VELLORE INSTITUUTE OF TECHNOLOGY

(Winter Semester: 2019-20)

INTRODUCTION TO INNOVATIVE PROJECT (PHY1999)

COURSE CODE: - SLOTS: TC2

PROF: E. JAMES JEBASEELAN SAMUEL

Medical Fluid Pouch Depletion Alarm

PROJECT REPORT

Submitted for IIP

Name of faculty: E. JAMES JEBASEELAN SAMUEL

(SCHOOL OF ADVANCED SCIENCES)

CERTIFICATE

This is to certify that this project report on “Medical Fluid Pouch Depletion Alarm” is being submitted for IIP Project (PHY1999) is a record of bonafide work done under my supervision. The contents of this project work have neither been taken from any other source nor have been submitted for any other CAL course.

The following is the list of students who have worked in this project:

Nikhil Subramanian 18BEC0711

Tushar Sengupta 18BEC0869

Lavish Dosi 18BEC0706

Drishan Dutt 18BEC0990

Yashwanth 18BEC0934

Riyash Charran 18BEC0971

Signature of the faculty: E. JAMES JEBASEELAN SAMUEL

ACKNOLEDGEMENTS

Our team would like to thank our Prof. E.James Jebaseelan Samuel for his continuous motivation and firm belief that he trusted in us (whole class) to innovate or create. We tried to implement all steps of idea generation and brainstorming and were gloriously rewarded in terms ease of idea generation process, finding out more than just a few problems and soln's.

The team itself, being diverse with students from India as well as abroad was able to gel well enough to come to satisfactory conclusions. We take pride in the fact that our idea was thought of all by our own with little modification suggestions from our sir.

ABSTRACT

The general idea is to create a device which can help the on-duty caretakers in a hospital to increase their efficiency by keeping a track on the glucose, saline or blood levels in the medical pouch which is being given through drips to a particular patient.
There are number of ways to go about this problem.

Introduction

To tackle this problem we have discussed many methods which will be revealed in the following slides.

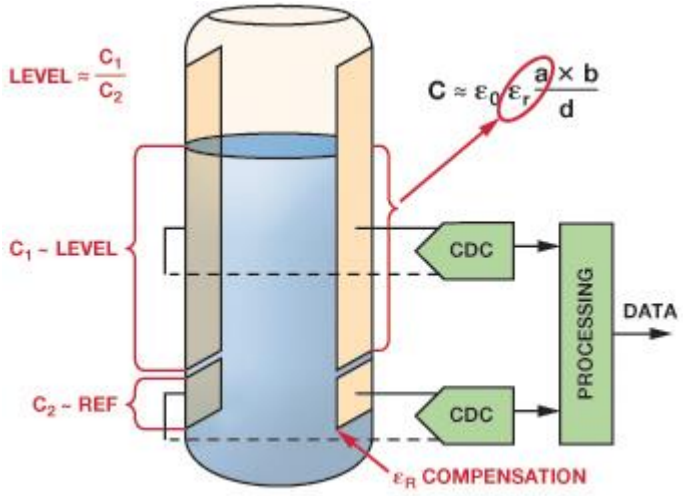
In simple terms, we intend to create a device which will notify when a medical pouch given to a patient is nearing its end.
We think this is important because if the empty pouch if left attached to the patient for long time, the blood will start reverse flowing into the pouch from the patient. This is really dangerous for the patient's health. In night duty, if the nurse due to various reasons , fails to remove a certain patient's drip. It might become turn out to be very risky.

That's why this is a problem which need to be addressed.

Initial Ideas

As far as we have researched, we haven't found any readymade device to tackle this problem. So we had to come up with our own solution.

Initially we though of dipping two conductors into the pouch to calculate the water level using the difference in capacitance.



