ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Home Health Assistive System for Critical Care Patients.

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ABSTRACT

Home medication management system was developed to provide a complete system for elderly and patients at home. The Medical Box at home acts as a central controller for the entire system. This box serves as a complete system of information to the patient starting from monitoring their body conditions, alerting them to take medicines properly, updating the medicine information, alerting the doctor and so on. This box contains different wireless communication devices such as RFID reader to read the medicine's tag value, and a GSM modem to send alert information to the relatives during emergency situation. Unfortunately, the concern to prescription medication disobedience that could be a basic kind of self managed care is not sufficient in these previous research activities. The center of the system is a powerful intelligent medicine box (IMedBox), which works not only as a traditional in-home medicine container, such as a drawer of cabinet, a thermostat or an icebox, but also as a "medication inspector", and an "onsite examiner" in daily monitoring. At one end, it is linked to public area, example, the hospital, the medicine supply chain and the emergency help center through GSM module. It can also communicate with Patient via wireless using zigbee. It updates physical parameter of patient such as temperature, Heart rate, PPG, BP and etc., and send it to hospital server. Then it updates medical description via wirelessly from hospital server for each patient in home based on their physical parameter. By using RFID reader, it can identify the person in Home. At patient Side, wearable biomedical sensor network using various biomedical sensor temperatures, Heart rate, PPG and Bp sensor connected. It sends the corresponding value to imedbox through ZigBee. RFID tag provide for each individual person. Buzzer is attached with patient to alert him or her to take medicines at proper time. Thus it acts as a complete system for total health care.

Keywords: Microcontroller, LCD, LED, Temperature sensor, LM35 transistor, Heart rate sensor, gas co2 sensor, blood pressure sensor.

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ISSN: 0975-8585

INTRODUCTION

The new generation form of healthcare and distributed patient-centric and self-managed care is emphasized as an alternative to the traditional hospitalized, staff-centric and professional managed care. It saves doctor and patients time too. The intelligent in - home medication box does not act as an only box to store medicine but its intelligent packaging includes monitoring of patient's condition, informing the doctor about it, updating the medicine list and also alerting the patient to take medicines at proper time [1]. The box is the central controlling unit for the whole process and the best option for disabled patients and elderly people at home. In patient module, various wearable sensors such as Temperature Sensor, PPG Sensor, Gas Sensor, and BP Sensor are connected to measure the basic parameters of human body [4]. The temperature, pulse rate, blood pressure, heart rate and CO concentration are recorded and sent to the box module that is the central controller placed at home, via Zigbee within the ranges of few meters. Patient's descriptions can be sent to the doctor through GSM.

It can range up to 35 kms. Doctor at the server side can receive the data and update the medicine list accordingly thus its easy way of communication between the patient and the doctor. A buzzer is also connected to the patient module to remind the patient to take medicine time to time. The I Med Box does not act as a store box or a medical inspector, but it is a human friendly guide for disabled, elderly patients at home [2 & 3]. It is the 24/7 working module. It saves the time of patients and doctors and also removes the long queues outside the clinics and hospitals. The medicine stores and ambulances can also be informed in case of emergency with the help of GSM. Rapidly increasing demands of daily monitoring is driving homecare solutions to integrate more and more sensing and data processing capacities, diagnosis and prognosis [8 & 9].

For example, tri-axis accelerometer, electrocardiogram (ECG), blood pressure, blood oxygen saturation (Sp02), respiration oxygen saturation, blood sugar concentration of monitored body temperature on 24/5 basis, so a powerful system is needed not only to address the medication noncompliance but also to be used as a generic in home healthcare station (IHHS) in everybody's home [4 & 7]. In this paper, an in-home medication management and healthcare system is proposed based on Radio Frequency Identification (RFID) and ubiquitous sensing technologies. Various vital parameters are collected by wearable biomedical sensors through wireless link. On site diagnosis and prognosis for these health parameters are supported by the scalable architecture. To boot, friendly human machine interface is emphasized to make it usable for the elderly, disabled and patients. A prototype system including the hardware embedded and user interface, database and some intelligent packages is implemented to verify the system concepts. It provides the easy mean of communication between the doctor and the patient. Thus it is the only one stop solution for the complete healthcare. The experimental results confirm the feasibility of the proposed solution.

