

Chronic Illness Monitoring and Habit Stabilization for Patients

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ABSTRACT: This project presents habit stabilization platform for communication, processing, presentation, storage, aimed to wireless monitor lifestyle, In general clinical status of patients affected by chronic diseases. Such the process is useful to support in an innovating Chronic Care Model. The platform exploits sensor, Wireless connectivity to the local gateway, and using a Standard format. The process allows the clinicians and practitioner to realize mistakes and Habit, before they become lead to hospitalization. The system also implements data analysis. As well as monitoring the state of health, the proposed chronic illness monitoring can be also used to wearable sensor. Two kinds of monitor kit have been developed. The first is dedicated to patient self-acquisition usually delivered directly to the patient when enrolled the medicine service. The second is design to support medical operator during the planned periodic home visits. Differ to the version of the gateway and usually in the set of sensors included in the kit depending on the target user of the system. The patient-oriented gateway is conceived to maximize the usability and to minimize the impact on the patient. It enables the patient to follow autonomously the personalized treatment plan, defined and updatable by the care team members via the server application, thanks to audio-visual remind messages helpers. The data acquisition, elaboration transmission completely automatic, transparent. Moreover, the gateway is able to collect out-of-plan activities performed on a personal basis.

KEYWORDS: Telemonitoring, Wireless, Wearable sensors, Voice recognize, Graphical method.

I.INTRODUCTION

The advances of voice recognize and sensor devices development, along with the wireless technologies, mobile Internet connectivity, provide possibility to implement new solution for the management and remote monitoring of the chronic patients, according to the health gateway. This model is based on personalized care planning, on presence of a multidisciplinary care team (medical specialist, nurses, etc.), and patient health care. The CCM approach is based on the sharing of clinical information to support the decision making [2]. It is acknowledged in literature that the CCM improves the management of chronic conditions, and reduces the healthcare costs [3].and voice recognize [4].

II. HARDWARE / SOFTWARE PLATFORM

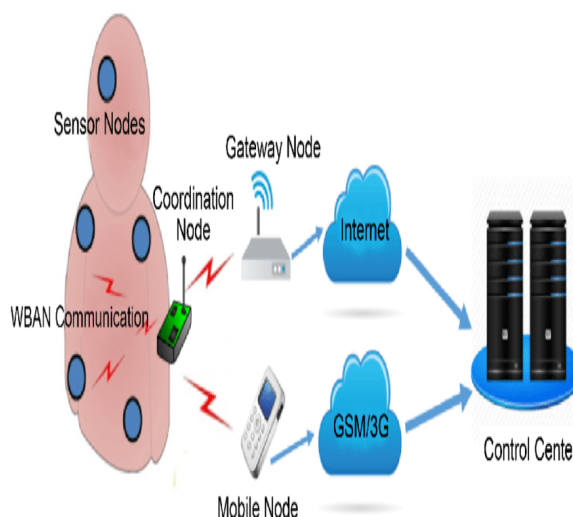
The server application repository part of the system, represent the central node of platform. It provide the resources communication, elaboration, configuration, presentation long term storage clinical data, and personalized care plan. In these process of server application some representation state transfer web service allows gateway to upload acquired data. And receive configuration updates automatically.

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III. MONITORING PROFILE

One of the advantages of habit stabilization of chronic. The doctor find the patients habits and analysis data by Graphical Method. The synchronization module allows the integration of the platform with third-party applications, such as hospital information systems or other repositories, in order to import/export data. It uses standard HL7 format. The server application has been developed by CSS.

Modules:

- Wireless area network
- Authentication
- Session management
- Report module
- Hardware communication

- a) First step communicate the all nodes then using wireless method of modules.
- b) Second module authentication it is verification purpose only for login the report page and represent on graph.
- c) Third module is session management module its used as day to day and monthly wise report generate.
- d) Fourth module is report, this page to create the Login page for user verification view there report page.
- e) The last one hardware communication is used to **communicate** device. It is a **hardware** device capable of transmitting information over the telephone or Wireless network device.

