

# Development of Intravenous Drip Infusion Bottles for Healthcare Centers

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## Abstract:

Thanks to the technical developments in recent years, many advanced procedures have emerged to ensure the patients' quick recovery in hospitals. The key thing is the need for proper nutrition, solvent & electrolyte research and treatment in hospitals. In both clinics, the service / child staff is responsible for ensuring the amount of the container of electrolytes. Unfortunately, though the observer may fail to adjust the bottle at the right time due to their hectic schedule. A IoT-based automatic warning and signalling system, using a sensor as a level sensor or weight sensor, is proposed in order to address this crisis situation. This is built on the idea that when fluid level / weight is below some limit the performance of the sensor shifts. If fluid level / weight is small, the observer will be notified at the control room via the monitor or mobile to indicate the patient's room number for rapid recovery. When such a surveillance system is installed, the risks of patient accidents will be minimized and the quality of hospital healthcare improved. We may build a ready-mate portable cover system for these bottle in the future.

**KEYWORDS:** Drip bottle, Fluid electrolyte, Load sensor.

## I. INTRODUCTION

Intravenous (IV) infusion involve consistent and accurate flow rate control and efficient dripping. The leakage rate is initially manually monitored, and the infusion drip is immediately followed by 15-30 seconds of observed drops. Set drip rate will also fluctuate as a result of different factors such as vein dilations or contractions, fluid pressure decreases, body temperature changes, etc..For that the regular medical staff involvement, which would usually happen for every fifteen to twenty minutes, Diverse types of trickle rate meters were developed [1-2].One method mentioned to track the infusion solution was based on a capacitive structure created by various un-contacting receptors draped across the components of the injection source. It is well known that fluid volume control can be performed using many methods, such as sensors or gyro sensors &electromagnetic sensing.

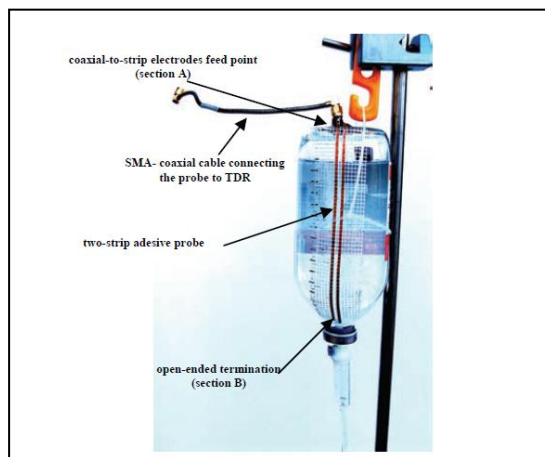
Particularly the time domain reflectometry of the microwave is recognised as a strong and efficient tool to analyse several liquids. One drawback of findings of time-domain reflectometry (TDR) is that they generally entail the insertion of a particular sensor in the calculated samples and calculation of the superconductivity and quantity of the test material [4-5]. Furthermore, the reliability, resolution and precision of the calculations, as well as the portability of the instrumentation and the probability of multipathing measurements are some other important aspects to consider. Multiplexing option in particular, throughout the common scenario of many mid-hospital cases, who might be constantly monitored by a centralized functional unit, would significantly bring down the cost of deployment[6]. A two-strip electrodes tightly connected to the exterior surface of the solvent container and two feed-off points for attachment to the TDR coaxial cable ensure the anti-invasivity of the sensory function. [7-9].

On such a related note, this is important to keep in mind that monitoring system can indeed be properly configured to provide a alert unless the rate of IV dripping exceeds a specified amount, or if the volume of fluid falls underneath a defined value[10].



