# Patient Drip Monitoring System

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**Abstract**-The world day by day every industry have introduce new techniques.Each work is being automated day by day. The medical sectors also introduce the new idea of "Patient drip monitoring system".The system are more useful to a hospitals and healthcare sectors. Various researches have been performed to overcome such critical situation. Different monitoring and alerting techniques are described in different researches. The major and fundamental requirement of the hospitalized patients is that every patient should be provided with a better treatment and observation and should be supplied the correct amount of vital nutrition at the correct time.For the medical professionals it becomes important to continuously monitor the conditions of a patient. In a large setup like a hospital or clinical center where a single doctor attends many patients. All most in all hospital, an caretaker/nurse is responsible for monitoring the drip bottle level continuously. But unfortunately during most of the time, the observer may forget to change the drip bottle at correct time due to their busy schedule. This may leads to several problems to the patients such as backflow of blood, blood loss etc. really helpful. A system is designed such that if the Intravenous fluid reaches a critical level, it is sensed by the LED and LDR set up and an send a message to a nurse mobile' room indicating the room number. When this is done, the nurse can easily identify the room and go there directly to change the bottle rather than keep checking every room to notice if the fluid has reached the critical level. Hence to prevent the patient from getting harmed and to protect their lives during saline feeding hours, the saline level monitoring and automatic alert system has been developed. The proposed system facilitates a sophisticated method of controlling saline drop rate by monitoring the saline system remotely by using Internet Of Things platform. The proposed system consists of a sensor used for monitoring the critical level of the saline liquid in the saline bottle and a mechanism that will stop the saline flow automatically after the saline bottle is completely empty. This proposed system can be utilized efficiently in homes as well as hospitals. This technology reduces the work of the nurse instead of keep on watching of an patient drip monitoring system. One of the greatest advantages of our project is the ease interface with users which functionally can be managed by means of mobile application.

Keyword-Optical Sensor,Arduino uno,GSM Module,LED

## I.INTRODUCTION

In Medical field, many devices to introduce a drastic change for monitoring the body measures like blood pressure, heart beat rate, diagnosis of heart attack symptoms and much more automatically with interdisciplinary nature.India is placed 154 position in healthcare among 195 developing countries in worldwide. According to the National Health Policy 2017 aims to raise public healthcare expenditure to 2.5% of GDP from current 1.4% with more than two-thirds of those resources going towards premier healthcare. It is still the largest employment source and a significant piece of the overall socio-economic development of India. Healthcare is highly central to India's progress. The growth of health facilities has been imbalanced India.Health care system is becoming more valuable for these days. In this scenario, maintaining patient's safety is the top most priority to be given in all hospitals. Now days, many automatic health monitoring devices are developed to ensure patients safety and to reduce the stress of the doctors. Many times, it is seen that the medical personnel do not monitor the flow rate or does not change the bottle of fluid on time due to burden of work or any other reason.However, such thing is not acceptable at all, as it may result in reduction of Hemoglobin level in a patient due to back flow of blood, which may result in several risks for patient. To avoid this situation, as a remedy, making this process as automated will take care of the system. This is what the following study is about i.e. how can the level monitoring system of such fluids be automated and even alert the medical personnel about changing the bottle on time, so that patient should not suffer any kind of risks. In this research, various ideas used are reviewed and a conceptual design is being proposed.In this proposed system the patient drip monitoring system automatically sends a message to the nurse through GSM technology. Even though many advanced automatic devicesare used, ensuring the safety of the patients during IV period is still a challenging issue. Intravenous (within vein) therapy is the infusion of liquid substances directly into the vein. Therapies administered intravenously are often

