

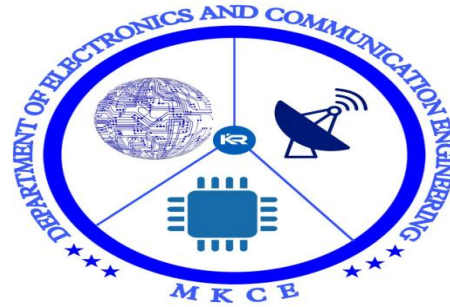


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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

MICROCONTROLLER BASED ANESTHESIA INJECTOR

FINAL REVIEW

BATCH NO : 39

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INTRODUCTION

1. Anesthesia is very important in major operations so that painless surgeries can be carried out. When anesthesia is given to the patient, the patient or any body part of that patient becomes unconscious.
2. An anesthetist is present during such operations to monitor the level of anesthesia, but sometimes the level of anesthesia may get vary which may cause side effects which can be fatal for the patient .
3. If an operation is extended than its estimated time and the anesthetist fails to administer the level of anesthesia in the fixed time interval, the patient may get disturbed and can wakeup in-between the surgery.

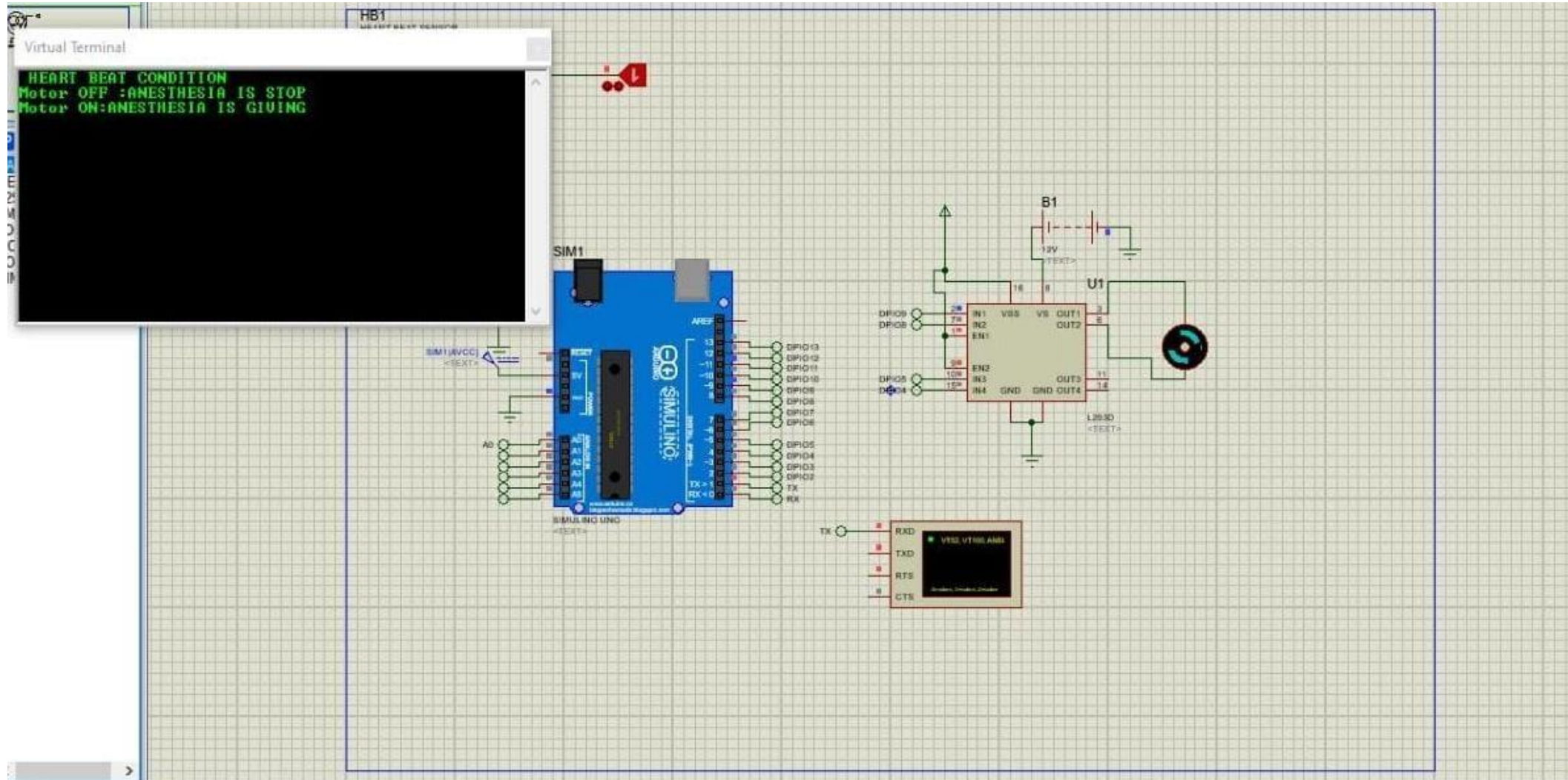
OBJECTIVE

- The main objective is to create a microcontroller based anesthesia injector that takes the input from anesthetist, the dosage of drug required for a particular patient and also analyze the biological parameters like heart rate, body temperature, blood pressure to regulate the drug flow.
- To monitor the sentience of patient by periodically observing various biological parameters, which are given to re-configurable device known as Field Programmable gate array (FPGA) reducing over dosages by effective observation and also parallel processing.

