iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 **Issue:** VIII **Month of publication:** August 2019

DOI: http://doi.org/10.22214/ijraset.2019.8132

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.177
Volume 7 Issue VIII, Aug 2019- Available at www.ijraset.com

Smart Saline Level Monitoring and Control System

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Abstract: In hospitals, Saline is fed to patients to treat dehydration and thus improve their health. In current health care measures, whenever a saline is fed to any patient, the patient needs to be continuously monitored by a nurse or any caretaker. Almost in all of the hospital, a nurse or caretaker is responsible for monitoring the saline level continuously without any interruptions. Due to the negligence and inattentiveness towards saline completion by doctors, nurses or caretaker of the patients and lack of nurses with sufficient skills in hospitals and their excessive workload, a huge number of patients are being harmed in the hospitals. Hence to prevent the patient from getting harmed and protect their lives during saline feeding period, the saline level monitoring and control system have been developed. The proposed system comprises of sensors which will act as a level sensor for monitoring the critical level of the saline in the saline bottle and control infusion drop rate from using motor mechanism to increasing and decreasing the saline drop rate. The system will show saline droplet status, saline drop rate and remaining time through app to be develop for convenient to hospital staff member. This proposed system can be utilized efficiently in homes as well as hospitals.

I. INTRODUCTION

These days technology is growing at a very high speed. Human lives have become much more dependent on electronic devices. Todays world requires sophisticated control in its different electronic gadgets. The basic aim of saline level indicator is to ease human lives.

Automation of the surrounding environment of a modern humanbeing helps to increase the work efficiency and saves time. Saline is fed when the patients body is dehydrated. A constant monitoring of the saline level in the bottle is required. If the empty saline bottle is not replaced immediately then the pressure difference between the patients blood pressure and the empty saline bottle causes reverse flow of blood into the saline.

Theses situation can be serious threat to the patients well-being. Thus the automation device is suggested in order to avoid any inconvenience that may be caused to the patients in case of lacking of constant monitoring by patients relatives or hospital employees.

The nurses can check saline droplet status of each patients bed without walking around patients room every hour. The device will send the status to the host unit and show the results. Therefore, nurses can checks a line droplet status.

II. PROBLEMSTATEMENT

Almost in all of the hospital, a nurse or caretaker is responsible for monitoring the saline level continuously without any interruptions. Due to the negligence and inattentiveness towards saline completion by doctors, nurses or caretaker of the patients and lack of nurses with sufficient skills in hospitals and their excessive workload, a huge number of patients are dying and are being harmed in the hospitals. Hence to prevent the patient from getting harmed and protect their lives during saline feeding period, we are going to develop the smart saline level monitoring and control system.

III. OBJECTIVES

A. To detect the critical level of saline bottle using IR sensor.
B. To make the system that automatically stop the flow after emptying of saline bottle using motor mechanism to increasing and decreasing drop rate which is controlling through app.
C. To design android application to display the result in the form of saline droplet rate, remaining time to empty the saline bottle displayed on mobile phone.
D. Provide cost effective and automatic saline level monitoring and controlling system which can be effortlessly implemented in anyhospitals.

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IV. PROPOSEDSYSTEM

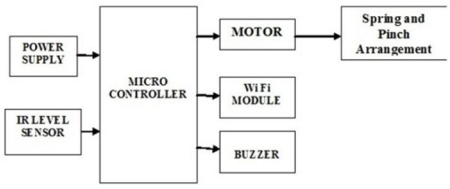


Fig. 1. System Architecture

This proposed system will function for different scenarios which are explained below as follows:
When the system is power on, IR sensor (TX andRX) will detect the drops of fluid and on another aspect, the microcontroller will calculate drop rate (drops per minute). It will also count a number of drops then according to the number of drops; it will calculate the level of fluid and remaining time.

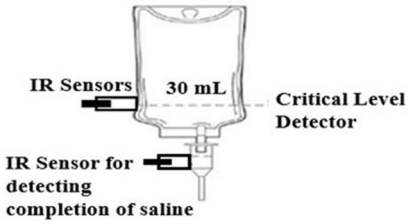


Fig. 2. Position of IR Sensor

An empty infusion solution bag at particular critical set level is achieved then it will alert with notification along with buzzer will beplayed.
Motor acts as an output for the microcontroller which is a mechanism used for control infusion drop rate.

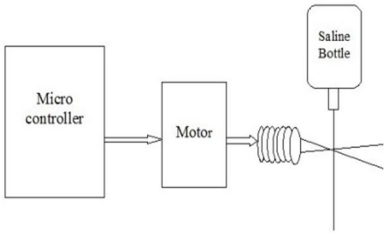


Fig. 3. Mechanism for stop reverse flow of blood



Fig. 5. System Hardware

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V. RESULT

A. Android Application

Successfully developed an android application named ”Saline Monitoring System” to display the result in the form of saline droplet rate, remaining time to empty the saline bottle displayed on mobilephone.

