation (SpO2)	Measurement range: 70–100%	Around 94% to 99%
Respiratory rate	2–50 breath/min	Adults: 12–24 breaths per minute

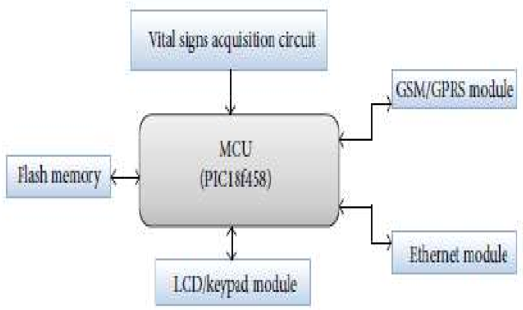


Figure 8: Functions of MCU.

(1) The Tier of Presentation. The presentation layer, which is comprised of an application software written in the C# programming language, enables the authorised user to interact with the received patient data. The interface design meets the majority of the general as well as functional criteria, as seen in the following diagram.

In the database, access limitations are enforced on a continuous basis depending on the authorised user who has been registered in the database.

(ii) It contains patient lists as well as personal information about those who have registered.

(iii) It shows the vital signs of the patient and allows them to establish thresholds for each measurable parameter.

(iv) It notifies healthcare practitioners when there is an abnormality.

(v) It includes the addition of a new patient, a new consultation, and a new medicine prescription.

VI. Prior medical data for all patients are shown, including illness diagnoses, previous procedures, clinical results, and past treatment.

Allergies, as well as pictures

(vii) It allows you to search for all of your registered patients using their ID number or their name.

(viii) It displays notations (patient experience) when measurements are being recorded.

(ix) It delivers messages to patients, including instructions on how to use the device and prescriptions for medications.

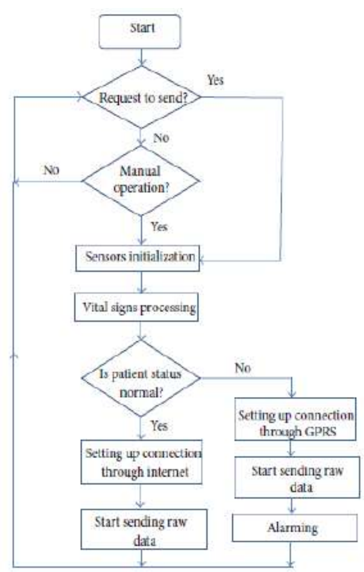


Figure 9:Work flow about mobile-care unit.

(i) store, retrieve, and update patient's record including his/her medical personnel's contact information and other Specifically, it will I save and retrieve the physiological sensor data that has been received and communicated by the medical care unit; and (ii) store, retrieve, and update patient consultations and medicine prescriptions.

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It is also necessary to preserve and retrieve the patient's notes during sessions.

the storage, retrieval, and updating of medical records for registered doctors, physicians, and nurses;

(vi) store, retrieve, and update ECG data, including the time, position of the R wave, and estimated ECG beat type; and (vii) store, retrieve, and update the ECG data. Figure 16 depicts a screen picture of the search process.

Monitoring Units (section 2.2.3). The web tier of the remote server is intended to enable distant users to get extensive information on healthcare recipients from any location and at any time by using ubiquitous devices such as laptops, PDAs, and mobile phones, among others. Finally, we can state that the suggested system is capable of operating in the three scenarios listed below.

(1) Connection based on time: all data required by remote caregivers or experts should be uploaded at the same time. Data compression is required in order to keep the upload time to a minimum. A time plan for uploading all patient data to a remote server should be established by the remote caregiver in this circumstance. Remote caregiver It is saved in the mobile care unit, and it will upload data in accordance with the time schedule that has been established.

(2) Emergency connection: in order to reduce the cost of utilising the GSM/GPRS network, we are developing an algorithm that identifies irregular heartbeats. When the mobile-care unit identifies an aberrant state during sensor monitoring, the data gathered is sent to a remote server where it may be used for clinical evaluation and treatment planning.

(3) Connection on demand for (Event awareness): The mobile-care unit uploads the quantity of data desired by distant caregivers or specialists in order to monitor the patient's health state.