**Fig 1.0** Image of a patient with drip Infusion Bottle

## II. BASIC THEORY



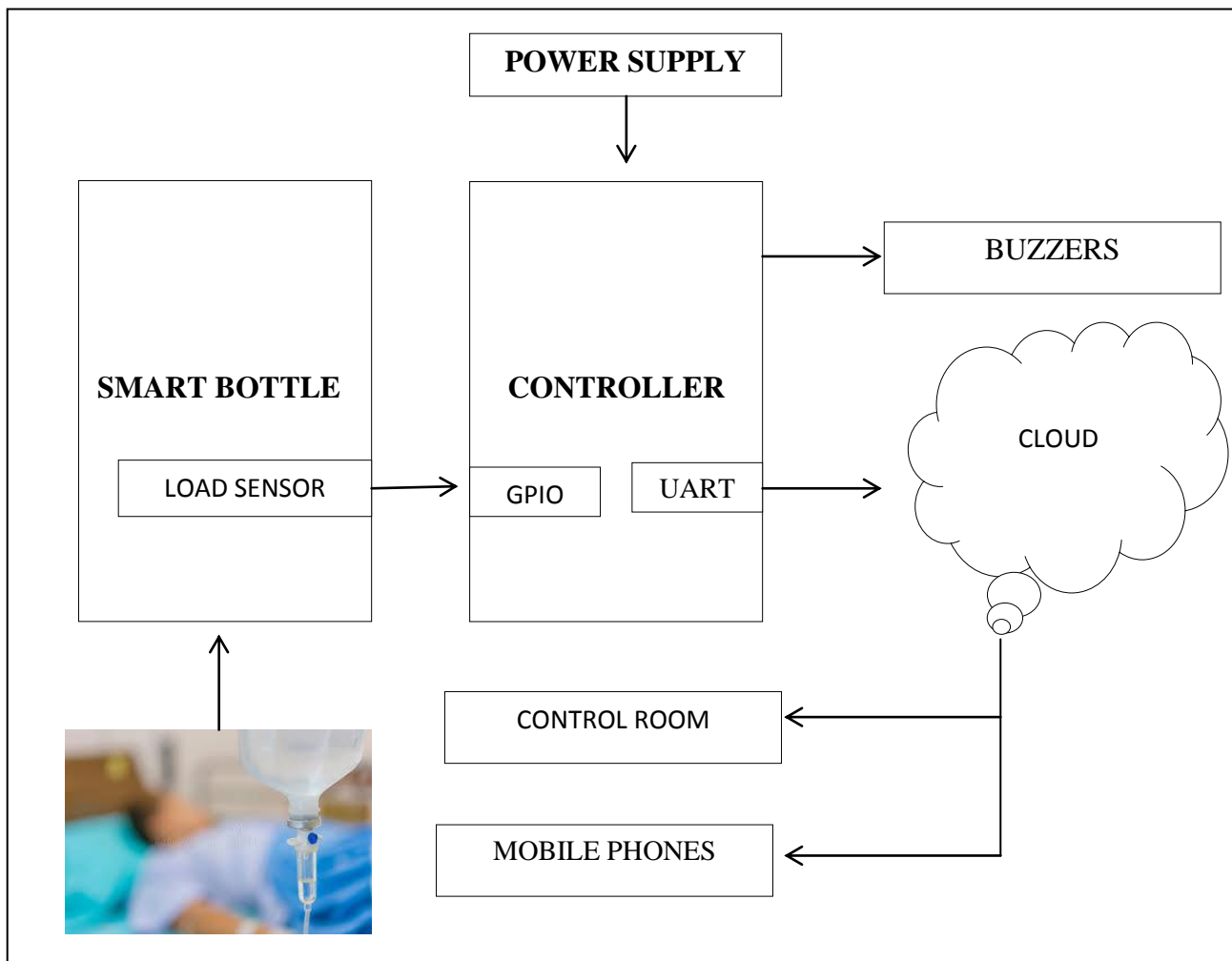
**Fig 1.1** Picture representation of a Drip Infusion bottle

Electrolyte is a substance similar to nutrient which supplies the body with energy. It is found normally in blood and body, and is important for healthy body function. Electrolyte Intravenous Infusion is prescribed to people with elevated blood glucose levels or with

dehydration. Electrolyte intravenous Infusion can even be used to dilute other medications before they are administered into the bloodstream.

Normally the fellow humans could not handle this kind of infusion by his own. Treatment with Intravenous Electrolyte Infusion normally takes place at a pharmacy. Your surgeon or a specially qualified nurse will give you it as a gradual inject into one of your veins (this is called an intravenous infusion). Specialist will determine what dosage one has to take, how much and for how long. It depends on one's health and other things, such as one's age, weight, blood tests, how well his/her kidneys function and whether or not other medications are being taken at the same time.

