Mechatronic Design And Robust Control of An Artificial Nebulizer Switching In Response To The Covid-19 Pandemic

Premalatha.S[1], Rajalakshmi.R[2]
[1,2] Dept of Biomedical- engineering
[1,2] Dhanalakshmi Srinivasan Engineering College, Perambalur

Abstract- *Over the world the COVID-19 disease is one of the most worldwide spread diseases. Owing to the unstable and spontaneous characteristics of this disease is essential to have a sensitive, rapid, and easy-to-use device for the detection of diseases biomarkers. Now a day's doctors/nurse is in a COVID-19 relief, they need to cover their body is Producing such datasets requires devices that can withstand real-world use and yet are unobtrusive enough to yield high doctors adherence. In this over IoT module and cayenne app can pair automatically when other devices in the pack are worn. The one-time smartphone-guided setup process guides the doctors through cloths. There in, the app displays real-time and summary data such as system, we describe a set of necessary characteristics for a device to address these issues, informed by stakeholders in pulmonary health monitoring and produce required mixture of oxygen air to doctor/nurses while working in the covid-19 isolation ward based respiration rate, PPG rate, SPO2 level, heart rate and body temperature person. A doctor can use one device alone; each individual device is software-associated with a unique set identifier before fulfillment occurs. The doctors can pair only one device respiration rate, PPG rate, SPO2 level heart rate and body temperature values detected.*

Keywords- Machine learning, ventilator, covid-19, sensor.

I. INTRODUCTION

In this article we are going t o explain that working of artificial ventilator of artificial ventilator by the data produced by comparing the predicated values in the dataset and real time data which is gathered by monitoring human body which is under the examination. The main usage of this system is switching on the ventilator before the predicted time.

EXCISTING SYSTEM

In the exciting system it have IOT device, smartphone app for server. The hardware contains nodes that were developed on the raspberry Pi zero (RPZ). The IOT node tracks health parameters including body temperature, cough rate, respiratory rate and blood oxygen saturation rate then updates. The COVID-19 safe framework can assist in minimizing the corono virus exposure risk.

II. PROPOSED SYSTEM

In the proposed system we are measuring the parameters with ARDUINO UNO board. Breathing abnormalities predicted using machine learning techniques. Once the system predicts the minimized ventilator life saving kit is switching on and produce ventilation automatically without the intervention of human.

III. MATERIALS REQUIRED

ARDUINO UNO MICROCONTROLLER: Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button.
HEART BEAT SENSOR: The MAX30100 is an integrated pulse oximetry and heart-rate monitor sensor solution. It combines two LEDs, a photodetector, optimized optics, and low-noise analog signal processing to detect pulse oximetry and heart-rate signals.

TEMPERATURE SENSOR: The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature.
ECG SENSOR : During an ECG , up to 12 sensors (electrodes) are attached to the chest and limbs. The electrodes are sticky patches with wires that connect to a monitor. They record the electrical signals that make the heart beat. A computer records the information and displays it as waves on a monitor or on paper.

PC(ML-KNN ALGORITHM): K-NN is a non-parametric algorithm, which means it does not make any assumption on underlying data. It is also called a lazy learner algorithm

because it does not learn from the training set immediately instead it stores the dataset and at the time of classification, it performs an action on the dataset.

USB-TTL: The USB TTLSerial cables are a range of USB to serial converter cables which provide connectivity between USB and serial UART interfaces. A range of cables are available offering connectivity at 5v,3.3v or user specified signal levels with various connector interfaces.

DRIVER AND REALY CIRCUIT: A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and most have double throw.

PUMP FOR OXYGEN SUPPLY: One of the major issues that COVID-19 patients start facing is the inability to breathe properly . Therefore, oxygen concentrators can be helpful in providing best possible oxygen supportive care. And, with the help of this medical device, a COVID-19 infected patient can take his/her oxygen therapy from the safety and comfort of their homes.

LCD DISPLAY:Liquid crystal cell displays (LCDs) are used in similar applications where LEDs are used. These applications are display of display of numeric and alphanumeric characters in dot matrix and segmental displays.

IV. IMPLEMENTATION

Finally we are collecting the real time data by heat beat sensor (MAX30100), temperature sensor (LM35), ECG sensor. After collecting the data we are comparing the data with the datset and then the working of the system gets started.

V. RESULT AND CONCLUSION

The Covid-19 outbreak has affected more than 210 countries as of today. The rapid increase in the number of cases caused healthcare industries to collapse. Countries have faced major problems such as medicine, personnel, and hospital capacity. Each country was taken on measures to reduce the spread of the virus. In addition, countries are making predictions for the future situation of the Covid-19 outbreak by using artificial intelligence methods. Thus, the burden of the health sector can be reduced by foreseeing future situations and making strategies and plans. In this project we have designed the automation system for patients that will helps to save the lives in the emergency period.

We developed and designed the prototype that provides ventilation by turning ON the Nebulizer automatically on monitoring the certain health parameters of the patients.