called specialty pharmaceuticals or drips. Even though monitoring the drip level of patient is a small thing for a nurse but it will affect the patient health severely during illness if the assist does not monitor it regularly.Our project is aimed in automating the intravenous fluid monitoring system using Arduino Uno. IV volume and fluid level can be precisely controlled. Also human can contact the system through GSM (Global System for Mobile communication).In drip monitoring system is failed to disconnect the drip system to patient, Air-in line sensor will be activated. All most in all hospitals, assist/nurse is responsible for monitoring the drip level system. But unfortunately, the observer may forget to change or stop the drip bottle at correct time due to their schedule. This may leads to several problems to the patients. Our project is overcome for this critical situation. This technology reduces the work of the observer.The user can communicate with the system through SMS (Short Message Service) which will be received by the GSM with the help the SIM (Subscriber Identification Module) card. The GSM sends this data to Uno which is also continuously receives the data from sensors in some form of codes. This helps to automate the healthcare system completely and sends the periodical report through GSM. Generally, it works automatically in auto mode when GSM receives a signal it changes to manual mode.Drip is usually used for long term treatments. But it can also be used for short-term treatment to rehydrate patients or to give them medicines to revitalize them. It is a very efficient process for quickly supplying the prescribed medicines into the entire body.

## II.EXISTING SYSTEM

The existing system contains a IV set which is attached to the drips chamber. The flow sensor is used to detect each drops of IV set. For each drop, the beam of light is broken at each time and that is transmitted and received by IR sensor. This provides a change in sensor output and comparator gives a pulse output for each drop. The drip rate is indicated using the LCD with which the observer can identify the volume of fluid in IV set. If the device is not sensed for 45 seconds it will give an alarm. If on complete drainage of the bottle, the needle is not removed from the patient, it results in back flow of blood into the tube. waiting for a nurse and then remove the tube, or patient Companies went to inform the nurse and then remove the tube.This results in undue stress on nursing staff who have to constantly monitor the

drips even as they manage multiple patients.Another system eliminates the constant manual monitoring of the level of liquid in a bottle is by using the load cell. The first intimation is given when 50 ml of liquid is left so that the hospital staff gets enough time to reach the room and replace the bottle. The second intimation is sent in the form of a call alert using a GSM modem to indicate the urgent need to replace the bottle.In the existing system the level sensor is used to check the fluid level of IV system the sensed level of the fluid is converted into electric signal and send it to the microcontroller. If the set point is crossed, the buzzer alerts the patient ward so that the IV bag can be replaced or removed on time. Also, the pressure sensor detects air embolisms/blood clots in the catheter.As a result the clot/embolism can be stopped from the patients vein. This in turn reduces several risks like cardiac arrest. Development of a LED based drip rate monitoring system. Development of a wireless system for wirelessly notifying the central monitoring station. Development of a wireless network for the transmission of the wireless messages to the central monitoring station.Design and development of a GUI for alerting the central monitoring station in case of any discrepancies in the drip rate.Development of a control mechanism for the control of the drip rate Development of a LED based drip rate monitoring system.Development of a wireless system for wirelessly notifying the central monitoring station.Development of a wireless network for the transmission of the wireless messages to the central monitoring station.Design and development of a GUI for alerting the central monitoring station in case of any discrepancies in the drip rate.Development of a control mechanism for the control of the drip rate.

## III.PROPOSED SYSTEM

Now days, many automatic health monitoring devices are developed to ensure patients safety and to reduce the stress of the doctors. These sterile solutions (sodium and dextrose) containing necessary nutrients to support the human life which is injected into the patient's body through a tube attached to the needle. Due to lack of caring, many problems will arise such as blood loss, backflow of blood through an IV tube. To overcome this situation, our proposed system to develop the IV fluid monitoring system automatically sends a message to the nurse through GSM technology and automatically turned off the flow of a liquid from the IV system by using the solenoid valves. Now days, many automatic health monitoring devices are developed to ensure patients safety and to reduce the stress of the doctors. These sterile solutions (sodium and dextrose) containing necessary nutrients to support the human life which is injected into the patient's body through a tube attached to the needle. Due to

