Certain Investigation on IOT Based Smart Pill Carafe in Health Care

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Abstract. During recent years, many technologies has been evolved for health care. It helps in quick recovery of patients in healthcare. As the population is increasing, the need of health prevention is also increasing day by day. In order to improve the patient health and to treat dehydration a bottle of saline is fed to the patient. Whenever a saline is fed to the patients, the care taker/nurse has to continuously monitor the patient. Assessing and managing of saline, good care for the patients are the most important thing in health care. The responsibility for monitoring the Glucose bottle level is done by care taker/nurse. The saline bottle should be checked and changed periodically. But, due to their busy schedule the nurse/caretaker may forget to change. In order to overcome this critical situation a system is designed to monitor the glucose bottle smartly is proposed using GSM (Global System for Mobile Communication). When the intravenous fluid level is below certain limit the IR sensor output voltage level changes based on the principle. The message output is compared continuously using comparator with a threshold value. When the liquid level reaches to its threshold value, the alert will be given through the LCD display. It will also provide intimation to the mobile phone with the help of GSM.

1. Introduction

Nowadays, the need for health care increases due to over population and pollution. Taking care of our own health is essential for everyone in this world. And so patient safety is one of the important roles that should be taken care in every hospitals. Many self activating devices are developing for healthcare, in recent years. These devices are reducing work pressure and stress of the doctors. These devices has created big changes in the medical field for tracking, observing, identifying new diseases and a lot more. Patient safety is still demanding even after using these self activating devices. To intimate caretaker/nurse about the glucose bottle is important. The proposed smart bottle monitoring will reduce the stress in monitoring the glucose bottle level manually. The liquid level in the saline bottle is monitored by load cell. When the liquid level in saline bottle reaches its threshold range, an alerts is given through message. The first warning will be sent has an SMS alert when the liquid reaches half the saline bottle. The second warning is the call alert that is done when there are 30 ml of liquid left.
2. Literature Survey

Drips are something that is inserted inside a vein using a needle by which the medicines can be given directly into the blood. The bottle should be monitored regularly. It seems like an easy job, but it requires regular monitoring or else it can cause serious issues like blood loss, backflow of blood. Due to this, the patient’s haemoglobin level will get reduced and it may also make the person anaemic. Good patient care requires the basic fundamental skill. In order to overcome this manual monitoring, and efficient health monitoring system is developed. In this proposed system uses IR sensor, RF transmitter, receiver, and buzzer. This system will give information to the control room. At an affordable cost, it will reduce the stress in continual monitoring [1,2].

A new system is proposed using a wireless sensor to monitor the IV Bottle. By using this system we can reduce cost and manual energy. In the dripping chamber, the different wireless sensors are placed. Every sensor network available in all rooms has been tested by a central device. The wireless device has four modules: 1) sensor module 2) radio module 3) feed module 4) microprocessor. This is another model that reduces stress in monitoring using the sensor network algorithm [3].

3. Existing System

In the existing system it contains the drip chamber in which an IV set is attached. Each drop of IV set is detected by the flow sensor, the IR sensor calculates the each drop of liquid in saline bottle. For each drop the output get change. The Caretaker/Nurse will be able to find the liquid level which indicates the drip rate with the help of LCD modem. An alarm will be given to the caretaker/nurse when the device is not sensed for few seconds. [4] Another system proposes a method in where the alert signal/alarm might interrupt the sick people. The caretaker of the sick people will request the nurse to replace the glucose bottle by the hospital staff. The absence of intimation for the glucose bottle will lead to serious health problem the sick people.

4. Proposed System

The proposed system reduces the frequent monitoring of the saline bottle manually. This system uses GSM, load cell, weight sensor that are connected to arduino for monitoring. Liquid level can be monitored by using the LCD display. The first intimation will be given when the liquid reaches 50 ml. Because the doctor or nurse need not to be in a rush to change the saline bottle. [5-8] The intimation will be given through a message. The 1st alert message contains the liquid rate level with the patient room number and also it shows if it reaches the threshold level. The 2nd alert will be sent through a call alert to the nurse or the hospital management to intimate the emergency need for changing the saline bottle.

5. System Architecture

In this system, weight sensor and load cell is used to monitor the level of the liquid by sensing its weight. So that we can able to know when the liquid reaches its minimum level and we can alert the doctor/nurse by using GSM modem at correct time. Figure 1 shows the System Architecture
6. Module Description

6.1. Sensing weight using load cell
6.2. Displaying weight in LCD
6.3. Sending SMS alert via GSM
6.4. Sending call alert via GSM

In the above system (Fig.(i)), the sensing of weight is done using load cell, which predicts the liquid level. LCD is used to display the level of the glucose bottle in grams. Now, the 1st alert will be through sms. The GSM module helps in sending sms. The 1st alert will be given when the liquid level reduces to its half and it will be an SMS alert. The 2nd alert will be a call to the healthcare management about the need of replacing the bottle. Thus this system eliminates the manual stress of monitoring the glucose bottle at a very low cost.

7. Results and Discussion

7.1 Expected Result

In this system by using the hardware and software, we can control and monitor the saline level of the patient by suing Arduino. The results are displayed on LCD screen and Smartphone using GSM module and the sensors. The results contain the alert message with saline level and room number.

8. Conclusion

This proposed system eliminates the regular monitoring of glucose level manually by intimating the caretaker through sending them alerts. It may cause serious issues to the patient if the saline bottle is not changed at the right time. The proposed system will avoid these kind of situation and this is a major advantage of this system.
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