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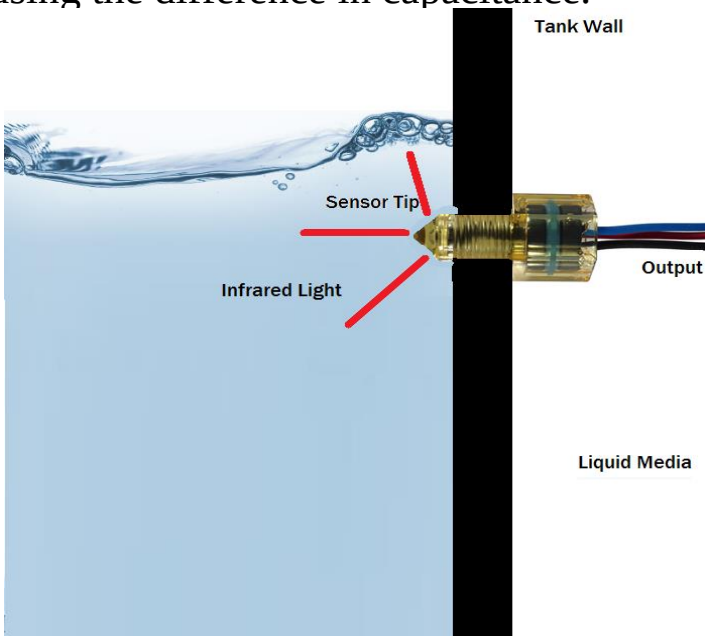
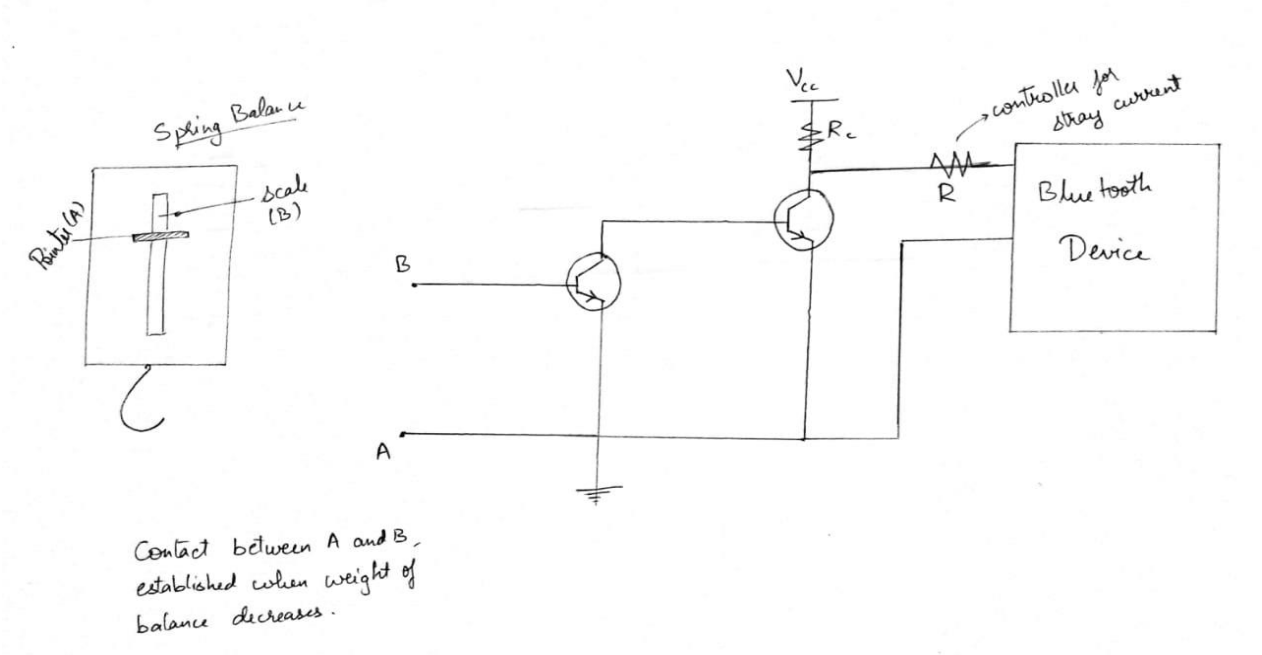


But in this model, as the fluid density changes with liquid, it need to be calibrated at every step, which works against our goal of increasing efficiency.

