# MICROCONTROLLER BASED ANAESTHESIA INJECTOR

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**Abstract:**

In case of any essential operations to be performed inside the situation of the affected person ought to be in anaesthetize situation. For operations which closing for extra than four hours anesthesia need to be given to sufferers on brief intervals as entire dose of anaesthesia can't be given in a particular stroke. This have to bring about the dying of the PATIENT. If the Anaesthesia administered is low, then the person can be wake up at the middle of the operation. In order to manage the situation of the patient the anaesthetist should be present. If the anaesthetist fails to administer serious problems may additionally occur. In order to keep away from those inconvenience an automated anaesthesia injector primarily based on a microcontroller will be useful. In this device a syringe infusion pump and microcontroller can be provided. The anaesthetist has decided the point of anaesthesia to be administered in milliliters consistent with hour to the patients using 3 exclusive sensors. The sensor sends signal to the microcontroller and using the statistics supplied the microcontroller directs the sign to the choice level as well as fed it into the syringe infusion pump in proper manner.

**Key words:** Operations, Anaesthetize condition, Anaesthetist, Microcontroller, Syringe infusion pump

## 1. Introduction

Embedded device is a aggregate of hardware and software program that are prepare for function within a larger mechanical or electrical device. Embedded systems are used to perform particular tasks. A very. excellent example for embedded system is digital cameras. In digital cameras we will store information and transfer them to any other gadgets together with PC's easily, where there's no need of movie for storing images. A very critical component of an embedded system is a microcontroller. We can say that a microcontroller is a single chip solution. One or greater CPU's together with reminiscence and programmable input are present in a microcontroller. A microcontroller can perform activities like storing statistics without using any outside RAM, ROM or EPROM and therefore decreasing the scale and the fee of the layout.

The difference between a microcontroller and a microprocessor is that during a microcontroller the task is predefined whereas inside the microprocessor it is consumer defined. Microprocessor has best CPU whereas microcontroller has the opposite peripherals including RAM, ROM at the side of CPU. Even though the capabilities are more, the dimensions and the cost of the microcontroller are less in comparison to microprocessor. Hence, the usage of microcontroller in an automatic anaesthesia injector might be efficient. Anaesthesia plays an crucial function in pain killing. Automatic Anaesthesia injector is used to manage anaesthesia for patients in right dosage. Thus, helping the affected person to go through operations with out any aspect consequences and ache. The design of an automated anaesthesia injector is required for a successful surgery.

## 2. Proposed Method

A keypad is provided with the system. Using the keypad the anaesthetist sets the level of anaesthesia to be administered to the patients in terms of milliliters per hour. The controller puts the whole system in control when receiving the prearranged level from the keypad. It also examine the biomedical features such as respiration rate, temperature rate and heart beat rate in order to analyze the need of anaesthesia to the patients. The threshold values of these parameters are predetermined and set as base code to the motor. Hence, the direction of rotation of the motor is controlled by the biomedical parameters. According to the rotary motion of the stepper motor the syringe

infusion pump moves to and fro and the anaesthesia given in the infusion pumps gets inserted in to the body of the individual patient accordingly. When the height of the anaesthesia gets reduced than the prescribed height of an alarm is setup to instruct the anaesthetist to refill the anaesthesia and continue the process.

Components:

- DHT11: to degree frame temperature.
- Heartbeat sensor: to calculate coronary heart beat.
- Respiratory sensor: to determine the breathing rate.
- Stepper motor: to govern the needle infusion pump's movement.
- Aanalog/Digital converter: to change analog signal to digital value format.

Temperature sensor:

- Thermistor and resistance thermometers are the maximum efficient approach that can be used to degree temperature. A thermistor is a semiconductor device with two terminals. The resistance of a thermistor is temperature sensitive, its resistance decreases with increases in temperature. The temperature co-green of resistance is very high of the order 4% to 6% per °c making it a great heat transducer. Resistance thermometers may be used to degree body temperature.
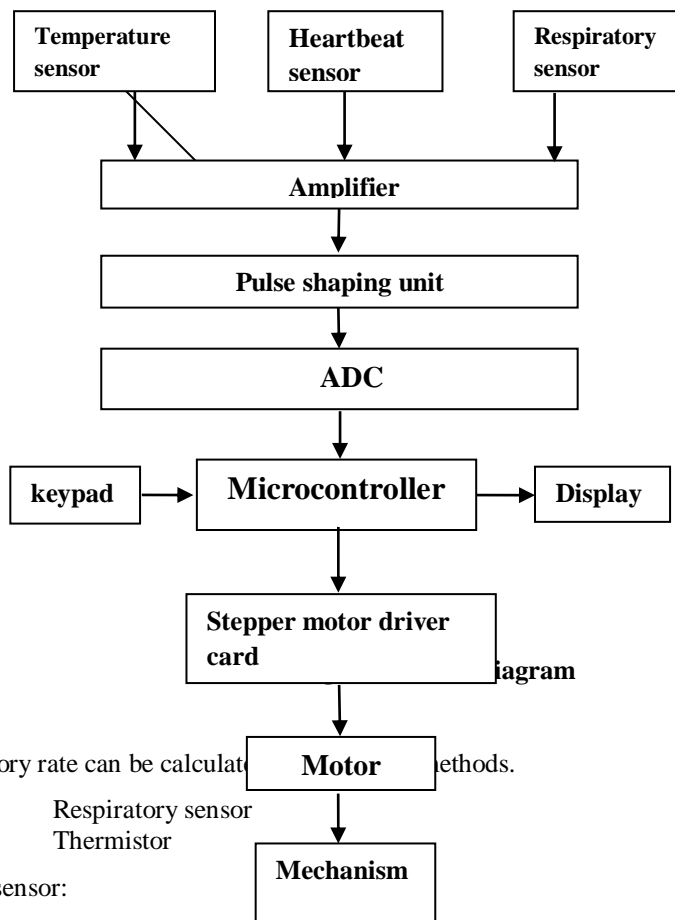


