ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 3, March 2016

A Survey on Automatic Flow Control in Drip

Arjun Udayan[1], Sachu R Kurup[2], Sharook H[3], C.Jeyanthi[4]

UG Students, Department of Electronics and Instrumentation Engineering, PSN College of Engineering & Technology, Tirunelveli, Tamilnadu, India [1,2,3]

Associate Professor, Department of Electronics and Instrumentation Engineering, Tirunelveli, Tamilnadu, India[4,]

ABSTRACT:Patient tracking structures is the time period for all the numerous gadgets that are used to supervise sufferers. One category of such devices is devices that indicators if the affected person gets right into a critical state. In our proposed method focuses on to monitor & initiate alert to doctors approximately the sufferers at some points of glucose journey injections. In our proposed device it will done four main duties, the flow of glucose will stopped, the float degree to be managed, while the liquid degree underneath the brink cost will upward push alarm and intimate to corresponding individual through wireless, then the any injections be applied means it is going to be automatically injected depends on the time based totally. All the actions are controlled through microcontrollers. And sensors are used to degree the price of liquid, and different feature primarily based motor.

KEYWORDS: Programmable IC, actuator, blood carrying bottle, solenoid valve, microcontroller, ultrasonic sensor.

I.INTRODUCTION

A drip is used for the patient when the patient becomes unhealthy. In the time of operations the food cannot give to the patient that time the trip was provide for their health. If it overflows it also cause any problem for that we use an at automatic flow control drip. Automatic flow control of blood in drip is done with the help of sensing the amount of the level in the bottle. A level sensor is placed outside the bottle. It can be measured with the help of variations in the level. The main components are programmable IC, actuator, blood carrying bottle, carrying stand and power supply. The major advantage of the project is that; when we are not able to stop the flow of fluid or if we made some careless mistake there is a chance to reflow of the fluid into the bottle. It may damage the human body and may tend to cause death.

By using this method we can automatically close the valve in the absence of the human operator. The sensing of the Level of bottle is taken initially and the bottle without fluid is taken as the set point. When the fluid reaches the value same as the set point and the sensor provide the signal and the programmable IC starts working. At the same time the motor starts rotating and the valve will be closed at the same time the wireless alarm attached to the setup will provide alert signal to the operator. These techniques is considering for the automatic control of blood injection.

II.LITERATURE SURVEY

1. Hikaru Amano**,** Hidekuni Ogawa**,** Hiromichi Maki**,** Sosuke Tsukamoto**,** Yoshiharu Yonezawa**,** W. Morton Caldwell, "**A remote drip infusion monitoring system employing Bluetooth"EMBC, IEEE. ISSN:1557-170X.**

We have developed a remote drip infusion monitoring system for use in hospitals. The system consists of several infusion monitoring devices and a central monitor. The infusion monitoring device employing a Bluetooth module can detect the drip infusion rate and an empty infusion solution bag, and then these data are sent to the central monitor placed at the nurses' station via the Bluetooth. The central monitor receives the data from several infusion monitoring devices and then displays graphically them. Therefore, the developed system can monitor intensively the drip infusion situation of the several patients at the nurses' station.

2. Xinling Wen**, "Design of Medical Infusion Monitor and Protection System Based on Wireless Communication Technology" IITA '08. ISBN: 978-0-7695-3497-8(Volume: 2)**

A medical infusion monitor and protection system is designed based on technologies of photoelectric monitor, modulation demodulation, single chip microprocessor (SCM), and wireless communication, etc. The infusion signal is

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collected by infrared photoelectric conversion characteristic. SCM AT89C51 processes monitor data and control area infusion speed and controls wireless transceiver nRF905 to constitute wireless communication system to transmit data. Through the serial interface MAX487 connected main controller with each control node, upper PC can monitor and control each node in real-time and renew control-schemes. Experiments shown that the rate of infusion speed monitor error is less than 2 drop every minute, and stability time is faster, which effectively completes intelligent infusion system monitor and alarm.

