

# IOT BASED DRIPS MONITORING AT HOSPITALS

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**Abstract** - This project work involves monitoring of the saline bottles in hospitals. This framework comprises of Arduino AT Mega 328, Load Cell, HX711 Amplifier, LED and GSM Module. With consideration to the difficulty faced by the patients and the nurses on the completion of the saline (drips) bottle, this project will make use of Load cell and the amplifier to convert the weight to voltage in order to measure the remaining of the saline bottle. Indications and alert will be made thrice to the nurses for the comfort through LED bulbs in patients' room and by calls and messages to all the nurses at duty.

**Key Words:** Arduino, Internet of Things, GSM Sim 800a, Saline monitoring.

## 1. INTRODUCTION

Better health is the central to human happiness and well-being. Patients' safety is the fundamental to provide that happiness and it is the absence of preventable harm caused to the patient at the time of health care. Every point in the process of care-giving contains a certain level of harm or uncertainty. It is that intelligence which has to be inculcated with care to prevent unnecessary risk during monitoring. With increase in population, there is an equal increase in mortality. Doctors use saline IV to replenish flush wounds, deliver medications and sustain patients throughout different therapies or surgeries. Currently, Technologies have always been changing for every sector creating wonderful tools and resources that makes our lives easier, better and faster. Today everyone is going for digital transformation. And of course, the healthcare industries are going to have a dramatic change in their services. Due to which the way of service offering patients will soon be going to change and the outcomes are going to be very much result oriented. If IV is not monitored in the right way, it may cause backflow of blood once it becomes empty which becomes dangerous for the patient.

### 1.1 Need for Automatic drips monitoring

Hence there arises the need for the automatic saline monitoring systems that must be implemented in hospitals.

Need for automatic saline monitoring:

1. Ease of access to patient data.
2. Provides the ability to deliver higher-quality care to patients.
3. Prevents the backflow of blood in IV tube.

## 2. LITERATURE REVIEW

- I) In smart drip infusion monitoring system, uses trickle implantation observing framework for use in hospitals. The framework comprises of a drip infusion, sugar level observing gadgets and a monitoring screen. The mixture observing gadget utilizing a pressure sensor (MPX10GP) technology module can identify the trickle implantation rate and a vacant imbue ment arrangement sack, and after that, this information is sent to the monitoring screen put at the medical caretaker's station by means of the radio frequency (nrf24L01). The monitoring screen gets the information from trickle implantation observing gadgets and after that shows graphically them. When pressure sensor value reaches the threshold value, control valve will close which stops immediately flow of fluid without any airflow in patient's vein. This system may not be accurate because some medicines might also be injected to saline bottle which may cause variation in pressure.
- II) Current health care organization requires manual caretakers and their heavy duties become a social problem in the modern world which is an extremely time-consuming job. We are proposing a system in which remote drip infusion monitoring and control system has been developed for hospitals. The system contains numerous Infusion monitoring devices, control system, and a central monitor. The infusion monitoring device using an IR sensor which can detect or sense the drip infusion rate (drops per minute), remaining time, an empty infusion solution bag at particular critical set level and also show remaining infusion capacity displayed on central monitor and this information will be

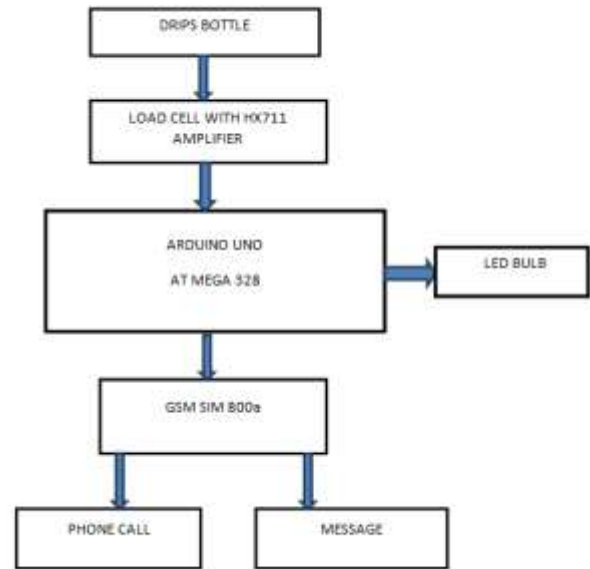
sent wirelessly to the crucial or central monitor placed at the nurse's control room and also from central monitor, nurses can control the drip infusion rate. The central monitor receives the data from several infusion monitoring or supervising devices and then displays all the information tabular form to the host PC. The proposed system eliminates continuous on vision/sight monitoring of the patient by nurses. But this system might also go unnoticed by the nurses if they are absent in the place where the central monitor is fit.

