Detection of Hypervolemia while IV Therapy and the Level of IV Fluid

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***Abstract*: Hypervolemia is a medical condition when you have excessive amount of fluid in your body, also described as having excess water retention or fluid overload. Healthy person have a certain amount of fluid in their bodies. When you have excessive amount of excess fluid, it can cause health complications such as swelling, high pressure, heart issues, and more. This freshly proposed system has aimed to find out the level of fluid in the IV bag and the hypervolemia (overloading). The overloading is identified by measuring the heart rate, swelling, and respiratory rate. Also, notification to the doctor and the nurse is communicate through wireless communication via the GSM, and a notification call is dialled at a critical situation**.

I. INTRODUCTION

Hypervolemia condition where the liquid portion of the blood (plasma) is too high. Fluid overload can cause serious complications, including worsening heart, kidney disease, and lung function. Diagnose hypervolemia by carrying out a physical exam to check for swelling. The doctor may also recommend tests to check the level of sodium in the blood and urine. IV therapy is a continuous process and there is a chance of hypervolemia and not possible of blood and urine test. The only way is to diagnose this condition is diagnosing during IV therapy. Our new proposed model is to monitor the patient respiratory rate, heart rate, and also swelling if occurs. The output of the project display the physical parameters and an alert message is sent to the doctor if there are any abnormalities or changes.

II. LITERATURE SURVEY

[1] Darshana Baviskar et al. in their paper proposed creative wellbeing checking frameworks is created with a minimal doctor or caretaker intercession, accessible for minimal price in rustic just as metropolitan zones. By methods for this, the medical attendant can screen the measure of saline even in the control room. A programmed saline level checking comprises; Level sensors which are utilized to decide the situation with fluid in the container whether it is typical or cautioning status. The identification of saline drop rate is very dependable. The yield acquired from the sensor is prepared to check whether the saline container is vacant. At the point when the degree of saline plunges under a specific level, the alert sound will be delivered. This framework dispenses with nonstop vision/sight observing of the patient by medical attendants.

[2] T. Thangam et al. in their paper target to discover an answer for the issue emerging in IV dribble bottles. Huge modules are used consequently. Level sensor (distinguish liquid levels in IV stream bottles & sends data to the regulator. The PIC (Programmable Interface Controller) board is used as a regulator module. The MGM module sends an alert message to clinical orderlies' phone numbers. Another thing is, naturally the fluid stream in the cylinder will be halted by utilizing the solenoid valve, just when the fluid level in the trickle bottles is going to least expand.

[3] S. Gayathri et al. discovered the degree of glucose in the glucose trip bottles. At the point when the glucose bottle is going to be purged, an alarm message is made to ship off the medical caretakers working there. Burden sensor, Arduino AT mega board, GSM modules are utilized. GSM sends the ready message to the medical caretakers' telephone number.

[4] Ram Kumar S et al. created a glucose bottle alarm for the emergency clinic staff. A benefit to the patients particularly during evenings. The modules used in this system are the GSM module, IR sensor, comparator, Arduino controller, and LCD. This framework likewise evades the lethal danger of air bubbles entering the patient's circulation system, which is a genuine danger as air rises in the blood can cause quick demise.

[5] Ashika A. Dharmale et al. This framework works with a complex technique for controlling saline drop rate by observing the saline framework distantly by utilizing IoT. This system comprises a sensor utilized for checking the basic level of the saline fluid in the saline container and a system that will stop the saline stream naturally after the saline jug is unfilled. This framework can be used productively in homes just as in emergency clinics.