3.Hiromichi Maki**,** Sosuke Tsukamoto**,** Yoshiharu Yonezawa**,** Hikaru Amano**,** W. Morton Caldwell**,** Hidekuni Ogawa**, "A new drip infusion solution monitoring system with a free-flow detection function"EMBC, IEEE. ISSN:** 1557-170X

A new drip infusion solution monitoring system has been developed for hospital and care facility use. The system detects the fall of each drip chamber drop of fluid and also a free-flow situation. Three non-contacting copper foil electrodes are used. The electrodes are wrapped around the infusion supply polyvinyl chloride (PVC) tube from the solution bag, the drip chamber, and the infusion PVC tube from the drip chamber. Drip infusion fluids have electrical conductivity, so a capacitor is formed between the infusion fluid and each electrode. A thirty kHz sine wave is applied to the electrode wrapped around the infusion supply PVC tube from the solution bag. The capacity-coupled signal on the drip chamber electrode is the transducer output. When an infusion fluid drop is forming, its length and diameter, and therefore the drip chamber capacitance, are increasing, causing change in the output signal. The drip chamber electrode can detect the fall of each drip chamber drop of fluid. When the infusion solution becomes free-flow, an infusion fluid drop is not forming and the infusion fluid flows continuously. Therefore, the capacitance of the electrode around drip chamber does not change the output signal. On the other hand, the electrode wrapped around the infusion supply polyvinyl chloride tube under the drip chamber detects the thirty kHz sine wave conducted by the infusion fluid. The drip chamber electrodes and the infusion supply PVC tube under the drip chamber detect each drop of fluid and free-flow, respectively.

4. Priyadharshini.R, Mithuna.S, VasanthKumar.U, KalpanaDevi.S, Dr.SuthanthiraVanitha.N, "Automatic Intravenous Fluid Level Indication System for Hospitals", IJRASET.ISSN: 2321-9653

During recent years due to the technological advancements many sophisticated techniques has been evolved for assuring fast recovery of the patients in hospitals. For good patient care in hospitals, assessment and management of patient's fluid and electrolyte need is the most fundamental thing required. All most in all hospital, an assist/nurse is responsible for monitoring the IV fluid level continuously. But unfortunately during most of the time, the observer may forget to change the saline 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. To overcome this critical situation, a low cost RF based automatic alerting and indicating device is proposed where IR sensor is used as a level sensor. It is based on the principle that the IR sensor output voltage level changes when intravenous fluid level is below certain limit. A comparator is used to continuously compare the IR output with predefined threshold. When the transceiver output is negative then the Arduino controller identifies the fluid level is too low and it alerts the observer by buzzer and LCD at the control room indicates the room number of the patient for quick recovery.

5. Bailey Flynn, Matthew Nojoomi, Michael Pan, Kamal Shah, "Intravenous Dehydration Relief in Pediatrics", IGHT

Diarrhoea-induced dehydration is the second leading cause of death in children under five years old [1]. Most of these deaths occur in the developing world. Severe dehydration is treated with intravenous (IV) therapy. One risk of IV therapy is over-hydration, which can to lead to severe complications and death. In the developed world, infusion pumps are commonly used to regulate the delivery of IV therapy, but these technologies are too expensive and complex for many hospitals in the developing world. Paediatric wards in these hospitals lack sufficient financial, electrical, and staff resources to monitor children undergoing IV therapy, often causing clinicians to forego treatment entirely.

We have developed IV DRIP—a simple, low-cost, mechanical automatic volume regulator to deliver intravenous fluid in low-resource settings. The device consists of two levers; an IV bag hangs on the upper lever, while a counterweight hangs on the lower, notched lever. The position of this counterweight dictates the volume of fluid dispensed. When the target volume is delivered, the levers tip and kink the IV tubing, stopping fluid flow and thus preventing over hydration.

Tests have shown that IV DRIP can deliver fluid volumes from 50 mL to 800 mL in 50 mL increments with 97.5% accuracy. Our device is comprised of parts that cost under $80, whereas commercially available infusion pumps cost $1000-$3500. IV DRIP is an affordable, accurate tool to help save the lives of hundreds of thousands of children annually.

