Anaesthesia Regulation Using EMG

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Abstract: The existing anaesthesia regulation device uses a heartbeat sensor to regulate the anaesthesia assume that if a patient is scary or started dreaming ,his heart beat varies according to his/her emotions. So, the system has some drawbacks that heart beat may vary depends on the patient's both physical and mental state. By the changes of the heart beat there won't be a possibility determining the anaesthesia level. In order to overcome here we are using the EMG sensor. By using EMG sensor, the accuracy of the machine becomes more, because only the physical state of the patient is monitored. The circuit consist of ATMEGA 328P microcontroller to regulate the device and supply the power to the active and passive components. It is mainly used during the long time surgery.

Keywords: ATMEGA controller, Motor/ Motor Driver, EMG & Temperature sensors and LCD.

I. INTRODUCTION

During the time of long term surgeries, we heard many accidents that patients died due to Improper anaesthesia regulation also they have suffered a lot. It is not only the fault of technicians or doctors but also the inability of that device to sense the patient's state accurately. In order to avoid these type of problems and also making the patient more comfortable we use EMG sensor for sensing the muscular contractions which directly says about the anaesthesia level in the patient, here we use ATMEGA 328P microcontroller and displaying the values of the anaesthesia level and the main part is motor driver circuit. The motor driver circuit provides the necessary instruction to the motor i.e. when the appropriate anaesthesia level is decreased the alarm is set and automatically the motor is made ON which regulates the anaesthesia to patient.

II. BLOCK DIAGRAM

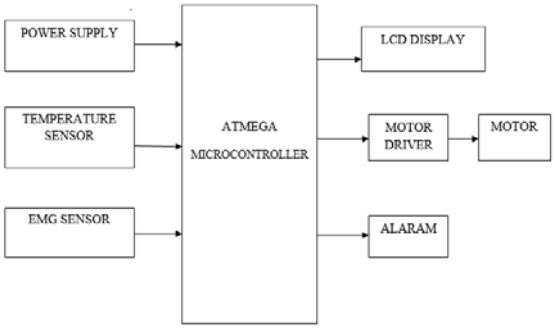


Figure 1 Block diagram

III. TECHNIQUES FOLLOWED

The power supply is taken from the mains, and by using a step down transformer a 12v current is supplied to the controller unit. The pins PB0, PB1, PB2, PB3, PB4 and ground are connected to the display.

The pins PD0 is connected to the EMG sensor and the pins PD1 is connected to the temperature sensor. The pin PC5 and ground is connected with the BUZZER. The pins PC0 and PC1 are connected to the motor driver circuit. The pins 8 and 5 in the motor driver circuit is connected to the DC motor.

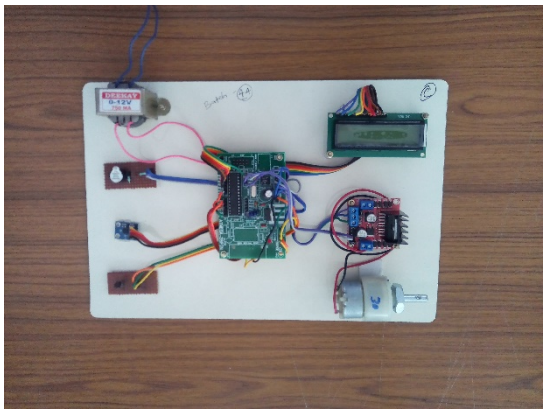
Normally, EMG is the electromyogram which measures the electrical activity of the muscles. If the patient should be in anaesthetic condition there will be the changes of several parameters in the body like, the heartbeat increases, muscle contraction decreases and the eye ball also be changes. By detecting these changes we determine the anaesthesia level of the patent. In the existing method they use the heartbeat sensor for detecting the anaesthesia level, if the heartbeat decreases level of anaesthesia will gets to be normal. This should be sensed by the sensor and where the microcontroller interconnected with this sensor. Likewise, in the proposed we use the EMG sensor for measuring the muscle movement and thereby we detect the anaesthesia of the patient, if the motor automatically drives by the motor driver circuit where the buzzer circuit operates when the level should be decreased.

The EMG sensor placed around the wrist of the patient. If any movement is detected the sensor send the signal to the microcontroller. Which regulate the alarm and motor. The following informations should be displayed in the LCD display.

The procedure of this device is followed by initially placing the sensor around the wrist region. So if any muscle movement is occurred then the sensor senses that movement and with the help of the microcontroller the alarm buzzers the sound. Then the displayed that the dosage level was reduced and the motor automatically runs when the alarm buzzers.

So, in the further development process, we add the infusion system to the motor which automatically supplies the amount of drug to the patient.

Yet, this device is used only for the long time surgeries.



IV. RESULT

Thus our project accurately sense the movements of patient, than the older versions of the anaesthesia regulators.

Although, we shown the accuracy, for the physically paralysed patients, the accuracy is not possible. If we overcome these drawbacks by integrating bath heart rate sensor and EMG sensor.

V. CONCLUSION

We upgraded the anaesthesia machine by using the EMG sensor, which makes both the patient side and doctor side more comfortable and convienient. A simple circuit using a microcontroller can do a lot in the field of anaesthetics.

VI. REFERENCES

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