Industrial Engineering Journal
ISSN: 0970-2555
Volume : 52, Issue 4, No. 2, April : 2023

IOT BASED ANAESTHESIA INJECTOR THROUGH ROBOT

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Abstract
The objective of our project is to make the alert message send through IOT module, In the hospital the patient should be in anaestheticcondition during operation suppose the operation is lasts for a long time 4to5 hours, complete dose of anaesthesia cannot be administered in a single stroke it may be lead to a patient death or unconsciousness if the lower amount of anaesthesia is given to the patient the patient is wakeup in half of the operation to avoid this, the anesthetic administer few millimeter of anesthesia per hour to the patient. if the anaesthetist fails to administer the anaesthesia to the patient at the particular time interval, other allied problems may arise. To avoid this we design an IOT based anaesthesia injector based on an arduino controller. The anesthetist can set a level of anaesthesia in terms of milliliter per hour to administer anaesthesia to the patient with the help of keypad. If the level of anaesthesia is decreased to lower level, the alert message send though IoT module.

Keywords-- Automated Anaesthesia, Arduino UNO,SPO2,Heartrate,

1. INTRODUCTION

A patient must be anesthetieze before any major surgery by the doctors to start the surgical procedure. in case of major surgerieswhich could take up to 4 or 5 hours, the complete dosage of anasthesia could not be administered in single dose of patient. since excess dose may case critical condition to the patient whichcould lead to permanent unconsciousness Moreover anaesthetist may fail to administer the accurate dose of anaesthesia for the period of the predestined time which might to disturbed the patient during surgical procedure The incidence of error is drastically reduced due to automatic mechanism of drug administration. In this context there is a need to automate the processes related to anaesthesia to minimize human error, disturbance from routine repetitive activities could be minimized and anaesthetist may have more time to take direct care to patient.Nowadays embedded system is used in many applications in medical industries to control various biological and biomedical parameters. Microcontroller is used to regulate the anaesthesia mechine automatically depending upon the various clinical parameters such as body temperature, heart rate and respiration. The main of the system is to control the drug injection speeddepend upon the patient's state during the surgical procedure. themain reason for administration of anaesthesia is to relive the anaesthesiologist so that they can dedicate their attention to other tasks as well fluid balance, ventilation, drug application etc thus to increase the patient's safety. The dosage given manually by doctors at times may vary from its standard value and result in ill effect on the patient. In order to achieve efficient injection of anaesthesia by automatic anaesthesia

controller, the heart beat sensor play an important role which takes into account the heart rate of the patient and inject anasthesia accordingly reducing the work of the doctors.

Statement of the Problem

The online shopping business is not attractive in Thanjavur District. The increasing population in the study area may create an opportunity for online shopping business. The industry is stagnant in this segment. There are many factors contributing to the growth of online shopping pattern. The factors differ by different writers, different time and in different countries. This study has made and exploratory investigation with a questionnaire to get more insight about the respondent's opinion. This study has identified convenience, product characteristics, and web site quality and awareness factors affecting online purchase intention.

Objectives of the study

- A working model of anaesthesia injector used for a patient during the surgery.
- To deliver accurate amount of dosage to the patient automatically by monitoring the vital parameters which will avoid over dosage and its side effects.
- To gain wide knowledge in embedded systems, which makes it towork very compactly.

2. RELATED WORK

To read the input from the keypad provided with the micro-controller. To activate the internal timer and enable it to interrupt the AT 89C51 whenever the timer overflows. To read the parameters such as heart rate, respiration, body temperature once in every specified interval. To check for the correctness of the parameters value and activate the alarm set with the system when the level of Anesthesia goes down. To calculate the stepper motor movement (increase the speed or decrease the speed) with the parameters provided by the Sensors. Continue the above until switched OFF or RESET. the total timing and opposite flow of blood will also be detected by using Micro Controller

3. PROPOSED FRAMEWORK

For this project, we are using MAX30100 for measuring Heart Rate and BloodOxygen Level (SpO2), LM-35 for measuring Body Temperature, MPX2050DP Pressure Transducer formeasuring Blood Pressure. The Arduino UNO is interfaced with all the aforementioned sensors todisplay readings on a 16X2 LCD Display and Adafruit 0.96''OLED Display. The Micro Servo Motor isconnected to a syringe carrying an anaesthetic drug.

The current priority is to address the question of how those changes will impact our daily practice. Technological progress has constantly upset societal order. For example, Luddites in the 19th century destroyed the first mechanical looms that they thought threatened their livelihood. The Industrial Revolution transformed first England, then most of the Western world, beyond recognition. Closer to us, the rise of computers, the internet, mobile telephony and data connections has changed our daily life to an extent that was in the realm of science fiction only a few decades ago. The technological improvements in the field of anesthesiology, noted above, have made anesthesia significantly safer. However, we must also recognize that they have led to a loss of clinical skills among younger practitioners, who tend to rely on tests and monitors rather than examining the patient.

