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DESIGN AN INSTANT ALERT SYSTEM TO MONITOR LIQUID LEVEL OF SALINE BOTTLE

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ABSTRACT

As the world's population continues to grow, the need for health protection is increasing day by day. Therefore, it is imperative for everyone in this world to take proper care of their health. In recent years, there has been rapid progress in health care as a result of technological advances in various fields of sensory, mechanical, and computer-assisted medicine to ensure the rapid recovery of patients in hospitals. The great and basic need for hospitalized patients is that each patient should be given the best possible treatment and care and should be given the right amount of nutritious food at the right time. Among the various treatments, salt treatment is the most important treatment that most patients receive in hospitals. A bottle of saline is given to patients to treat dehydration and thus improve their health. In hospitals, whenever patients receive too much salt, the patient needs to be given by a nurse or caregiver on an ongoing basis. But unfortunately, there are critical situations, namely, the patient's blood also shifts back to the saline system due to negligence in salt filling and the busy systems of doctors, nurses, or caregivers, hence the high value. of patients dying or being injured in hospitals. Therefore, in order to prevent the patient from being harmed and to protect his or her health during a high-salt diet, a saline level monitor and an automatic alert system have been developed. The proposed system facilitates a sophisticated way to monitor the saline system through the Arduino platform. The proposed system consists of a sensor used to monitor the critical level of salt in a salt bottle and a device that will sound a buzzer and send an SMS to Dr. if the salt bottle is empty. The proposed system can be used effectively in homes and hospitals.

Keywords*: Arduino, Load cell, Saline Bottle*

1. INTRODUCTION

Saline is believed to have originated during the Indian Blue cholera epidemic that struck Europe in 1831. William Brooke O'Shaughnessy, suggested in an article in the medical journal Lancet that he should inject cholera patients with oxygen-rich salts, and his suggestion was immediately accepted. by Dr. Thomas Latta in treating cholera patients for a beneficial effect. In the decades that followed, a variety of alternative therapies for Latta were explored and used to treat cholera patients.

Whenever a patient is given too much salt, they need regular monitoring by a nurse and any relative. Often due to negligence, negligence, busy time, and the additional number of patients, the nurse may forget to change the saline bottle as soon as it is completely consumed. Shortly after the salt deplets, the blood rushes back to the salt bottle due to the difference in blood pressure and pressure inside the empty salt bottle. This can cause blood to flow that distorts the salt bottles from their veins. This results in a decrease in hemoglobin levels in patients and may also lead to a deficiency of red blood cells (RBCs) in the patient's blood causing fatigue. Therefore, there is a need to develop a saline monitoring system that will reduce patient dependence on nurses or caregivers to some degree.

Regular monitoring of the level of saline in the bottle is necessary. If the saline in the bottle is completely consumed, and the bottle can be replaced immediately then the pressure difference between the patient's blood pressure and the empty saline bottle causes bleeding without saline. This condition can be a major threat to the patient's well-being. The automatic switch is therefore recommended in this project to avoid any disruption that may occur to patients if the patient's relatives or hospital staff are not regularly monitored.

In the proposed system salt is automatically detected using Arduino. We use many hardware tools connected to the Arduino Nano micro controller. Hardware devices include - Power supply, download sensor, GSM, and Buzzer. All of these devices are incorporated into Arduino to monitor salt. Here we use a load cell, which is used to measure the mass of salt that produces an analog

2. LITERATURE REVIEW

The main purpose of this paper will be to prioritize the implementation of the salt level indicator in the salt bottle using the Internet of Things (IoT) as a platform. The proposed system incorporates IR sensors that are used to detect / monitor certain surrounding features. The IR sensor will serve

as a level sensor to monitor the important level of saline in the salt bottle. Whenever the level of saline reaches the previously defined critical level; RF-based automatic device warning and notification are sent to hospital staff. A warning message will be sent online to the nurses and doctors in charge of the patients. Along with that, the alarm buzzer will also start ringing. The purpose here is to introduce the composition and use of indicators of excess salt. The proposed system can be used effectively in homes and hospitals.

Arduino is a great controller and the load cell will provide weight data using the configuration. The weight of saline salt is 1 kg when full and if it weighs less than 200gms the bottle is about to run out. So Arduino will call and send an SMS to Dr.'s mobile number.

