Labview Based Analysis On Electronic Intravenous Drip & Hr Monitoring System

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Abstract: The drip rate monitoring system constantly notes the drip flow of the patients and the heart rate monitoring system continuously monitors the heart rate of the patients. Our proposed work aims at developing a drip rate monitoring system and a heart rate monitoring system for hospitals to monitor patients and to alarm the medical professionals during the night hours thereby reducing the work strain of the nurses. Simulation results are developed using LabVIEW.

Index Terms: Drip rate, Heart rate, PIC Microcontroller, and LabVIEW

1. INTRODUCTION
Currently in developing countries there is often no affordable, reliable solution for monitoring and controlling drip rates. Clinics are often understaffed and cannot continuously monitor drip flow to patients. If a clamp slips, or if an intravenous line becomes kinked, an improper amount of fluid can be given to the patients, causing swellings to patients. This is especially true for small children, who are most susceptible to the adverse affects of over-infusion. Often connected to adult sized IV bags, children are at a high risk for being over-hydrated, which often leads to death. During intravenous (IV) infusion of fluid [15], the flow rate is obtained as the product of the drip rate (fluid drops per minute) and the drip factor of the tubing (number of drops / ml). The drip rate is fixed by controller on the tubes, and it is supervised by visually totalling the drops over 17 or 35 seconds to find the degree per minute. The drip count fixed by medical attendant change due to numerous reasons. It is affected by dilation or contraction of the patient's veins as they warm up. The drop of fluid across the intragenic needle is blocked by tissue. Gravity pressure in bag and fluid volume are directly proportional and it consequences in a reduction in the drip rate. Every 15 to 20 minutes, a drip has to be checked to ensure that it is flowing at the correct rate. While analyzing the past systems we found that they have used a drip chamber and a photo-sensor assembly clipped around it to sense the drops falling in it. A drip rate meter then developed to sense the drops in the drip chamber and displays the drip rate. The presence of sensor assembly on tubular drip compartment has infrared light source provides access to a photo-sensor at backend. This relatively changes the output produced by the sensor at the required end. Compared to visual counting, drip counter provides acceptable calculation reading and its reaction period is adjusted to minimum drops. The instrument can be intended to give a caution if the IV drip rate stays past the set furthest reaches of resistance past a specific time, or when the liquid volume clinched abatements beneath a set worth.

2 EXISTING METHODOLOGIES
The other existing models make use of non-contacting copper foil electrodes [1]. The terminals are folded over the implantation supply polyvinyl chloride (PVC) tube from the arrangement pack, the drip chamber, and the mixture PVC tube from the trickle chamber. But these existing models do not provide accurate results as produced by the infrared sensors and these do not offer any means to alert the nurses directly during the night hours, as the alarm is placed near the patients. It requires extra work to illuminate nurture about the frenzy state of the patients. The other proposed works [3] makes use of the concept of inducing an ac voltage in the patient's body by a pulse oscillator which is then recorded by the electrodes in the drip tube. In the event that the infusion needle is confined the air conditioner voltage changes and an alarm is given to the medical caretaker station. So the first phase of our project is to develop a drip rate monitoring system that will be able to alert the nurses using a wireless communication system whenever it predicts a faulty drip flow.

According to WHO an estimated 17 million people die of cardiovascular diseases, particularly heart attacks and strokes, every year. A significant number of these passings can be credited to tobacco smoking, which expands the danger of biting the dust from coronary illness and cerebrovascular malady overlap. Physical inactivity and unhealthy diet are other main risk factors which increase individual risks to cardiovascular diseases. The development of the electrical sign makes your heart's chambers contract and unwind. When a signal passes through a chamber wall, the chamber contracts. When the signal has moved out of the wall, the chamber relaxes. In a solid heart, the chambers contract and unwind in a planned manner, or in cadence. At the point when your heart pulsates in mood at an ordinary rate, it's called sinus cadence. An issue in your heart's electrical framework can upset your heart's typical beat. Any sort of irregular musicality or pulse is called an arrhythmia. It's typical and solid for your pulse to accelerate or back off during the day as your action level changes. Be that as it may, it's not typical for your heart to pulsate out of cadence. At the point when your heart pulsates out of mood, it may not convey enough blood to your body. Tuning in to the heart is maybe the most significant, essential, and viable clinical strategy for assessing a patient's cardiovascular capacity. A gifted expert can rapidly assess regular protests that might be very genuine. The existing projects create an ECG sensor system [16] that can be wirelessly connected to a handheld device that can graphically present the heart signals. During our