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III.WORKING PRINCIPLE

We have developed a remote drip infusion monitoring system for use in hospitals. The system consists of several infusion monitoring devices and a central monitor. This system works on the way that when the glucose or the medicine becomes empty the flow of medicine to the patients is automatically controlled. This application is done with the help of sensors and microcontroller action. The working principle behind this operation is that the sensor senses the variable and then it passes the signals to the microcontroller. Based on the output from the sensor the microcontroller starts working. By the combined action of the solenoid valve the flow gets stopped and it also alerts the operators about the present status of the patients.

A medical infusion monitor and protection system is designed based on technologies of microcontrollers, solenoid valve and wireless communication, etc. The ultrasonic sensor senses the level of the bottle and transmits the signals to the microcontroller. The infusion signal is collected by infrared photoelectric conversion characteristic. SCM AT89C51 processes monitor data and control area infusion speed and controls wireless transceiver nRF905 to constitute wireless communication system to transmit data. Through the serial interface MAX487 connected main controller with each control node, upper PC can monitor and control each node in real-time and renew control-schemes. Experiments shown that the rate of infusion speed monitor error is less than 2 drop every minute, and stability time is faster, which effectively completes intelligent infusion system monitor and alarm.

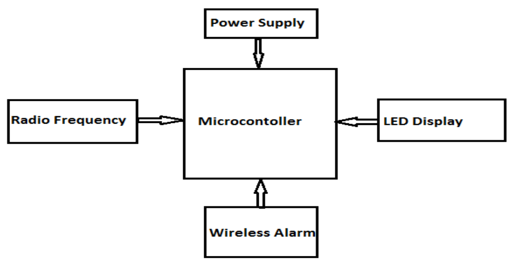

Fig. 1: Receiving unit.

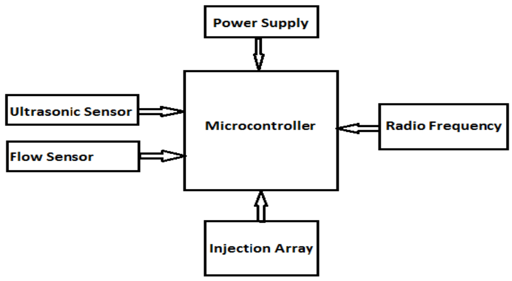

Fig 2: transmitting unit

We proposed a new technique called automatic flow control in drip. This system is based on the level sensor and microcontroller. Our proposed system is to introduce to develop the mechanism without the involvement of the human operator the common people are suffering due to different diseases. The sensor based system provides better quality and precision. These techniques is considering for the automatic control of blood injection. It reduces the manual Operation and Time to monitor the sufferers continuously is not possible at all the time. Human interferences is needed for the sufferers. Diseases like DENGUE FEVER, DIAHHERA, MALARIA, CHOLERA, DYSENDRY, FEVER etc. are common in our country. Drips are commonly used in affected peoples to give food and medicine .If we are not able to stop the drip it then there is a chance of the fluid to be returned to the bottle.

The blood flow through veins is at high pressure. That is why the blood is to be returned to the bottle. Nowadays the medical field is so advanced, but in poor countries it is still undeveloped. So that we are introduce this device. The patients are suffering due to the different kinds of diseases. Drips are used to administer the food and

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medicines.

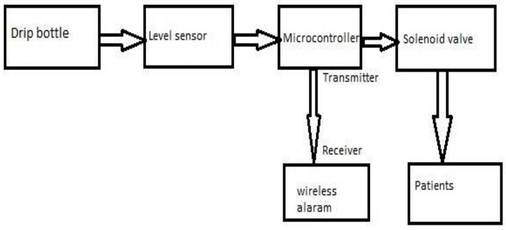

Fig 3: Autoamtic flow control

If we are not able to stop the fluid flow then there is a high chance of the fluid to be returned to the body. The advantage of this project is to close the valve automatically in the absence of human operator. The control actions are done by the microcontroller. The motor starts rotating and the valve will be closed. The wireless alarm attached to the setup will provide the alert signal to the operator. These techniques are considered for the automatic flow control drip

IV.MICROCONTROLLERS

Circumstances that we find ourselves in today in the field of microcontrollers had their beginnings in the development of technology of integrated circuits. This development has made it possible to store hundreds of thousands of transistors into one chip. That was a prerequisite for production of microprocessors, and the first computers were made by adding external peripherals such as memory, input-output lines, timers and other. Further increasing of the volume of the package resulted in creation of integrated circuits. These integrated circuits contained both processor and peripherals. That is how the first chip containing a microcomputer, or what would later be known as a microcontroller came about.