3. SYSTEM MODELLING

2.1. INTRODUCTION

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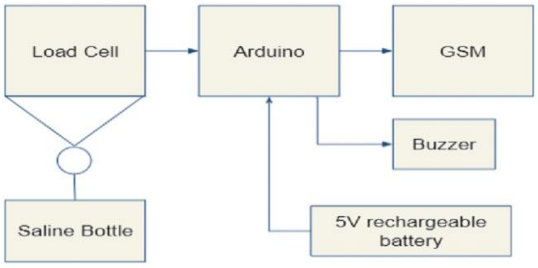

Fig 1. Block diagram

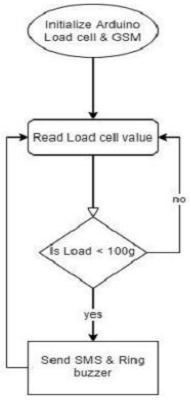

Fig 2. Program Flow Chart

2.2. SYSTEM MODULES

a) Arduino Nano

The Arduino Nano circuit board with Arduino IDE can read analog or digital signals from a variety of sensors, turn on the engine, turn on / off the LED and perform many other such functions. All operations are performed by sending a set of instructions to the ATtmega328 microcontroller, on board via Arduino IDE. Arduino board includes Power USB, Power (Barrel Jack), voltage controller, crystal oscillator, voltage pins (3.3v, 5v, gnd, vin), analog pins A0 to A5, icsp pin, power led indicator, tx and rx led. , 14 digital input / output pins, Aref, and Arduino reset.

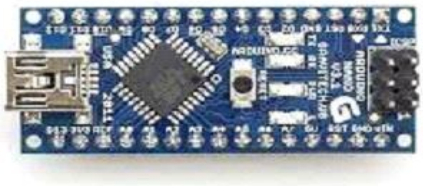

Fig 3. Arduino NANO Board

b) Load Cell

A loading cell is a transducer that converts power or pressure into an electrical output. The magnitude of this output is directly proportional to the energy used. Load cells have a gauge gauge, which fluctuates when pressure is applied to it. Then the strain gauge produces an electrical signal in decay as its resistance changes in fluctuations. The load cell usually contains four types of gauges on the configuration of the Wheatstone bridge. Load cell comes in different types such as 5kg, 10kg, 100kg and so on, here we have used Load cell, which weighs up to 40kg.

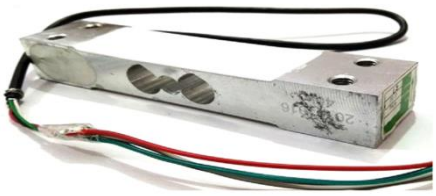

Fig 4. Load Cell

c) HX711 Weight Sensor Module

Load cell-generated electric signals are now a few milliliters, so they need to be continuously upgraded with a specific amplifier and that is why the HX711 Weighing Sensor comes into the picture. The HX711 Weighing Sensor Module has the HX711 chip, a 24-degree A / D converter (Analog to digital converter). HX711 has two analog input channels and we can get up to 128 benefits by configuring these channels. The HX711 module therefore enhances the low voltage output of the Load cells and this amplified & digital-converted signal is incorporated into Arduino for weight gain.

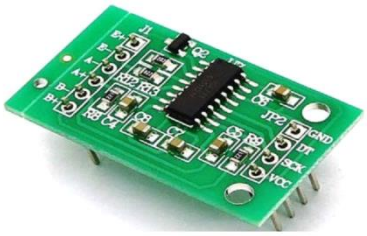

Fig 5. HX711 Weight Sensor Module

d) GSM SIM 800L

The GSM / GPRS mini-break board is based on the SIM800L module, supports the quad-band GSM / GPRS network, available on GPRS and remotely transmits SMS message data.

The board has a combined size and low current consumption. With energy saving strategy, current consumption is as low as 1mA in sleep mode.

It communicates with the microcontroller via the UART port, supports command comprising 3GPP TS 27.007, 27.005 and the advanced SIMCOM AT Commands.