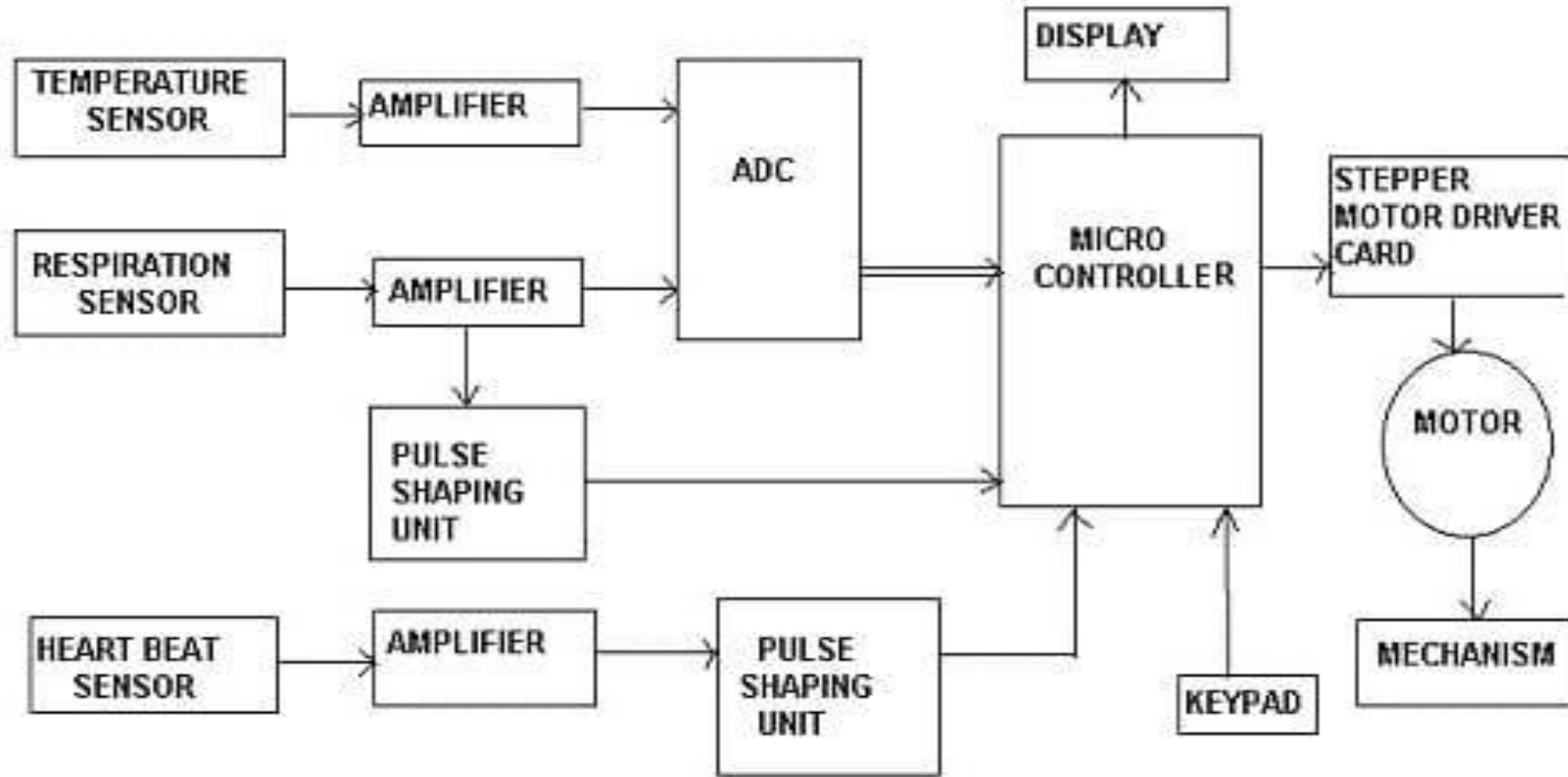
ABSTRACT

- When a major operation is carried out, anesthesia must be given to the patient. Sometimes it happens that estimated duration of the operation may get extended. This extension can be up to 4 to 6 hours, where the anesthetist cannot judge the level of overall anesthesia required.
- If appropriate level of anesthesia is not given to the patient it may lead to death of the patient and if incomplete level of anesthesia is given to the patient, the patient can wake up in between the operation.
- To avoid such unpredictable situations the scheme of automatic anesthesia machine using microcontroller is helpful. The system consists of microcontroller and syringe infusion pump.

CIRCUIT DIAGRAM



BLOCK DIAGRAM



COMPONENTS REQUIRED:

1. Micro-Controller – to Control the overall operation
2. Stepper Motor – to control the movement of the Syringe Infusion Pump
3. Liquid Crystal Display (16*2)
4. Keypad (4*4)
5. Syringe Infusion Pump

MICROCONTROLLER:

1. A Microcontroller is a general purpose device that is meant to read data, perform limited calculation on that data and control its environment based on those calculations.
2. The prime use of a microcontroller is to control the operation of a machine using a fixed program that is stored in ROM.

TEMPERATURE SENSOR:

The most accurate method to measure temperature is to use Thermistor. In this we are using LM35 series integrated circuit temperature device. The LM35 device does not require any external calibration to provided typical accuracies at room temperature and over a full -55°C to 150°C range.

HEARTBEAT SENSOR:

A heart beat sensor shall be used to replace the ECG machine. This sensor shall use optical method to sense blood flow in veins and convert that to heart beat. Heartbeat sensor connected to the port1.0 pin of the microcontroller is used for monitoring the pulses of the heart.

RESPIRATION SENSOR:

The primary functions of the respiratory system are to supply oxygen to the tissues and remove carbon dioxide from the tissues. The action of breathing is controlled by muscular action causing the volume of the lung to increase and decrease to affect a precise and sensitive control of the tension of carbon dioxide in the arterial blood.