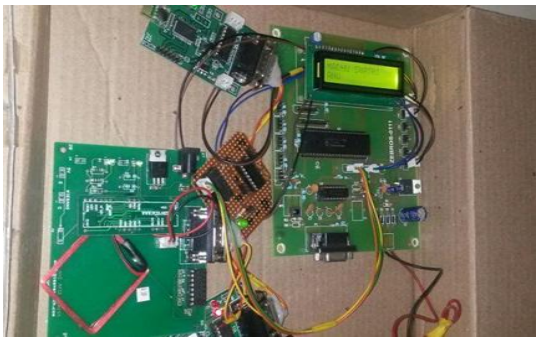
PROPOSED METHODOLOGY

The existing system was not user friendly. It always required attendant or a nurse with the patient. Even the updating of medicines was not possible. There was less parameter to be measured. Earlier system acted like a box of medicine and not the complete system for a person's health care.

The proposed system requires tri-axis accelerometer, electrocardiogram (ECG), blood pressure, blood oxygen saturation (Sp02), respiration oxygen saturation, blood sugar concentration, body temperature are monitored on 24/7 basis. The powerful system is needed not only to address the medication non-compliance but also to be used as a generic in home healthcare station (IHHS) in everybody's home [5]**.** It monitors the patient's conditions, informs the doctor, updates the medicine list and also alerts the patient to take exact medicines at proper time. Thus, this system is implemented to develop a single stop solution for the entire process of the patients as shown in figure 1.

ISSN: 0975-8585

Figure 1: Hardware circuit implementation



One side of the module contains the biomedical sensors to sense the various parameters and the other side sends the data to the imed box module through Zigbee. A buzzer is also connected to alert the patient to take medicine at proper time.

The various parameters value are received by the box module via Zig bee. It sends the same values to the doctor to prescribe medicines for the patient through the wireless network of GSM. It is also a store to keep medicines. Patients with their following RFID tags can collect the required medicine prescribed by the doctor. Doctor at the server side receives the information of patients from the box and updates the medicine list and sends it back to the box through GSM.

Heart Rate Sensor

The heart rate sensor is designed to give digital output of heat beat when a finger is placing inside it, when the guts detector is functioning, the top-most LED flashes in unison with every heart beat. This digital output can be connected to microcontroller directly to measure the Beats per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse. The sensor consists of a super bright red LED and light detector. The LED must be super bright because the light weight should with stand finger and detected at alternative finish. Now, once the guts pumps a pulse of blood through the blood vessels, the finger becomes slightly a lot of opaque and so less light reached the detector. With every heart pulse the detector signal varies. This variation is regenerate to electrical pulse. This signal is amplified associate degreed triggered through equipment that outputs +5V logic level signal. The output is additionally indicated on high by a crystal rectifier that blinks on every heart beat.

This heart beat sensor is designed to give digital output of heat beat when a finger it will be placing inside it. When the guts detector is functioning, the top-most crystal rectifier flashes in unison with every heartbeat. This digital output is connected to microcontroller on to live the Beats per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse.

Blood Pressure Sensor

The Blood Pressure Sensor is used to measure systemic arterial blood pressure in humans, non-invasively. It will live blood pressure and calculate both the systolic and diastolic blood pressure using the oscillometric methodology. The active sensor in this unit is the SenSym SDX05D4pressure electrical device. it's a membrane that flexes as pressure changes. This sensor is arranged to measure differential pressure. The sensor produces an output voltage which varies with the pressure measured within the cuff. It includes special electronic equipment to reduce errors caused by changes in temperature. We provide an electronic equipment circuit that conditions the signal from the pressure device. With this circuit, the output voltage from the Blood Pressure Sensor will be linear with reference to pressure. This device is provided with electronic equipment that supports auto-ID. When the data-collection software identifies the sensor and uses pre-defined parameters to configure an

experiment appropriate to the recognized sensor.