Conclusion

This paper proposes the design and implementation of a remote telemedicine framework, in which all physiologically significant signs are transmitted to a remote clinical server through both cell networks in the event of a crisis and the web in the case of a routine check for long-distance monitoring. As a result, the cost of using the GSM/GPRS network is reduced since only exceptional situations will be communicated across the cell network. Furthermore, the suggested framework includes a conveniently located electronic interface for healthcare professionals to monitor and respond to urgent symptoms that need remote treatment. The suggested framework coordinates the sensor unit, the handling unit, and the correspondence unit, in contrast to the other frameworks that are cited in the presentation [18–28]. The ebb and flow exercises in what is referred to as the 4G versatile systems ensure universal access to a wide range of radio system innovations, thereby providing, in addition to expanded inclusion, the best association mode at the point of contact, in any case, while utilising a variety of remote access advancements and seamlessly transitioning between them at the same time.

Using finding frameworks, for example, the worldwide positioning system (GPS), geological data frameworks (GIS), and intelligent traffic control frameworks can also potentially improve social insurance administrations, for example, when a moving rescue vehicle is attempting to arrive at a patient using the quickest course or when an emergency vehicle transporting a patient is attempting to find a medical clinic with a reasonable turnaround time. a situation that cannot be reconciled

References

[1] S. Pavlopoulos, R. H. Istepanian, S. Laxminarayan, and C. S. Pattichis, "Emergency health care systems and services: section overview," in Proceedings of the 5th International IEEE EMBS Special Topic Conference on Information TechnologyApplications in Biomedicine, pp. 371–374, 2006.

[2] R. Anta, S. El-Wahab, and A. Giuffrida, Mobile Health: The potential of Mobile Telephony to Bring Health Care to the Majority, Inter-American Development Bank, 2009.

[3] M. F.Wyne,V.K.Vitla, P.R.Raougari, andA.G. Syed, "Remote patient monitoring using GSM and GPS technologies," Journal of Computing Sciences in Colleges, vol. 24, no. 4, pp. 189–195, 2009.

[4] M.-K. Suh, C.-A. Chen, J.Woodbridge et al., "A remote patient monitoring system for congestive heart failure," Journal of Medical Systems, vol. 35, no. 5, pp. 1165–1179, 2011.

[5] A. Hande, T. Polk, W. Walker, and D. Bhatia, "Self-powered wireless sensor networks for remote patient monitoring in hospitals," Sensors, vol. 6, no. 9, pp. 1102–1117, 2006.

[6] E. Sardini and M. Serpelloni, "Instrumented wearable belt for wireless health monitoring," Procedia Engineering, vol. 5, pp. 580–583, 2010.

[7] F. E. H. Tay, D. G. Guo, L. Xu, M. N. Nyan, and K. L. Yap, "MEMSWear-biomonitoring system for remote vital signs monitoring," Journal of the Franklin Institute, vol. 346, no. 6, pp. 531–542, 2009.

[8] H. Alemdar and C. Ersoy, "Wireless sensor networks for healthcare: a survey," Computer Networks, vol. 54, no. 15, pp. 2688–2710, 2010.

[9] P. S. Pandian, K. Mohanavelu, K. P. Safeer et al., "Smart Vest: wearable multi-parameter remote physiological monitoring system," Medical Engineering & Physics, vol. 30, no. 4, pp. 466–477, 2008.

[10] B.Mehta, D. Rengarajan, and A. Prasad, "Real time patient telemonitoring system using LabVIEW," International Journal of Scientific and Engineering Research, vol. 3, no. 4, pp. 435–445, 2012.

[11] A. Loutfi, G. Akner, and P. Dahl, An android based monitoring and alarm system for patients with chronic obtrusive disease [M.S. thesis], Department of Technology at Orebro University, 2011.

[12] V. K. Sambaraju, Design of a Wireless Cardiogram System for Acute and Long-Term Health Care Monitoring, ProQuest, 2011.

[13] C.Wen,M.-F. Yeh, K.-C.Chang, and R.-G. Lee, "Real-time ECG telemonitoring system design with mobile phone platform," Measurement, vol. 41, no. 4, pp. 463–470, 2008.

[14] G. Tartarisco, G. Baldus, D. Corda et al., "Personal Health System architecture for stress monitoring and support to clinical