lack of caring, many problems will arise such as blood loss, backflow of blood through an IV tube. To overcome this situation, our proposed system to develop the IV fluid monitoring system automatically sends a message to the nurse through GSM technology and automatically turned off the flow of a liquid from the IV system by using the solenoid valves. To overcome this situation an effective idea is proposed to develop an effective health monitoring system which alerts the doctor or nurse when the fluid level of saline bottle is beyond the threshold limit. It comprises of IR sensor, RF transmitter, Receiver, buzzer, etc.  Basically IR transmitter transmits an IR ray which is received by the IR receiver and the measured output is in terms of voltage. The IR transmitter continuously    transmits the rays through the saline liquid and the IR receiver starts to receive it and the corresponding output voltage is measured as 4.5V. When the process is going on, slowly the saline liquid enters into the patient's body through their vein. This is done with the help of intravenous (IV) set. Hence the level of nutritious liquid in the saline bottle is getting decreased gradually. Firstly while the saline bottle is feeded to the patient, the starting level will be completely full so the obstacle will cut the light rays of first IR sensor and the first LED of the IR sensor will be glown and the automatic alert message of partially filled bottle will be sent to the nurse, Similarly when the saline bottle is partially filled and partially empty then the obstacle will cut the light rays of second IR sensor and the second LED of the IR sensor will be glown and at last when the saline is becoming completely empty,then the same obstacle will cut the light rays of the third IR sensor and then the third LED of the IR sensor will be glown and the automatic alert message of completely empty saline bottle will be sent to the doctor as well as the flow of saline will be stopped automatically using a micro servo motor. As there may be negligence of nurses or doctors towards the patients or may be that they cannot reach patients so to avoid the reverse back flow of blood after completion of saline bottle, this micro servo motor is used to automatically stop the flow of saline immediately after the saline bottle is completely empty.

## IV.COMPONENTS USED

### A.Ardunio UNO

Arduino UNO is an 8-bit microcontroller with 32KB flash memory. It is the main controller of the IV fluid level indicator. It is programmed in such a way so as to produce the output when the intensity of light sensed changes.The ardunio uno sense the and send a message throw a GSM.

### B.GSM Module

The automatic control mode which is consists of GSM mode and flow control mode by which the user can important schedule. The mode selector which helps to nurse with alarm mode for set point value, for controlling the appliances and digital notice board. This module use the control of both the electrical appliances and the digital notice board in which the controller send the SMS, they were reached the predefined set value. The SMS received by the nurse/assist number. GSM module is interface with the arduino controller with the above following conditions through problem.

### C.Optical Sensor

The devices made by these researchers used the transparent nature of the drip chamber to develop an optical drop detection mechanism. The system consists of a light source and a sensor. The light falling on the sensor gets interrupted by a saline drop while fallin. This changes the electrical parameter of the photo-sensor. The response of the optical sensor corresponding to the fall of a single fluid drop in the drip chamber has been explained. Similar effects were observed at a decreased scale when the upper part of the drop scattered some more light. A variety of advantages of the optical sensing mechanism over the capacitive sensing mechanism have been discussed. . The optical system is uneffected by electrical interferences. The infusion rate was determined by the dividing the drip rate by the drop factor. The drip rate was displayed in an LCD panel. With the push of a button the drip rate was displayed in either drops per minute or volume infused per minute. A decrease in the frequency of the square wave was observed when a drop fell in the chamber. The microcontroller detected the fall in frequency which was used to count the number of drops.

### D.LED

The 1 Watt Light Emitting Diode acts as the light source for the setup. It is positioned on one side of the intravenous trips bottle. It is also necessary for making the logical decisions necessary for the notification at the central monitoring station and the control of the drip rate.Developed a device that consisted of an LED, receiver, and an amplifier circuit.Amplifier was used to amplify the signal from photo receiver. This signal was given to a digital counter,which counted the number of drops that fell inside the drip chamber.Using as even segment display the total number of drops were displayed.

## V.CONCLUSION

The patient drip monitoring system is helpful to used in patient caretaker and nurse .This also reduces the stress of repeated checking about the status of IV set.Automatically send a message to nurse mobile.It will be reduce a manual work. As the entire proposed system is automated, it requires very less human intervention. It will be advantageous at night as there will be no such requirement for the nurses to visit patient's bedevery time to check the level of saline in the bottle since an alert notification The patient no need to a care takers it will be automatically send a message.Hospital the nurse will be handle multiple patient in a time and avoid the some problem of blood reflux and etc.This technology is that it incorporates wireless technology for better and efficient communication with the healthcare givers.New technologies are emerging in medical field for the betterment of people and to serve the society.

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