IV. SERVER APPLICATION DIAGRAM

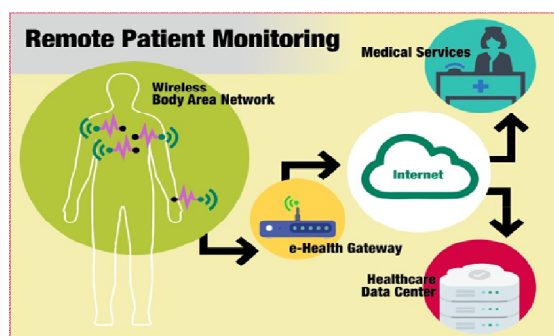
The diagram its represented in architecture of process in chronic illness habit stabilization. The HTTP request from the clients and manages the authentication. According to the strategy (username and password), it restricts the access to the resources being on the rules of logged user particular nursing operators and patient.

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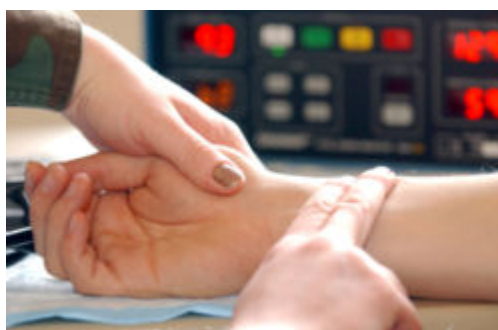
HEART BEAT MONITOR

HEART RATE:

Heart rate is a term used to describe the frequency of the cardiac cycle. It is considered one of the four vital signs. Usually it is calculated as the number of contractions (heart beats) of the heart in one minute and expressed as "beats per minute". See "Heart" for information on embryonal heart rates. The heart beats up to 120 times per minute in childhood. When resting, the adult human heart beats at about 70 bpm (males) and 75 bpm (females), but this rate varies among people. However, the reference range is normally between 60bpm (if less termed bradycardia) and 100bpm (if greater, termed tachycardia). Resting heart rates can be significantly lower in athletes. The infant/neonatal rate of heartbeat is around 130-150bpm, the toddler's about 100–130 bpm, the older child's about 90–110 bpm, and the adolescent's about 80–100bpm. The pulse is the most straight forward way of measuring the heart rate, but it can be deceptive when some heart beats do not have much cardiac output. In these cases (as happens in some arrhythmias), the heart rate may be considerably higher than the pulse rate.

Measuring of Heart Rate:

The pulse rate (which in most people is identical to the heart rate) can be measured at any point on the body where an artery is close to the surface. Such places are wrist (radial artery), neck (carotid artery), elbow (brachial artery), and groin (femoral artery). The pulse can also be felt directly over the heart.



BLOOD PULSE DETECTOR:

A person's heartbeat is the sound of the valves in his/ her heart contracting or expanding as they force blood from one region to another. The number of times the heart beats per minute (BPM), is the heart beat rate and the beat of the heart that can be felt in any artery that lies close to the skin is the pulse.

Two Ways to Measure a Heartbeat Manual Way:

1) **Heart beat** can be checked manually by checking one's pulses at two locations- wrist (the **radial pulse**) and the neck (**carotid pulse**). The procedure is to place the two fingers (index and middle finger) on the wrist (or neck

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below the windpipe) and count the number of pulses for 30 seconds and then multiplying that number by 2 to get the heart beat rate. However pressure should be applied minimum and also fingers should be moved up and down till the pulse is felt.

2) **Using a sensor:** Heart Beat can be measured based on optical power variation as light is scattered or absorbed during its path through the blood as the heart beat changes.

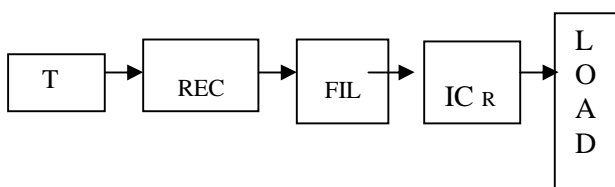
BODY TEMPERATURE:

To measure the volumetric water content in body. Body moisture sensors measure the volumetric water content indirectly by using some other property of the body, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content. The relation between the measured property and body moisture must be calibrated and may vary depending on environmental factors such as body type, temperature, or electric conductivity. Body moisture sensors typically refer to sensors that estimate volumetric water content.

