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Intravenous Drip Monitoring System Using IOT

Sri Mathi V [1], Suganya MB [2], Sandhiya K [3], Nivetha D [4]
Assistant Professor Myilsamy G [5]
Department of Electronics and Communication Engineering,
Jansons Institute of Technology, Karumathampatti, Coimbatore, Tamilnadu, India-641659

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ABSTRACT: The aim is to design an Intravenous Drip Module, In our current medical care system, the monitoring of patients in a hospital throughout the day is a tiresome process. Sometimes Doctors or Nurses are too busy, so they can't monitor each patient. This causes many problems like injecting saline or Intravenous (IV) fluids in to the vein of patient. If the drip system is not monitored on time, it will causes problems like backflow of fluid, blood loss etc. In order to reduce the workload and overcome such critical situation in the area of an intravenous drip monitoring system, we proposed a system called Automated Intravenous Drip Monitoring System using IoT.

KEYWORDS: Intravenous Drip Monitoring system; Intravenous Fluids; Injecting Saline; Backflow; Blood Loss

I. INTRODUCTION:

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 socioeconomic development of India. Healthcare is highly central to India's progress. The growth of health facilities has been imbalanced India. Automation in healthcare is an emerging field unknown to us. In current era, there is no time for youngsters to concentrate on healthcare as it requires more time and work. In terms of business, it has much profit. By introducing automation, time and stress can be Automation in healthcare is an emerging field unknown to us. In current era, there is no time for youngsters to concentrate on healthcare as it requires more time and

work. In terms of business, it has much profit. By introducing automation, time and stress can be reduced in Nurse/Monitoring person. As we are moving to a future of health care, we have to save person health There are many disadvantages in the healthcare system like infection control due to assessments of doctor, heart attack due to clot of Air embolism in back flow of blood in intravenous fluid, medication errors due to surgery and clinic respective. This project helps to rectify those problems and hopes youngsters to concentrate on healthcare as it as emerging field which is required for the future. Intravenous therapy is the infusion of fluid substances directly into a vein. Intravenous WIfiply means "within vein".

IV system may be used to correct fluid imbalances, to deliver machines, for blood transfusion or as fluid replacement to correct. This way is the fastest way to deliver medicines or fluids. Therefore, it is necessary to monitor treatment through IV therapy. Our project is aimed in automating the intravenous fluid monitoring system using Arduino Uno R3. IV volume and fluid level can be precisely controlled. Also, human can contact the system through WIFI.

II. LITERATURE SURVEY:

1] A remote drip infusion monitoring system employing Bluetooth

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

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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.

2] Design of Medical Infusion Monitor and Protection System Based on Wireless

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 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 Automatic Intravenous Fluid Level Indication System for Hospitals 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 back flow 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.

BLOCK DIAGRAM:

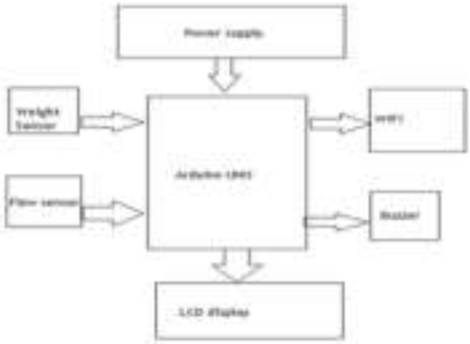

Fig 1 block diagram

WORKING METHODOLOGY: Interfacing weight and flow sensor with Arduino. HX711 will calculate the initial amount of glucose weight. Flow sensor will record the flow of bottle. When the flow reaches certain threshold value, solenoid valve will stop the flow. In turn, buzzer also will be alarmed and status will be updated in application

The IOT device collects data from the subject body and IV bag through the sensors and transmit data along Bluetooth to the application. The application is where all the data can be monitored and analysed at real time using the Mobile app. The fluid level is detected by load sensor. If the fluidlevel goes to an empty state it will give alert to the nurse Mobile Application. Fig 2 shows the hardware design of proposed system

MODULAR DESCRIPTION: 1]Interfacing WIFI with Arduino A **WIFI Module** is basically a WIFI Modem connected to a PCB with different types of output taken from the board – say TTL Output (for Arduino, 8051 and other micro controllers) and RS232 Output to interface directly with a PC (personal computer). The board will also have pins or provisions to attach mic and speaker, to take out +5V or other values of power and ground connections. **2]Load Cell Interfacing with Arduino** We are interfacing 40Kg load cell to the Arduino using HX711 Load cell amplifier module. HX711 is a precision 24-bit analog-to-digital converter (ADC) designed for weigh scales and industrial control applications to interface directly with a bridge sensor. The input multiplexer selects either Channel A or B differential input to the low-noise programmable

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gain amplifier (PGA). Channel A can be programmed with a gain of 128 or 64, corresponding to a full scale differential input voltage of ±20mV or ±40mV respectively, when a 5V supply is connected to AVDD analog power supply pin.