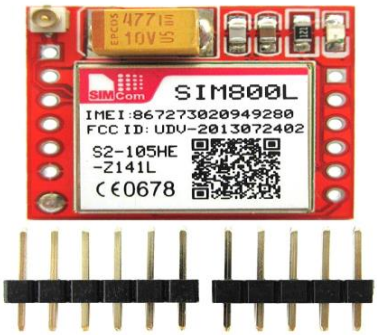

Fig 6. GSM SIM 800L

4. IMPLEMENTATION

The proposed system facilitates a more sophisticated way to control the rate of salt depletion by monitoring the saline system remotely through the Internet of Things. The proposed system consists of a sensor used to monitor the critical amount of salt in a salt bottle and a method that will stop the automatic flow of salt after the salt bottle is completely empty. Or to some degree. This is especially helpful for patients, especially at night. This system also avoids the fatal accident of air bubbles that enter a patient's bloodstream, posing a serious threat as the blood bubbles can cause immediate death. Such a device will create a safe environment for patients. The proposed system aims to solve the above problem successfully with this the nurse can monitor the amount of salt coming from inside the control room. Automatic saline monitoring includes Levels sensors used to check the condition of the liquid inside the bottle to normal or alert status. The detection rate of saline depletion is very reliable. The output of the sensor is analyzed to determine if the salt bottle is empty. When the salt level drops below a certain level, an alarm goes off to alert employees in the control room. The proposed system eliminates continuous monitoring of the patient's vision / vision by nurses. The main purpose of this program is to automatically monitor the patient's saline level using Arduino nano and the whole system is remotely controlled by the Android OS smart phone. In hospitals, it is not possible for a nurse to monitor each patient. It may hurt the feelings of the patients, so in order to overcome this situation we improve the proposed system. The main purpose of the program is to monitor the level of saline and to inform the current level of saline to the nurse. And when the saline finishes the system automatically stops the flow of saline with the help of spring.

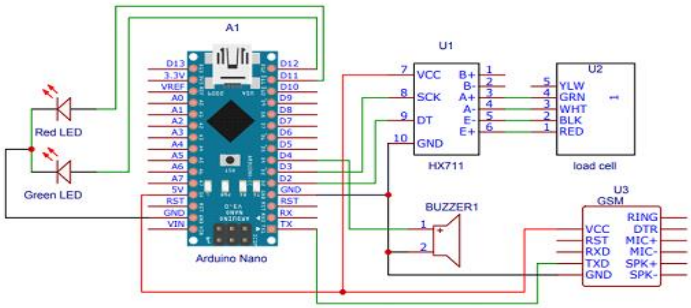

Fig 6. Proposed Circuit Block Diagram

5. RESULT

The output signal generated by the load cell is in the millivolt range, so we need an amplifier to convert the signal to a level that we can later convert to a digital signal and process it. For this purpose, we are using the HX711 amplifier sensor. The HX711 amplifier sensor incorporates the HX711 chip capable of converting analog to digital with 24-bit accuracy. The HX711 module maximizes the low voltage load of the load cell and transmits it to Arduino so that Arduino can keep calculating the weight from this data.

GSM Interfacing

When the SIM card is inserted into the GSM the LED status is displayed as 1 second blink and try to connect the LED blink for 3 seconds and it is ready and connected.

To send an SMS using the AT command in programs

AT - Once the handshake test is successful, it will return to OK

AT + CMGF = 1 → configure in SMS mode

AT + CMGS = \ "+ ZZxxxxxxxxx \″ → sender mobile phone number

"Message"

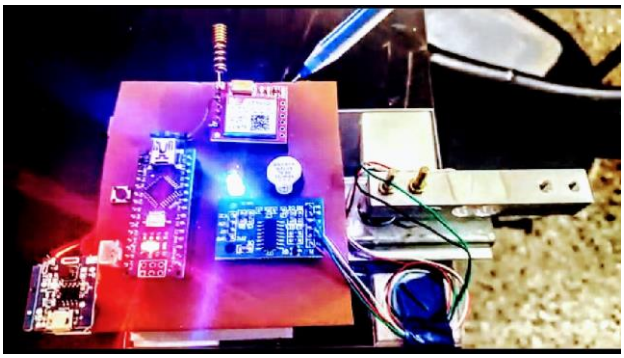

Fig7. Project Model

6. CONCLUSION

The proposed program will reduce manual effort. It requires very little human intervention as the system is completely automatic. The system is very helpful at night as there will be no need to constantly monitor the level of saline by people. This program can also be used at home, at a reasonable cost because the default system does not include any components of recurring costs. This program also helps to reduce operating costs. Patients can be hired in real time without the need for regular visits from doctors or nurses. As patients are monitored further, the chances of a blood loss are controlled and the patient's life is not involved because of any negligence. This ultimately helps to reduce people's mistakes. By using such a system, patients will also be reassured, which will help them recover faster.

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