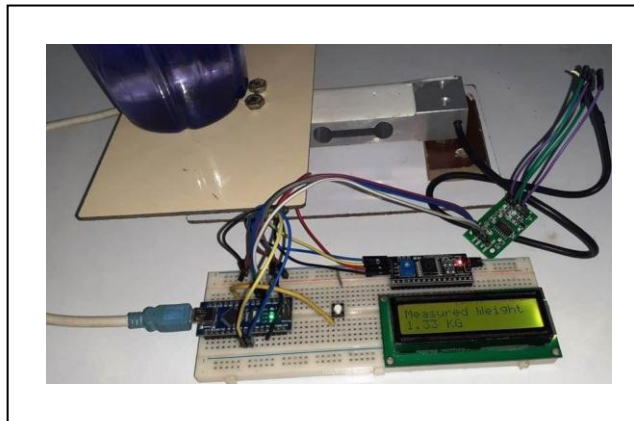
### III. PROPOSED SYSTEM



**Fig 1.2** Proposed Block Diagram

As shown in the above block diagram Arduino UNO, Load Sensor, Cloud Computing & Buzzers are used. Using Load Sensor we can monitor the volume of liquid present inside the drip infusion bottle. We have to note down to the least volume of Electrolyte bottle at which a notification has to be triggered to the doctors or the nurse who is taking care of the subjected patient. So once the proposed prototype is developed then it is coded based on the user's health level and hanged on the drip infusion bottle. When the bottle is filled, the controller or the entire system controls the amount of fluid in the container as it begins to decrease and the value is monitored as well as the coded value is checked. Whenever the volume gets decreased beyond the threshold level, it gets sensed through the load sensor based on the weight and it triggers the controller to send a notification to the authorized persons. By this notifications we can alert the Control Unit giving the information about the ward no and also the patient details. Finally, one can continuously monitor the Drip levels in the Infusion bottles using the proposed method.

#### IV. Results & Discussions



**Fig 1.3 a)** Hardware implementation of the proposed system as a prototype model. In Fig 1.3 a) prototype is just checked using a normal water bottle. As you can see the above figure in which weight of the bottle is displayed.



**Fig 1.3 b)** Hardware implementation of the proposed system installed in infusion bottles. In Fig 1.3 b) our prototype is installed in the drip infusion bottles which is used in the hospitals for patients who are bed ridden.

## V. CONCLUSION

This proposed prototype can precisely monitor the level of electrolyte in a drip bottles. Important factor to be noted is we don't have any existing method (i.e.) automated or semi-automated prototype to check on the drip bottles other than a nurse or an assistant who needs to live monitor the levels. Monitoring system provides an advantage of modularity, portability, high accuracy and mobility which makes it very captivating for medical applications. All the objectives mentioned in the abstract are met.

## REFERENCES:

1. Raghavendr.B,Vijaylakshmi.K,Manish "Intravenous Drip Meter & Controller"978-1-4673-9622-6/16/2016 IEEE.
2. Adeyinka, Elijah. "Impact of Service Marketing on Healthcare Management in Nigeria." *International Journal of Managerial Studies and Research* 2, no. 9 (2014): 155-161.
3. Rajapaksha, U. R. D. S., and U. W. M. R. Kappagoda. "Factors Affecting to Turnover Intention of Non-Managerial Employees in Apparel Industry: A Sri Lankan Experience." *International Journal of Managerial Studies and Research (IJMSR) Volume 5* (2017): 76-82.
4. ÖZTÜRK, Yunus Emre, and Zührem Ergün. "The Effect of Business Performance on Market Versatility in Health Institutions."
5. Pawera, Rene, and Zuzana Smehylova. "Phenomenon of Socio-Economic Inequalities of Unprivileged Groups in the Labor Market. The Case of the Slovak Republic." *International Journal of Managerial Studies and Research* 3, no. 6 (2015): 134-139.
6. Ojo, Oyetunde. "Organisational Restructuring and Performance Evaluation in Federal Ministry of Health, Abuja, Nigeria." *International Journal of Managerial Studies and Research* 3, no. 9 (2015): 76-84.
7. H.C.Kim and Y.S.Yang"Development of a miniaturized IV drip rate meter using optical sensors and fuzzy rule based detection algorithm"proc. 20th Annual International Conference of IEEE Engineering in Medicine and Biology Society, Vol.20,No.4,1998,pp.1795-1798.
8. Campus, Enugu. "Women Petty Trading and Household Livelihood in Rural Communities in South-Eastern Nigeria."
9. Autho Abdul Aziz Fahad" Design and implementation of blood bank system using web services in cloud environment" International Journal of MC Square Scientific Research Vol.11, No.3,2019.
10. Shermin Shamsudheen1 , Azath mubarakali2" SMART AGRICULTURE USING IOT" International Journal of MC Square Scientific Research Vol.11, No.4,2019

11. Prasath, R., and T. Kumanan. "Distance-Oriented Cuckoo Search enabled optimal histogram for underwater image enhancement: a novel quality metric analysis." *The Imaging Science Journal* 67.2 (2019): 76-89.