While robotic assistance for anesthesia is being rolled out, we can focus on those tasks that humans perform better than computers. Robots can help human practitioners improve care by increasing their precision and reliability, aiding their vigilance, and freeing them up to focus on higher level tasks and procedures. Humans are flexible and are better at problemsolving than machines, but they take poorly to repetitive tasks that quickly lead to boredom, fatigue and a drop in vigilance as well as low morale. The assumption of researchers is that robotic assistance during anesthesia will make our profession more enjoyable and even safer by decreasing the menial aspects that machines do well,

simplifying the documentation, and allowing us to focus on the patient rather than the equipment and the paperwork. The risk, obviously, is overreliance on the technology and a paradoxical drop in vigilance. Ergonomics, i.e. adjusting the environment to the needs of the humanrobot team, might help reduce that risk by providing feedback in a form that is informative yet not overwhelming, and highlights the essential.

Experience with industrial robots shows that while workers initially fear losing their jobs, companies often end up hiring more personnel because production costs drop. Workers warm up quickly to the robots and, as they do the programming themselves, tend to see the robots as subordinates rather than a threat. Research is also ongoing on the ways to improve robot acceptability and likability. For anthropomorphic robots, gestures accompanying speech increase their likability. Interestingly, mildly incongruent gestures, suggesting that the robot could make mistakes, made the robot even more likable

We need to develop and integrate these systems to make anesthesia even safer.

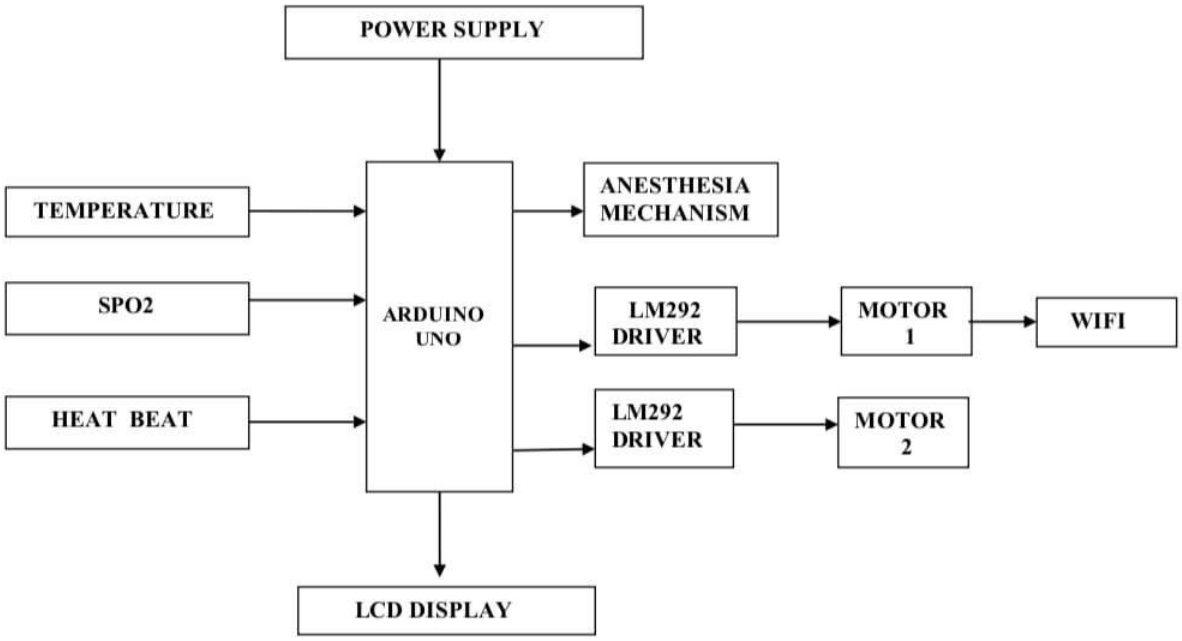
Components Used

COMPONENTS USED	QUANTITY
Arduino UNO	1
100K Potentiometer	1
10K Potentiometer	2
Resistors	4
Heart Rate and Oximeter Sensor-MAX30100	1
LCD Display-16x2	1
Adafruit 0.96"OLED Display	1
L293D - Motor Driver	1
DC Servo Motor	1
Temperature Sensor - LM35	1
LEDs	2
Jumper Wires	-
ESP8266	1
Pressure Transducer MPX5050DP	1

Industrial Engineering Journal
ISSN: 0970-2555
Volume : 52, Issue 4, No. 2, April : 2023

EXPERIMENTAL RESULTS

Block Diagram:



CONCLUSION AND FUTURE WORK

The project provides a means of automating the anesthesia injection process by using syringe mechanism and the infusion set mechanism. The proposed system shows a working prototype of anesthesia administration system. Also, the system consists of a database which contains the drug dosage value for different modes of surgery. By introducing different modes of operation namely the induction phase and the maintenance phase, the various stages of the surgery are accounted for. By automating the induction process, the system plays a very important role of assisting the anesthesiologist thereby reducing the risk of anesthesia overdose. The user interface provides an easy way of interaction for the user. The database developed is easily scalableand can include more surgeries. The patient health monitoring feature is also included within the system which involves storing the vital parameters of the patient in a spreadsheet file. This later assists in the report generation and analysis. Future improvements include using a wireless mode of communication such as Zigbee, GSM to transmit the sensor values. Also by introducing more intelligence into the system, the system can be made autonomous.

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