The Final Idea

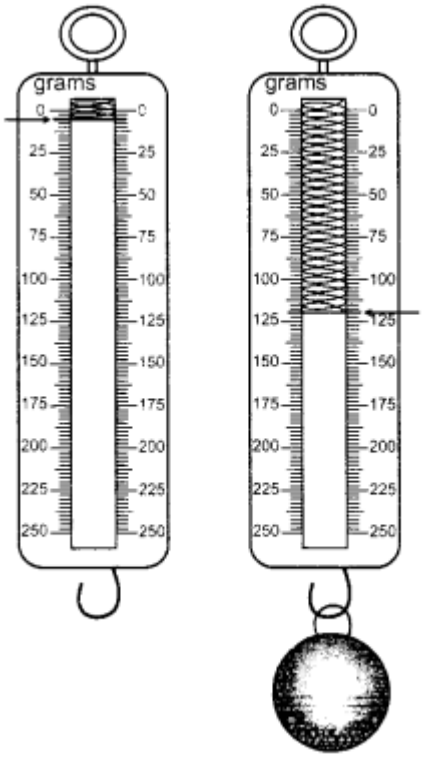
The final idea we landed on is using weight of the pouch to sense if the pouch is filled or empty. For this we decided to use spring balance so that its hook will be easily used to hang the pouches from while the device also can be used.

This will be the measuring side of the device. In this the pointer will act as one side and the scale will act as the other side of the wire.

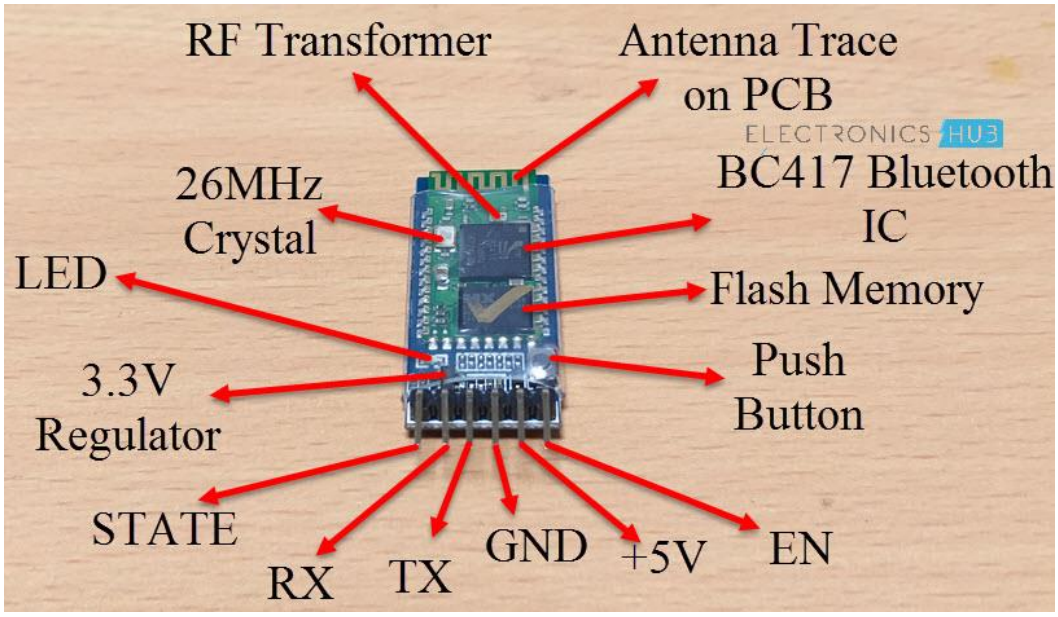


Lets say the Pointer is A and the Scale is B. Now when a new pouch is suspended on the hook, the distance between A and B increases which leaves the device in open state.

As the fluid in the pouch decreases, A starts rising towards B (because of spring).



When A touched B, the circuit becomes closed so the device gets activated. The current through AB is very low. So through the two transistors the current will get amplified high enough so that the Bluetooth device gets activated. This Bluetooth device will send message to the nearby phones, notifying the completion of the medical pouch.



The nearby phones will receive the notification through an app which is in process of creation.

Outcomes of the Project

This project is basically created to increase efficiency of the nurses by reducing errors while in duty.
This is help in reducing casualities by errors in the hospitals.
This reduces the strain on the nurses as they don’t have to keep checking it constantly.
It will be of special help to patients who are very old as they cant call the nurse when the fluid is nearly depleted.

It can improved further… by the rate of how the distance between A and B decreases the rate of depletion can be established.
If this data is plotted, any irregularities in the data will mean that there has been some tampering or has been disturbed.

References

- Some images from Google images.
- The circuit diagram was designed by us , using a basic Current amplifier as a backbone for this circuit.