Innovative IoT-Based Infusion Pump for Patient Care Optimization

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Abstract - **This project is when human inject injection to the patient through the help of saline that time there are some mistakes are happened by human like in accurate precision delivery of the liquid to the body of patient is to be less or more then injecting process is very harmful to potion. So that we maintain the highly accuracy for infusion because it very harm effect to the it's body. In that we also temperature, heart rate, oxygen level of the patient. When saline is fully empty then the blood is reversed to the saline it is risky for patient by using load cell it stops automatically.**

Keywords: Microcontroller, driver, load cell, motor, driver, Wi-Fi modules, LCD display, keypad.

I. INTRODUCTION

Our device is high accurate then other pumping device in which one syringe is mounted for accurate delivery of liquid. This device is very useful for medical sector it is compacting in size and very accurate of in this sector. In this device syringe is move by syringe piston to achieve desired dosages. Our device is IOT based which monitored and also controlled by doctors easily by internet. In our project device doctor can set the amount of syringe infusion by internet by this process patient respond, well as fast as fast. In this project by using load cell, we can control the saline as when the saline is empty then blood is reversed to stop it by load cell. This all data is recorded and doctors can control safe operation of patient .by this all process it did not need of inspection.

II. PROBLEM STATEMENT

Infusion of syringe is a tool of in which mechanically injects liquid in to the patient body. There is no any other tool of infusion of syringe with selected dose and time. Detection of empty saline of flow rate which detect by load cell and block the infusion as early.

III. METHODOLOGY

Supply is provided to device by 12V, 1A adapter.

User inputs the desired flow rate and dosage (count) using the keypad.

The microcontroller calculates the required motor steps.

The motor driver controls the stepper motor to push the syringe plunger.

The infusion pump will work as input given to it.

The load cell system initially at 0 weight position.

After the saline bottle is trap on the hook & system measure the weight of saline bottle.

When the saline bottle near to the empty or its level is down the servo motor stop the flow of fluid other sensor like spO2 & body temperature sensor are measure or monitor parameters.

These all parameters like oxygen level, body temperature, heart rate, saline level are seen by user on website or app.
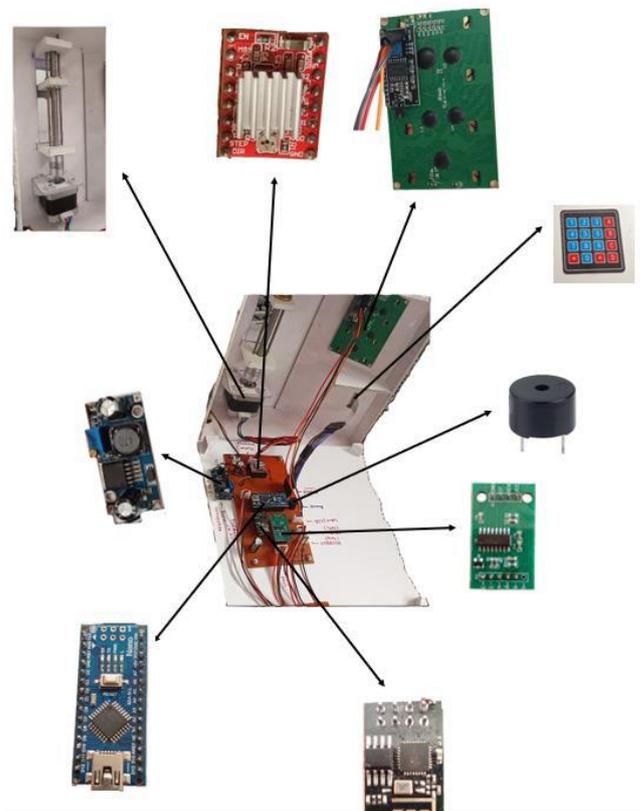

Figure 1

IV. COMPONENT USED

1. Arduino Nano V3.0 With USB cable
2. SpO2 Sensor MAX30100
3. Waterproof Digital Temperature Sensor Probe DS18B20
4. Wi-Fi Module ESP8266
5. Stepper motor
6. 20x4 LCD display I2C interface
7. Stepper Motor Driver A4988
8. 4x4 Keypad
9. Buzzer
10. Buck converter (12V to 5V)
11. Servo motor
12. Syringe Linear Actuator setup
13. PCB for mounting components and ports
14. Wires and other connectors for PCB and Components
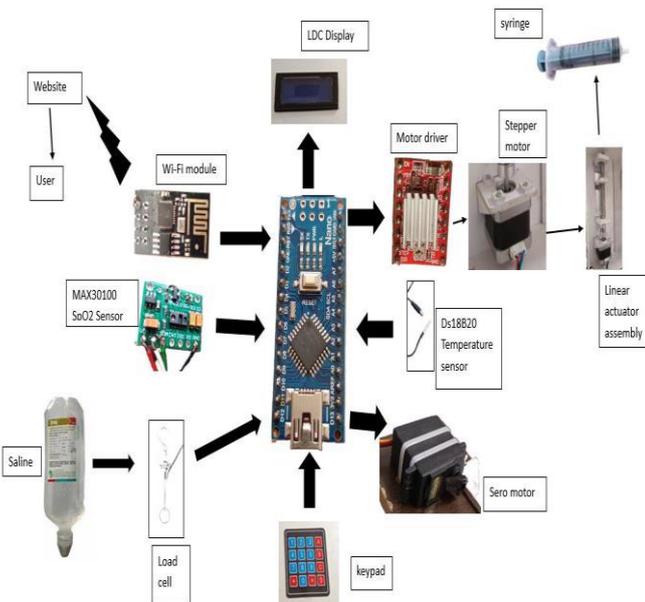15. Fomes (8mm & 5mm) for design frame

Figure 2

V. PROPOSED WORK

Innovative IoT-Based Infusion Pump for Patient Care Optimization is including some health care sensor like body temperature sensor, heart rate sensor, oxygen level sensor, load cell sensor and other main components display, microcontroller, wi-fi modules, motors, drivers and syringe set up. When supply is provided to device internet is connected to the system and then liquid is insert in syringe for further operation. In this system we give the count, delay, and ml liquid by using the keypad. In load cell system when saline level nears to the empty level the system detects the weight of the saline and blocks the supply of saline pipe. This all data is seen by user by the help of internet through mobile, laptop etc.

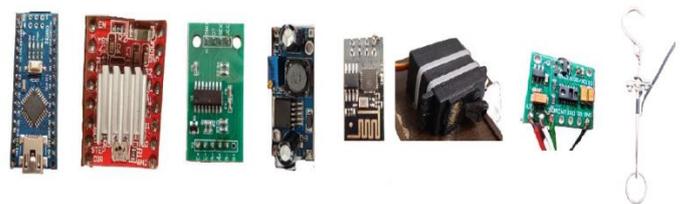**Sensor & Controller:**

Figure 3

Components:

Figure 4

VI. RESULT

This system is very useful to patient care and it help patient to get very well as fast as. It easy to use to user and user can see all data without any problem through internet. It reduces human errors by improving patient safety also.

VII. CONCLUSION

We try to make a most useful and safe device to patient an also doctors. Our aim is to get patient health very well and make doctors work easy. This device is perfect for the medical sector. This system is applicable for any patient who is bedrest. The user can see all patient health like patient heart rate, oxygen level, body temperature and saline level. This system is most accurate and safe for patient.

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