Power supply:

The AC voltage, typically 220V rms, is connected to a transformer, which steps that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit removes the ripples and also remains the same dc value even if the input dc voltage varies, or the load connected to the output dc voltage changes. This voltage regulation is usually obtained using one of the popular voltage regulator IC units.

BLOCK DIAGRAM



Working Transformer:

The potential transformer will step down the power supply voltage (0-230V) to (0-6V) level. Then the secondary of the potential transformer will be connected to the precision rectifier, which is constructed with the help of op-amp. The advantages of using precision rectifier are it will give peak voltage output as DC, rest of the circuits will give only output.

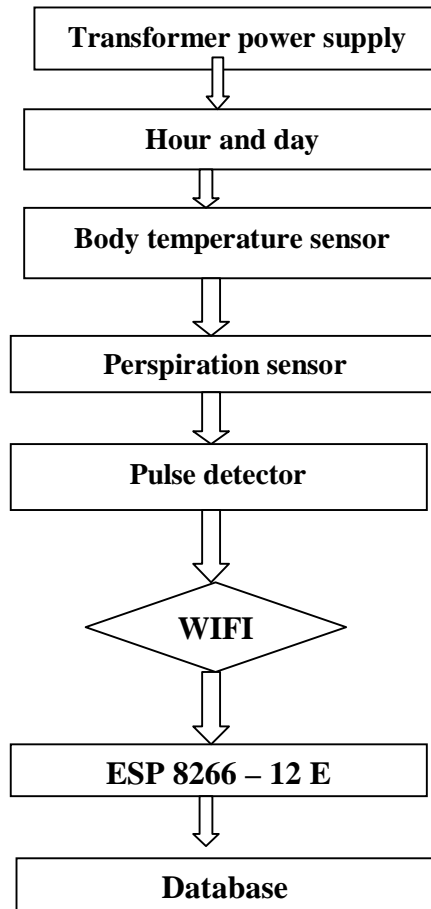
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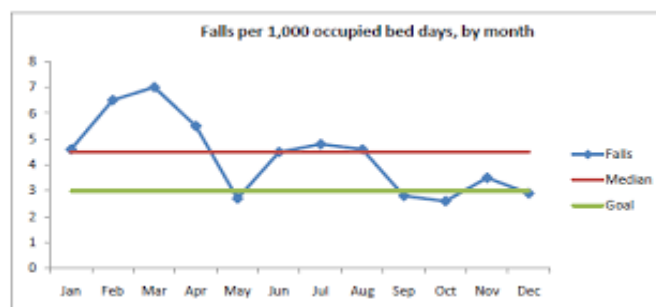
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FLOW DIAGRAM



GRAPHICAL METHOD

This page enables a member of the patient care team to monitor a specific activity assigned to a patient. The chart trend lines show the activity results history, with the possibility zoom-in, zoom-out and select a specific period of interest. For each point of the chart it is possible to obtain detailed information (i.e. acquisition date, values and connected).



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V. CONCLUSION

The presented a telemedicine service platform allows an effective application of the Chronic Care Model. Indeed, at the state-of-the-art the CCM is not often implemented through a fully integrated ICT-based information system, with a seamless digital data flow from the sensors worn by the patient to the desktop of the remote caregiver. The platform exploits monitoring kits that includes wearable sensors with BT/BLE connectivity to the local gateway and a connection, using XML and standard HL7 CDA formats, to a server based data processing and repository. The monitoring kit is available both in patient-oriented and professional-oriented versions. The server SaaS application allows the care team members to manage the enrolled patients and to monitor at distance their vital parameters according to personalized care plans. The aim is continuously supporting the medical staff with updated data, thus moving from a medicine of emergency to a proactive healthcare model. The system generates alarms on vital signs thresholds violations and multi parameters analysis, enabling the medical staff to realize diseases aggravations before they become irreversible and lead to hospitalization. This way it is possible to reduce the rate of hospitalization, the emotional and psychological state of the patient. Further alarms if present Moreover, the page provides information on the future planning of the activities.

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