III) In Automatic low cost saline monitoring system, it mainly focuses on providing advanced saline level monitoring system. The idea is to provide cost effective, reliable and automatic saline flow monitoring system which can be easily implemented in any hospital and can be easy for doctors as well as nurses to monitor the saline flow from a distance. The proposed system eliminates continuous on sight monitoring of patient by nurses or doctors. Due to the use of microcontroller ATMEGA 328, wireless module CC2500, Bluetooth module and IR sensors. The drawback of this system is that, IR sensors are very much sensitive to obstacles that may appear on their way and Bluetooth module will have a low range communication.

### 3. PROPOSED SYSTEM

This system will work based on Arduino AT Mega 328, GSM module sim 800a, 1kg load cell, HX711 Amplifier. A load cell will be fixed on the saline stand with the load cell amplifier HX711. The saline bottle will be hanged at the centre of the load cell so that it can measure the weight of the bottle. Arduino Uno will be in the patient's room and once the bottle has reached to 40 percent of saline, the arduino will be activated and it glows the LED bulb (red color to indicate emergency) which will be placed in front of the patient's room. By this way, anyone passing the room will be able to identify that it is an emergency and intimate the nurses nearby. Later when the saline level reaches to 20 percent, Arduino will alert GSM Sim 800a used to send a message to mobile phones of all the nurses in duty indicating the need to change the saline bottle. This will hence give time for the nurses to replace the bottle accordingly. The final intimation will be by call alert sent to nurses and doctors when the saline level is below 10 percent which needs an alarming consideration.

### 4. BLOCK DIAGRAM



### 5. COMPONENTS:



A one kg load cell with HX711 Amplifier is required. A **load cell** is a type of transducer which is used to convert mechanical force into a measurable electrical output, anything which needs to be weighed probably **uses a load cell** to do so.



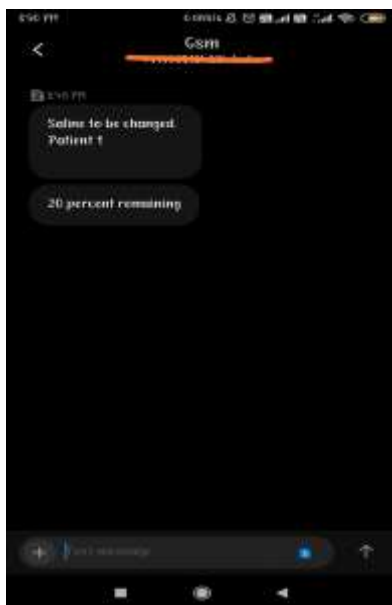
Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able

to read inputs – weight on a sensor, a finger on a button and turn it into an output – activating gsm, turning on an LED, publishing something online. Here we use Arduino AT Mega 328.



**SIM800A** is a complete Quad-band GSM/GPRS solution in a SMT type which can be embedded in the customer applications. **SIM800A** support Quad-band 850/900/1800/1900MHz, it can transmit Voice, SMS and data information with low power consumption. It can fit into slim and compact demands of customer design. It will receive data from Arduino microcontroller and act accordingly.

## 6. OUTPUT:



## 7. CONCLUSION

An automated Saline monitoring system will thus be very much accurate due to 1kg load cell. It will help us monitor patients at regular intervals of time through different alerts. It will also keep the nurses free from haste and panics. It is very beneficial and cost effective. Moreover this will never go unnoticed since alert is given to multiple mobile phones via messages and calls.

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