The respiratory rate can be calculated methods.

3.   Respiratory sensor
4.   Thermistor

Respiratory sensor:

A respiratory sensor is utilized in order to test the respiration activity. By calculating the variation in the resistance along the thorax, a strain gauge type chest transducer can be used. The element of strain gauge in the transducer changes, due to the movement in respiratory system. Hence the respiratory rate can be measured.

Thermistor:

The thing op-amp is used to make bigger the sensed respiration alerts as well as exhibited by utilizing the transistor to transistor logic the usage of transistor (BC 547). The tool contains an alarm via a buzzer that beeps while the patient stop respiratory or has a small breathing rate (22bpm). The thermistor is utilized here for breathing sensor is thermistor 473 that is the NTC (bad temperature coefficient) thermistor. NTC thermistor gives the proposed engine with perfect sensor performance that is established to be fine in plenty of appliances.

Heart beat sensor

It is important to test whether or not the coronary heart beat is ordinary when managing anaesthesia to the enduring. Standard price of heart beat is seventy two beats in line with minute. Heart beat monitoring can be accomplished in ways:

1) Electrocardiogram (ECG)
2) Pulse

Electrocardiogram (ECG)

The electrical hobby of the heart is measured by using electrocardiogram primarily based on Einthoven triangle. One electrode referred to as reference electrode is located on the proper leg. Other electrodes are placed at the proper arm, left arm and left leg. The capability difference between the two electrodes is measured because the electrical interest of the heart. Then the electrodes pick up the indicators to high advantage differential amplifier. Finally the ECG waveform is attained.

Pulse

The pulse means to the go with the course of blood commencing the heart to the limbs. That pulse is measured at the wrist of the man. This pulse happens once in line with coronary heart beat. This indicators can be picked via maintaining a piezo-electric pick up via on the wrist. Pulse price isn't like heart rate.

microcontroller

89C51 is the microcontroller that can be suggested to apply on the whole system. It is produced by way of Atmel, MC, USA.

SERIES: 89C51 Family

TECHNOLOGY: CMOS

The main characteristics are

- Eight bit CPU, flash memory with on chip
- RAM with on  chip facts
- Bidirectional and independently addressable Input/Output lines.
- Several 16 bit counters/ timer.
- Several priority/ vector/ source interrupt structure.
- Clock circuitry and on chip oscillator.
- Erasable Programmable Read Only Memory with On chip.
- Serial bus interface with SPI.
- Timer with Watch dog.

Stepper motor

The stepper motor is used to transform electrical pulses into equivalent growth of motion in rotary shaft known as steps. There exists a one to one correspondent among electrical pulses as well as steps of the motor. These

are categorized into two phase, three phase and four phase stepper motors. These stepper motor used in anaesthesia injector is 4-phase stepper motor. It has S1, S2, S3 and S4 phases.

Syringe combination pump

This syringe combination pump presents standardized run of fluid through accurately forcing the plungers of a syringe toward its container .It presents a constant waft as it should be delivering anesthesia in curtical hospital therapy It uses infra- red sensors which facilitates to accurate alarm machine while the syringe was blank otherwise some atmospheric bubble crammed It is simple to setup and portable and it is robust.

Program details

In order to make the device work, a program is required.
- The enter to be study from the keypad provided with the microcontroller.
- The internal timer to be activated and to enable to interrupt the AT89C51 whenever the timer overflows.
- The parameters such as coronary heart rate, respiration, body temperature to be as soon as in each designated interval..
- The rightness of the factor rates to be checked as well as set the alarm with this whole system to be activated while the level of anaesthesia set out downward.
- The movement of stepper motor (growth the velocity or reduce the rate) to be calculated by means of the constraint furnished through the sensors.
- Carry on the above in anticipation of the switch with RESET or OFF.

## 3. Conclusion

Many technologies have been developed so as to sell and make the life comfortable for the sicknesses people .Technologies play a vital role inside the healthcare. Our present day technology specializes in automation where minimal or no man pressure required. Our presentation on microcontroller based totally anaesthesia injector is very beneficial for anaesthologists to carry out their work with none flaws. It also makes their paintings easier. Hence it'll enhance healthcare technologies.

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