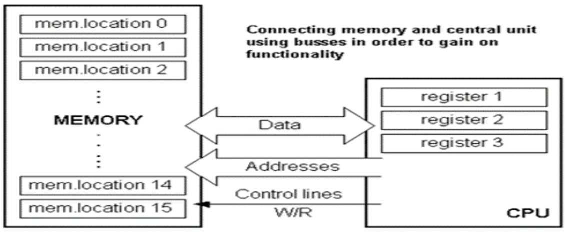

Fig 4: Ultrasonic Sensors

Ultrasonic sensors (also known as transceivers when they both send and receive, but more generally called transducers) work on a principle similar to radar or sonar, which evaluate attributes of a target by interpreting the echoes from radio or sound waves respectively. Active ultrasonic sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor, measuring the time interval between sending the signal and receiving the echo to determine the distance to an object. Passive ultrasonic sensors are basically microphones that detect ultrasonic noise that is present under certain conditions.

A. PIN DESCRIPTION OF ULTRASONIC SENSOR HC-SR04

Sl. No	Pin	Description
1.	Vcc	Connect to 5V dc
2.	Trigger	Pulse input that triggers the sensor
3.	Echo	Indicates the reception of echo from the target
4.	Gnd	Gnd

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B. **POWER SUPPLY**

A power supply provides a constant output regardless of voltage variations. “Fixed" three-terminal linear regulators are commonly available to generate fixed voltages of plus 3 V, and plus or minus 5 V, 9 V, 12 V, or 15 V when the load is less than about 7 amperes

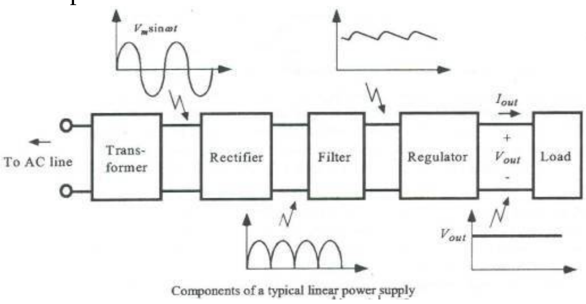

Fig. 5: RF Transmitter and Receiver

The TWS-434 and RWS-434 are extremely small, and are excellent for applications requiring short-range RF remote controls. The transmitter module is only 1/3 the size of a standard postage stamp, and can easily be placed inside a small plastic enclosure.

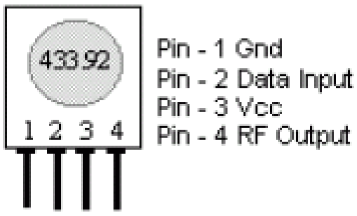

Fig. 6: TWS-434 Pin Diagram

TWS-434:

The transmitter output is up to 8mW at 433.92MHz with a range of approximately 400 foot (open area) outdoors. Indoors, the range is approximately 200 foot, and will go through most walls. The TWS-434 transmitter accepts both linear and digital inputs, can operate from 1.5 to 12 Volts-DC, and makes building a miniature hand-held RF transmitter very easy. The TWS-434 is approximately the size of a standard postage stamp.