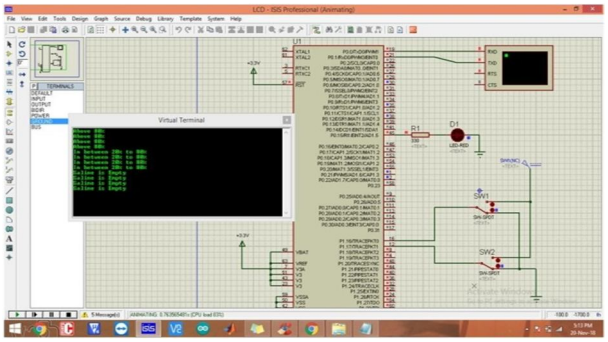


Fig. 4. Simulation



Fig. 6. Login Screen of Android Application

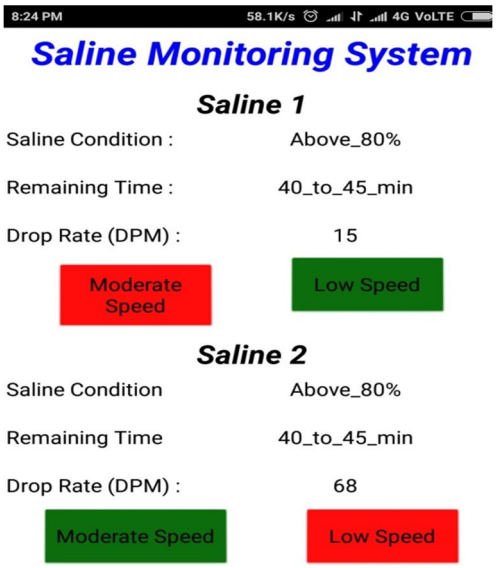


Fig.7. Result displayed

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VI. CONCLUSION

As the entire proposed system is automated, it requires very less human intervention. It will be advantageous at night.It can wirelessly send the information and display the results in the form of saline droplet rate, remaining time to empty the saline bottle. This will reduce the stress in continual monitoring by the doctor or nurse.

VII. ACKNOWLEDGMENT

I would like to thank my guide Prof. S. S. Shirganfor his consistent guidance, inspiration and sympathetic attitude throughout the total work, which I am sure, will go a long way in my life. I am grateful for the many useful comments and suggestions provided by him, which have resulted significant improvements in thepaper.

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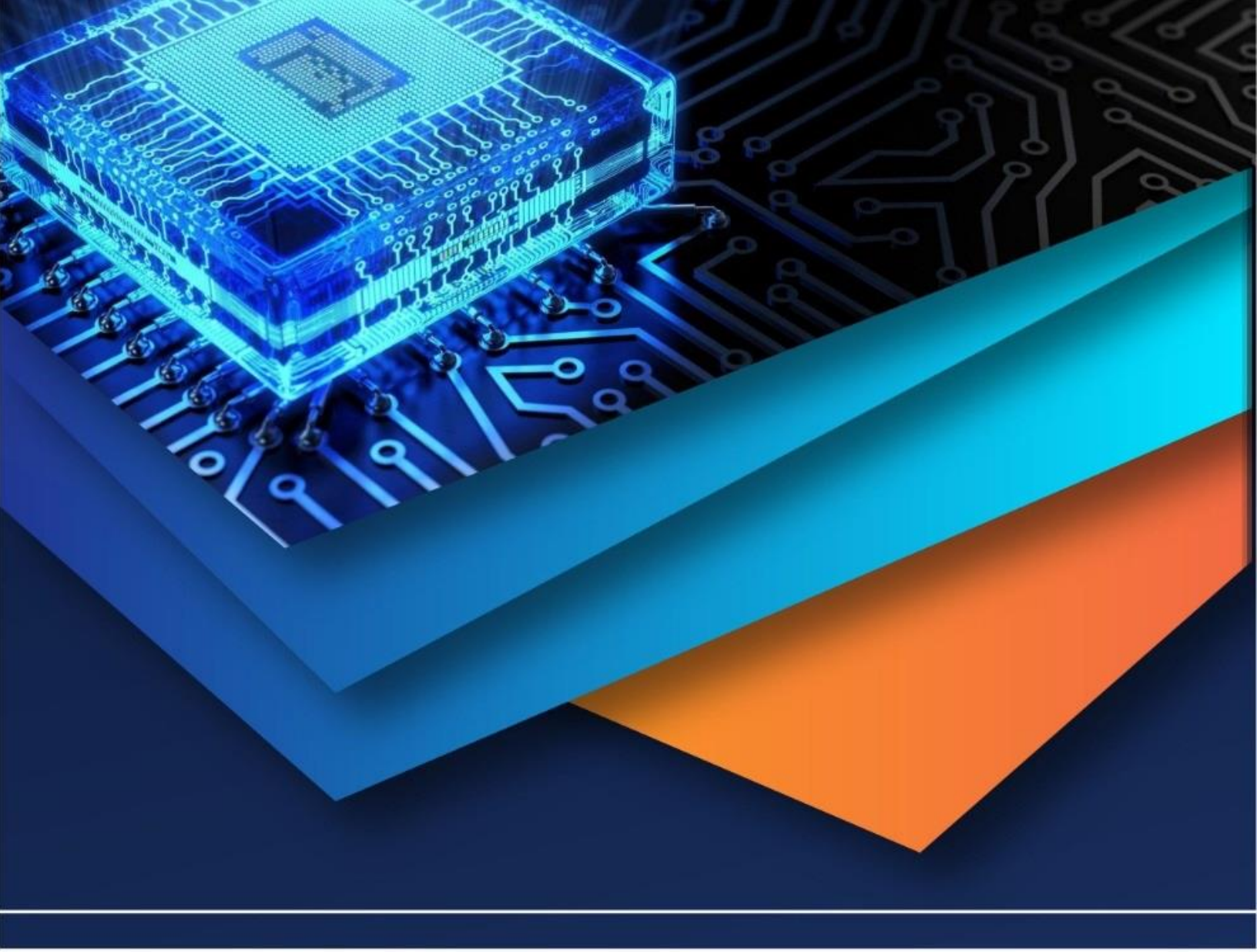
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