3]Solenoid valve Interfacing with Arduino

The operation principle is WIfiilar to relay, it has a coil inside it, which when energized, pulls the conductive material (piston) inside it, thus allowing the flow of liquid. And when de-energized it pushes the piston back in the previous position using the spring and again blocks the flow of liquid. During this process, the coil draws a large amount of current and also produces hysteresis problem, hence it is not possible to drive a Solenoid coil directly through a logic circuit. Here we are using a 12V solenoid valve which is commonly used in controlling the flow of liquids. The solenoid draws a continuous current of 700mA when energized and a peak of nearly 1.2A so we have to consider these things while designing the solenoid driver circuit for this particular Solenoid valve.

Fig 2 hardware design

OUTPUT & GRAPHS:

Fig 3 shows the output produced in the lcd display by collecting data from sensors

Fig 3 result display on lcd

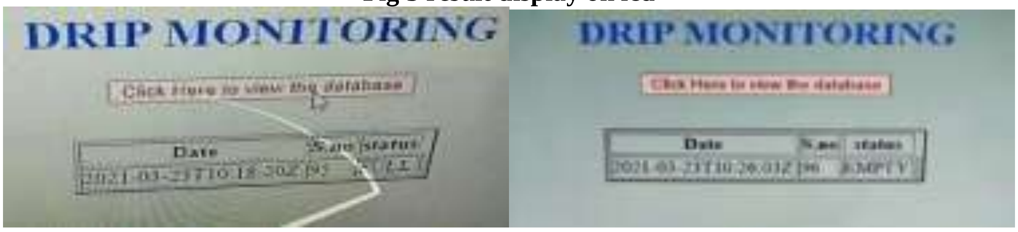

Fig 4 Result displayed on the interface The above Fig. 4 describes the final output of the system.

III. 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 method can be used for the overcoming of the careless mistakes done by the operators. All of the discussed systems ultimately aim at regulating the rate of infusion and sending and an alert in case of events like drastic change in flow rate, nil flow or blockage of the tube. The systems indeed ensure that the clinician takes quick action in case of an emergency through mobile alerts, voice modules or alarms. However, these techniques have yet to be adapted in clinical settings owing to a variety of factors such as affordability, reliability and ease of implementation. Another factor to take into consideration is the fact that while these systems effectively regulate the flow rate and provide alerts in case situations like the backflow of blood occur, the clinician in charge has to come up to the patient to rectify the issue. However, despite these setbacks, these monitoring systems facilitate better management of intravenous infusion both for the clinician and the patient and further development of these devices will no doubt exacerbate their benefits.

REFERENCE

[1]. **Smart drip infusion monitoring system for instant alert-through nRF24L01**K Ramisha Rani ; **N Shabana ; P Tanmayee ; S Loganathan ; G Velmathi 2017 International Conference on Nextgen Electronic Technologies: Silicon to Software (ICNETS2)**

[2]. Raghavendra B, Vijayalakshmi K, Manish Arora, **”Intravenous Drip Meter Controller Need Analysis and Conceptual Design",** COMSNETS 2016 - NetHealth Workshop

[3]. Pratiksha W. Disgrace, Sanjaykumar L. Patil, **"Arduino UNO and GSM Based Wireless Health Monitoring System for Patients.”,** International Conference on Intelligent Computing and Control Systems 2017

[4]. Ramisha Rani K, Shabana N, Tanmayee P, Loganathan S, Dr.Velmathi G, **“Smart Drip Infusion Monitoring System for Instant Alert Through nRF24L01”,**International Conference on Nextgen Electronic Technologies, 2017.

[5]. **” Intravenous Drip Monitoring System for smart hospitals Using IoT”** , Ms. Sincy Joseph, Ms. Navya Francis Ms. Anju John, Ms. Binsi Farha, 2019 2nd International Conference on Intelligent Computing, Instrumentation and Control Technologies (ICICICT).

[6]. **Patient Monitoring and Automatic IV Control System Based on IOT** Ms.J.Sindhukavi, Ms.C.Janani, R.Hehma Gayatri, 2018 International Journal of Scientific Research and Review