LCD DISPLAY:

A liquid crystal display (LCD) is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals (LCs). LCs don't emit light directly. A 16X2 display module is employed to display 16 characters in 2 rows.

STEPPER MOTOR:

A stepper motor transforms electrical pulses into equal increments of rotatory shaft motion called steps. In automatic anesthesia injector a 4 phase stepper motor is used. Consider a 4 phases as S1,S2,S3,S4 .

SYRINGE INFUSION PUMP:

The syringe infusion pump provides uniform flow of fluid by precisely driving the plunger of syringe towards its barrel. It provides accurate and continuous flow rate for precisely delivering anesthesia medication in critical medical care. It has an alarm system activated by infra-red sensor and limit switches.

SOFTWARE USED

The implementation of this system is done in **proteus software**. Here the input side has only one sensor that is the temperature sensor. Sensor output is sent to arduino board. With the help of driving circuit the motor rotation is controlled.

ADVANTAGES

- Dosages are calculated accurately.
- The procedure is technically feasible and often preferred because it is precise, rapidly adjustable, safe and effective especially for procedures lasting more than 1-2 hours.
- The anesthetic agents used are not metabolized and therefore have little or no toxic effects. Also they are relatively insoluble in blood and therefore are “blown-off” quickly, providing a quick recovery.

FUTURE SCOPE

- This paper can be implemented for the treatment of humans. So that the need of Anesthetic can be eliminated in the hospitals.
- And also during the emergency conditions, this project is very effective to calculate the dosage of anesthesia within short duration of time.
- Further when this project is implemented for humans some more parameters should monitored such blood pressure, neuron functions, etc. The dosage calculation of anesthesia can be improved by using both height and weight of the patient.
- So that most accurate anesthesia dosage can be calculated.

REFERENCE

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Thank you

