

DESIGN AND DEVELOPMENT OF A LOW-COST BREATHING AID UNDER HEALTH EMERGENCY

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Introduction:

Human lungs use the reverse pressure generated by contraction motion of the diaphragm to suck in air for breathing. A contradictory motion is used by a breathing aid to inflate the lungs by pumping type motion. A breathing aid device mechanism must be able to deliver in the range of 10 – 30 breaths per minute, with the ability to adjust rising increments in sets of 2. Along with this the breathing aid must have the ability to adjust the air volume pushed into lungs in each breath. The last but not the least is the setting to adjust the time duration for inhalation to exhalation ratio. Apart from this the breathing aid must be able to monitor the patient's blood oxygen level and exhaled lung pressure to avoid over/under air pressure simultaneously.

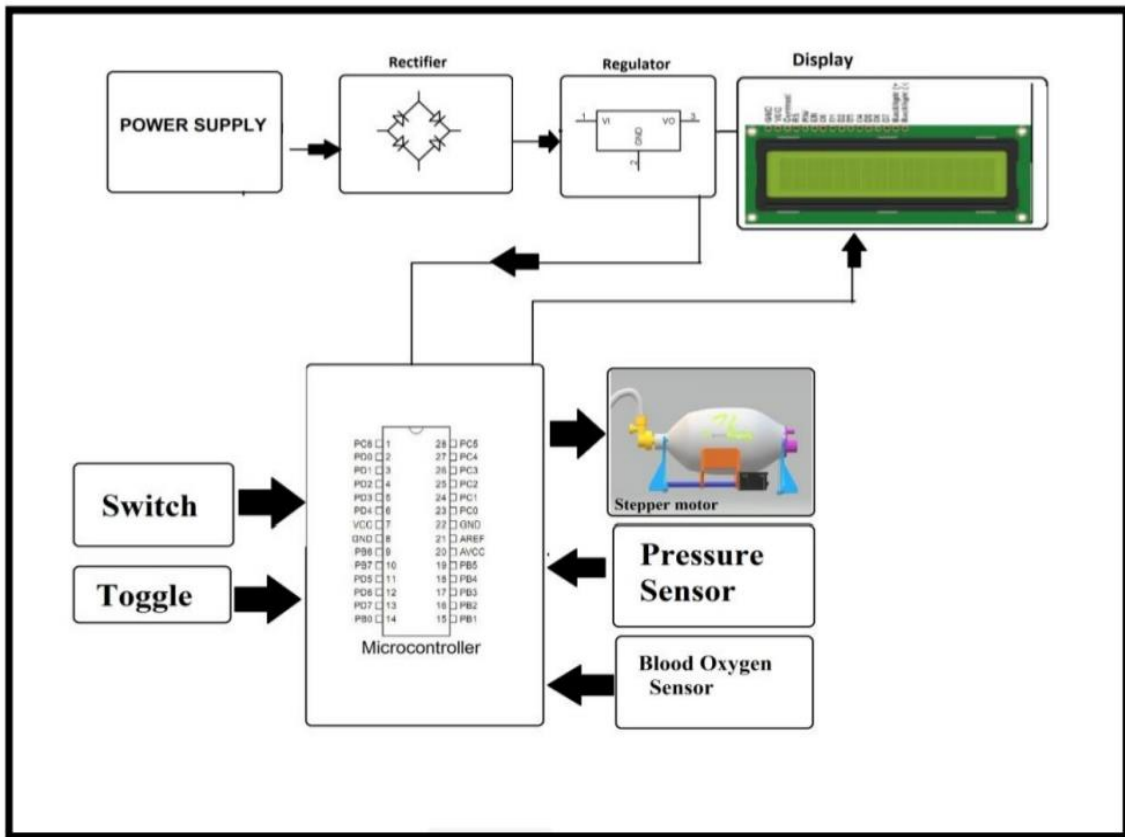
Objectives:

The objective of the project is to cater the local storage of breathing devices and develop an Arduino controlled breathing aid that could be used in emergency medical units in hospital as well as mobile medical units such as ambulances to provide emergency health service or it could be even used at home. Companies are scaling up production of breathing assistance devices such as ventilators, but this will not be sufficient to meet the demand according to the current forecasts. We propose a simple, low cost breathing aid which can be easily manufactured and integrated into the hospital environment or at home to support patients.

Methodology:

The breathing aid we aim to design and develop encompasses all these 5 requirements to develop a reliable yet affordable DIY breathing aid to help in times of pandemic. A silicon bag driven by DC motors with 2 side push mechanism is used to push the bag. A toggle switch is used for switching and a variable pot to adjust the breath length and the BPM value for the patient. Our system makes use of blood oxygen sensor along with sensitive pressure sensor to monitor the necessary vitals of the patient and display on a mini screen. Also an emergency buzzer alert is fitted in the system to sound an alert as

soon as any anomaly is detected. The entire system is driven by Arduino controller to achieve desired results and to assist patients in COVID pandemic and other emergency situations.



Results and conclusions:

This project intends to develop an Arduino controlled breathing aid system which helps the person to overcome breathing problem which can lead to death when proper supervision is not provided. Instead, they can use this system to help themselves when they struggle from breathing.

Scope for future work:

Data transfer to Cloud and further, notification to concerned using IoT upon continuous observation helps to pay immediate attention and save life if possible.