III. IMPLEMENTATION

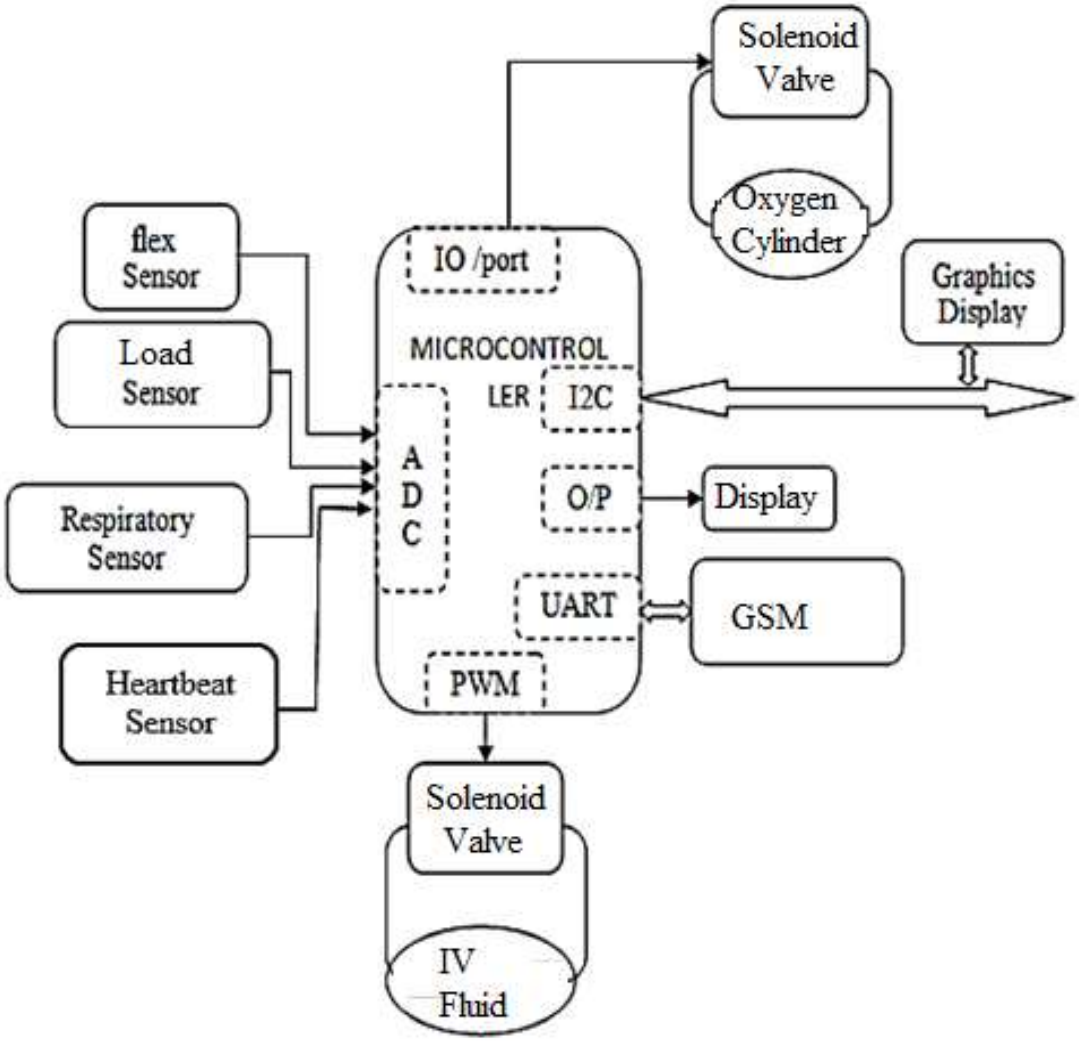

Figure 1: Proposed model block diagram

The working of the proposed system is shown in figure 1. First, the input sensors that are Load sensor, Flex sensor, Respiratory sensor, Heartbeat sensor, and an electrically controlled valve known as solenoid valve are embedded with the Arduino UNO as per the block diagram. Then coming to the output part connection the LCD and a GSM module are connected to the output terminals of the Arduino UNO. The power source used is 230 V, DC supply. As soon as the power is given, the input sensors sense the parameters and display the output in the LCD. GSM module will transmit the alert message to the caretaker or the doctor immediately to intervene with the patient if a critical condition arises.

IV. CONCLUSION

Thus we have designed a system that can be practically used in hospitals for indicating the level of fluid in the IV bag and also fluid overloading can be detected using this, also the effects of hypervolemia can be prevented. If this system is used in hospitals it can reduce the treatment time taken by the doctor.

REFERENCES

[1] Darshana Baviskar, Pooja Patil, Shivlila Bhatambre, Madhuri Hake, Prof. Sharad Adsure, IoT based Saline level monitoring system, 2018.
[2] T. Thangam, T. Murugajothi, R. Rajakumari, T. Suganya, and M. Thiruveni, "Automatic Control and alert message system for Intra Venous Fluid Level", 2019.
[3] S. Gayathri, C.S.Sundar Ganesh, "Automatic Indication System of Glucose level in glucose trip bottle", 2017.
[4] Ram Kumar S, Saravana Kumar S, Sukumar M, "Remote Monitoring the Glucose Bottle level in hospitals", 2017.
[5] Ashika A. Dharmale, Recati R. Mehare, Ankita R. Bharti, Shweta R. Meshram, Prof. Swapnil V. Deshmukh., "IOT Based Saline Level Monitoring & Automatic Alert System", 2019.