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second phase we aim at analyzing the heart rate of the patients by fixing a threshold using LabVIEW as a tool and to trigger an alarm during panic conditions to the nurses in hospitals.

3 METHODOLOGY

The following block diagram shown in figure 1 uses infrared sensors to monitor the drip rates and to send an alarm whenever the rate exceeds the threshold fixed.

**Fig 1 Proposed Drip rate alarm system**

3.1 Design Process
In this paper we are designing a drip management system for managing and monitoring the patients with drip bags to check the drip rate. A sensor setup is used to measure the level of the drip rate which is detected and continuously read by the microcontroller’s counter. The data from the microcontroller is encoded and is transmitted. The data is received by the receiver and an alarm is set to make the alert, if the drip rate exceeds the threshold estimated.

3.2 PIC 16F877A Microcontroller
The incredible bit of leeway of this is so as to change the circuit's structure and activity, all that is required is an adjustment in the program practically if any, circuit hardware modifications are necessary. The microcontroller unit used here is a PIC16F877A. The core controller is a mid-range family having a built-in SPI master. 16F877A have 33 I/O pins. It is capable of initiating all intersystem communications. The master controller controls each functions of the system with a supporting device PIC 16F877 is a 40 Pin DIP (dual in package) and is also available in PLCC and QFP. It is a high performance RISC (Reduced instruction set computer) CPU. This has a Flash Memory: Up to 8K x 14 Words, RAM (Data Memory): Up to 368 x 8 bytes EEPROM: Up to 256 x 8 bytes Operating Speed: DC – 20 MHZ and 20ns instruction cycle, Interrupts: 15, Input/Output Ports: total 5 nos. Following the PIC microcontroller we have an encoder block.

3.3 Encoder (HT12E)
The 2^12 encoders are a progression of CMOS LSIs for remote control framework applications. They are equipped for encoding data which comprises of N address bits and 12_N information bits. Each address/information info can be set to one of the two rationale states. The programmed addresses/data are transmitted together with the header bits via an infrared transmission medium upon receipt of a trigger signal.

3.4 Decoder (HT12D)
The decoders receive serial addresses and data from a programmed 2^12 series of encoders that are transmitted by a carrier using an IR transmission medium. The 2^12 decoders are a progression of CMOS LSIs for remote control framework applications. They look at the sequential info information multiple times ceaselessly with their residential locations.

4 IMPLEMENTATION

LabVIEW is a graphical programming condition utilized by a huge number of specialists and researchers to create refined estimation, test, and control frameworks utilizing natural graphical symbols and wires that look like a flowchart. The software tool implemented in the design for data acquisition is LabVIEW, selected primarily as it is capable of acquiring and processing the bio signals and has vast graphical capabilities and flexibility in design.

4.1 Simulation Results
Here we have developed a threshold detector part for heart rate using LabVIEW. Results are shown in figure 2.

**Fig 2 Threshold detection using LabVIEW**

The comparing yields appeared beneath demonstrate three changed cases for ordinary, low and extremely high pulse. Green LED will switch over between various limit levels. At the point when limit pointer crosses 90 at that point LED will shine high showing irregular pulse.
5 CONCLUSION
We have tried to implement both drip rate and heart rate monitoring system at a single push. That is two separate phases with real time implementation of drip rate and Heart rate variability analysis using LabVIEW. Till now we have predicted abnormalities in heart rate and the corresponding results are shown above. In parallel we have completed the design part of drip rate monitoring system and now we are programming the PIC Microcontroller for sending an alarm to the receiver end.

REFERENCES