C. **Liquid crystal display (LCD)**

A liquid crystal display (LCD) is an electro-optical amplitude modulator realized as a thin, flat display device made up of any number of color or monochrome pixels arrayed in front of a light source or reflector. It is often utilized in battery-powered electronic devices because it uses very small amounts of electric power. Each pixel of an LCD typically consists of a layer of molecules aligned between two transparent electrodes, and two polarizing filters, the axes of transmission of which are (in most of the cases) perpendicular to each other. With no liquid crystal between the polarizing filters, light passing through the first filter would be blocked by the second (crossed) polarizer. The surfaces of the electrodes that are in contact with the liquid crystal material are treated so as to align the liquid crystal molecules in a particular direction. This treatment typically consists of a thin polymer layer that is unidirectional rubbed using, for example, a cloth. The direction of the liquid crystal alignment is then defined by the direction of rubbing. Electrodes are made of a transparent conductor called Indium Tin Oxide (ITO).

Before applying an electric field, the orientation of the liquid crystal molecules is determined by the alignment at the surfaces. In a twisted pneumatic device, the surface alignment directions at the two electrodes are perpendicular to each other, and so the molecules arrange themselves in a helical structure, or twist. Because the liquid crystal material is light passing through one polarizing filter is rotated by the liquid crystal helix as it passes through the liquid crystal layer, allowing it to pass through the second polarized filter. Half of the incident light is absorbed by the first

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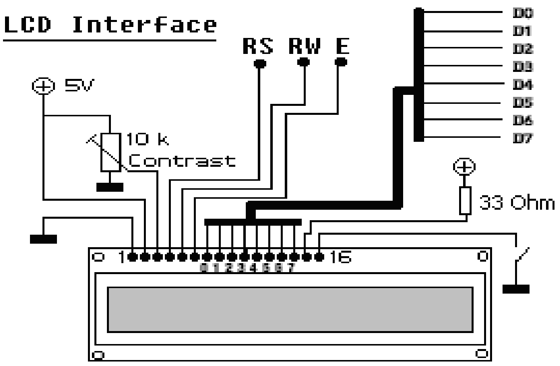
polarizing filter, but otherwise the entire assembly is reasonably transparent. When a voltage is applied across the electrodes, a torque acts to align the liquid crystal molecules parallel to the electric field, distorting the helical structure (this is resisted by elastic forces since the molecules are constrained at the surfaces).

This reduces the rotation of the polarization of the incident light, and the device appears grey. If the applied voltage is large enough, the liquid crystal molecules in the center of the layer are almost completely untwisted and the polarization of the incident light is not rotated as it passes through the liquid crystal layer. This light will then be mainly polarized perpendicular to the second filter, and thus be blocked and the pixel will appear black. By controlling the voltage applied across the liquid crystal layer in each pixel, light can be allowed to pass through in varying amounts thus constituting different levels of gray.



VI.CONCLUSION

The presented automatic flow control in drip is realized as a small, compact and advanced technology in the medical field. Here the continuous flow of medicine through drip to the patient is automatically controlled. This can be done by measuring the level of medicine through the drip and is compared with set point and flow of medicine is stopped when it reaches the desired set point. This methods can be used for the overcoming of the careless mistakes done by the operators.

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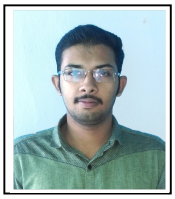
BIOGRAPHY



Arjun Udayan (First Author) is pursuing his Bachelor of Engineering degree in Electronics and Instrumentation Engineering from PSN College of Engineering and Technology, Tirunelveli, India. His aim is to involve in Research and to become an Inventor.

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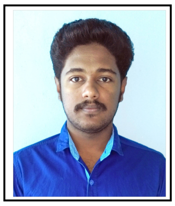
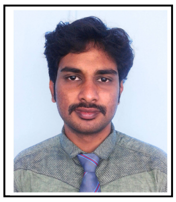


Sachu R Kurup (Second Author) is pursuing his Bachelor of Engineering degree in Electronics and Instrumentation Engineering from PSN College of Engineering and Technology, Tirunelveli, India. His aim is to become a technician.



Sharook H (Third Author) is pursuing his Bachelor of Engineering degree in Electronics and Instrumentation Engineering from PSN College of Engineering and Technology, Tirunelveli, India. His aim is to become a Leading Entrepreneur.