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This detector is supplied with electronic equipment that supports auto-ID. When the data-collection software identifies the sensor and uses pre-defined parameters to configure an experiment appropriate to the recognized sensor. The Blood Pressure Sensor is not compatible with TI calculators for data collection.

CO Sensor

In current technology, monitoring of gases produced is very vital. From home appliances like air conditioners, electronic items to electrical chimneys and safety systems at industries which require continuous observation of gases is extremely crucial. Gas sensors are vital a part of such systems. From home appliances like air conditioners to electrical chimneys and safety systems at industries observation of gases is very crucial. Gas sensors are important an area of such systems. Very little variety of a nose, gas sensors impromptu react to the gas gift, thus by keeping the system updated concerning any alterations that occur at intervals the concentration of molecules at vaporous state.

RESULTS AND DISCUSSION

The center of the system could be a powerful intelligent medication box. One end of the system, it's connected to the public space. It communicates with Patients using angularity bee. It updates the physical parameter of the patients. It updates the medical description via wireless. It also uses RFID reader for identification of patients. One solution for this purpose from traditional industry is the One Dose Packaging, however it simply makes medication a lot of convenient for patients instead of improves the measuring compliance or forestall from the disobedience directly. The Noncompliance detecting and recording are introduced. But they are mainly used as afterward checking measure instead of preventive measure.

Their complicate operations are only usable for a well-trained caregiver instead of patient, teenager, elderly, and disabled. At the same time, rapidly increasing demands of daily monitoring is driving homecare solutions to integrate more and more sensing and data processing capacities with on-site diagnosis and prognosis [6]. For example, tri-axis accelerometer, electrocardiogram (ECG), blood pressure, blood oxygen saturation (Sp02), respiration oxygen saturation, blood sugar concentration, body temperature is monitored on 2417 basis [5]. So a powerful system is needed not only to address the medication noncompliance but also to be used as a generic in home healthcare station (IHHS) in everybody's home A biomedical sensor network using various biomedical sensor are connected to the patient. A buzzer is attached to the patient for alerting. It has an intelligent packing and ubiquitous sensing technology. It is human friendly easy way of communication between doctors and patients.

In this paper, an in-home medication management and healthcare system is proposed based on Radio Frequency Identification (RFID) and ubiquitous sensing technologies. Preventive medication management is enabled by an intelligent packaging sealed by Controlled Delaminating Material (CDM) and controlled by RFID link. Various vital parameters are collected by wearable biomedical sensors through wireless link. On site diagnosis and prognosis for these health parameters are supported by the scalable architecture. Additionally, friendly human-machine interface is emphasized to make it usable for the elderly, disabled patients.

CONCLUSION

One solution for this purpose from traditional industry is the One Dose Packaging, but it just makes medication more convenient for patients rather than improves the compliance or prevent from the noncompliance

directly. Noncompliance detecting and recording was introduced by a prototype of Smart Medical Refrigerator, a microchip powered tablet package and a Smart Dose Reminder. But they are mainly used as afterward checking measure instead of preventive measure. Their complicate operations are only usable for a well-trained caregiver instead of patient, teenager, elderly, and disabled. At the same time, rapidly increasing demands of daily monitoring is driving homecare solutions to integrate more and more sensing and data processing capacities with on-site diagnosis and prognosis. For example, tri-axis accelerometer, electrocardiogram (ECG), blood pressure, blood oxygen saturation (Sp02), respiration oxygen saturation, blood sugar concentration, body temperature is monitored on 2417 basis. So a powerful system is needed not only to address the medication noncompliance but also to be used as a generic in home healthcare station (IHHS) in everybody's home.

A various biomedical sensors are connected to the patient. A buzzer is attached to the patient for alerting. It has an intelligent packing and ubiquitous sensing technology. It is human friendly easy way of communication between doctor and patients. In this paper, an in-home medication management and healthcare system is proposed based on Radio Frequency Identification (RFlD) and ubiquitous sensing technologies. Preventive medication management is enabled by an intelligent packaging sealed by Controlled Delaminating Material (CDM) and controlled by RFlD link. Various vital parameters are collected by wearable biomedical sensors through wireless link.

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