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STUDY ON IOT-POWERED INTELLIGENT VENTILATION SYSTEM

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ABSTRACT

A ventilator is an automatic device made to aid in the human lungs' ability to take in and expel carbon dioxide. Because COVID-19 attacks the respiratory system and causes breathing difficulties that ultimately result in mortality, I have chosen this specific paper to help combat this global catastrophe. Mechanical ventilation systems are considered to be basic systems of life. By enabling remote ventilator control, this technology attempts to create a physical barrier between medical personnel and patients, thereby limiting the spread of this illness.

Keywords: Covid-19, Arduino, Smart Doors, Face Recognition, RFID.

I. INTRODUCTION

It is our responsibility as engineers to step in to address this issue and stop the development of the Covid-19 disease at this time, and from this perspective, I have decided what I will do to assist humanity in general and the medical community in particular in overcoming this disease through the creation of a smart ventilator that allows medical personnel to assess the patient's condition and his levels of oxygen, blood pressure, heart rate, and body temperature without having to touch him [1-5]. The purpose of an artificial respirator is to make up for the known lack of oxygen in the lungs by providing more oxygen [6-10].

II. LITERATURE REVIEW

An Open-Source Hardware Mechanical Ventilator (OSH-MVs) paper to address the COVID-19 health problem is the first review's main question: Taxonomy and modern technology. The objective is to improve health care for persons who have the Covid-19 virus and make it higher quality, more efficient, safe, and effective than it was in the past. The fundamental idea is to create artificial air pressure in order to force air into a patient's lungs [11- 15]. Three pressure levels rotate throughout the breathing cycle: the first peak pressure (PIP), the plateau pressure, and the final positive respiratory pressure (PEEP). The greatest pressure that may be determined during a breathing cycle is called PIP. Challenges and solutions in providing ventilators for COVID-19 patients, according to the second literature review[16-20]. Patients with COVID-19 require ventilators, but because there are so many infected individuals, health care systems struggle to supply these devices. What function does 3D printing technology play in ventilators?

Goals:

Showcase the value of ventilators, ascertain their accessibility and degree of necessity in the COVID-19 pandemic, and evaluate the contribution of contemporary technologies in eradicating the virus.

Methods: For a thorough literature study, use search engines like PubMed, SCOPUS, Google Scholar, and Research Gate while using keywords like ventilators, patients with coronavirus, healthcare systems in 2020, 3D printing technologies, and ventilators. Third literature review: "Can robots assist

in reconfiguring and increasing ventilator production in the face of COVID-19?" It was challenging to meet this great demand because the manufacturing systems used were designed with automation solutions that were inflexible enough to meet this great demand and the human being to carry out all stages of "manufacturing, assembly, and conditioning." Systems," which is another challenge at this time as they must coordinate their efforts to eradicate this disease [21-30]. This study utilized the COVID-19 global health emergency to accept suggestions for using robots to boost ventilator productivity. "A review of open-source ventilators for COVID-19 and future pandemics" is the topic of the fourth literature review. Based on what was summarized from the analysis of the academic literature to arrive at the fundamental designs for the manufacture of ventilators that were already investigated, and the practical specifics required, they discussed ventilators at the beginning of this literature review. The following key ideas were distilled from this literature review of ventilator paper literature: In addition to production files (STLs used in mechanical designs by 3D printers), printed circuit board (PCB) and other hardware design files from to boost production and development, design source files (such as design by PC or CAD software) are crucial to implementing the design mechanically[31-43].

III. DESIGN AND ANALYSIS

The block diagram system will be covered in the fifth section. The system flow chart, requirements analysis— which includes summarizing the main datasheet parameters—initial conditions, input and output parameters, and microcontrollers and outputs will all be covered in detail. After that, we'll talk about equations, relations, and constraints. Next, we'll discuss developing test plans, identifying test points, and system test plans.

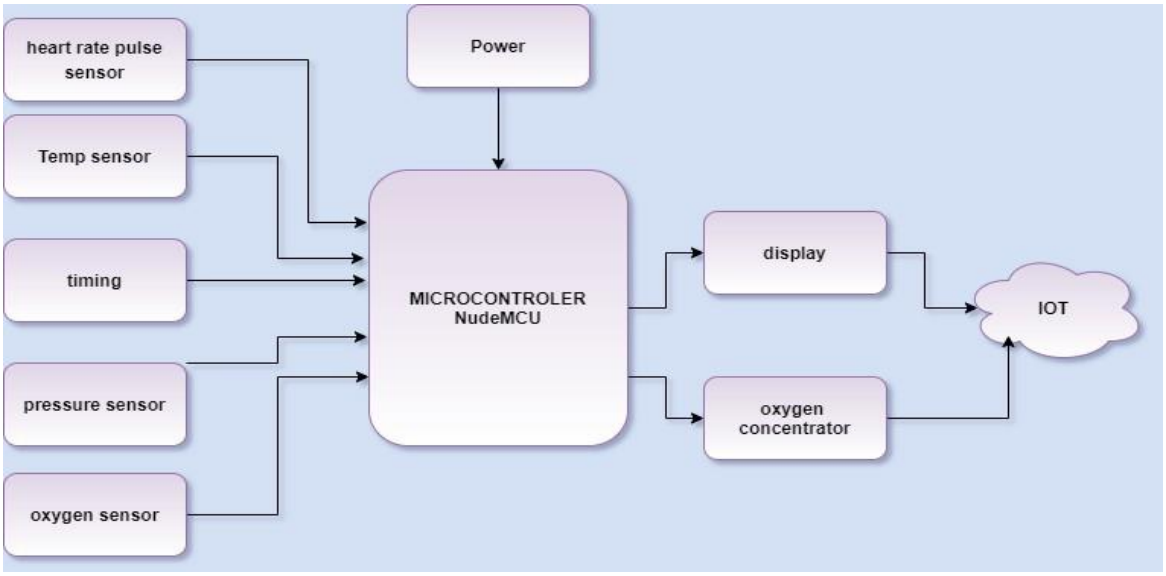


Figure 1: Block diagram

It was noted that there are four sensors (a heart rate sensor, a temperature sensor, a pressure sensor, and an oxygen sensor) in this block diagram that are used as inputs to the system that uses the microcontroller as a programmer for the information coming from those sensors. Additionally, it was noted that there is a display onthe other side of the diagram that is used as an output for the system that displays and programs the results obtained from the sensors.

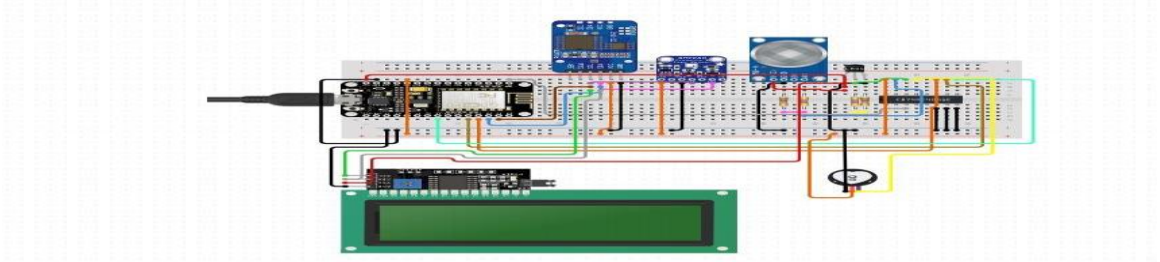
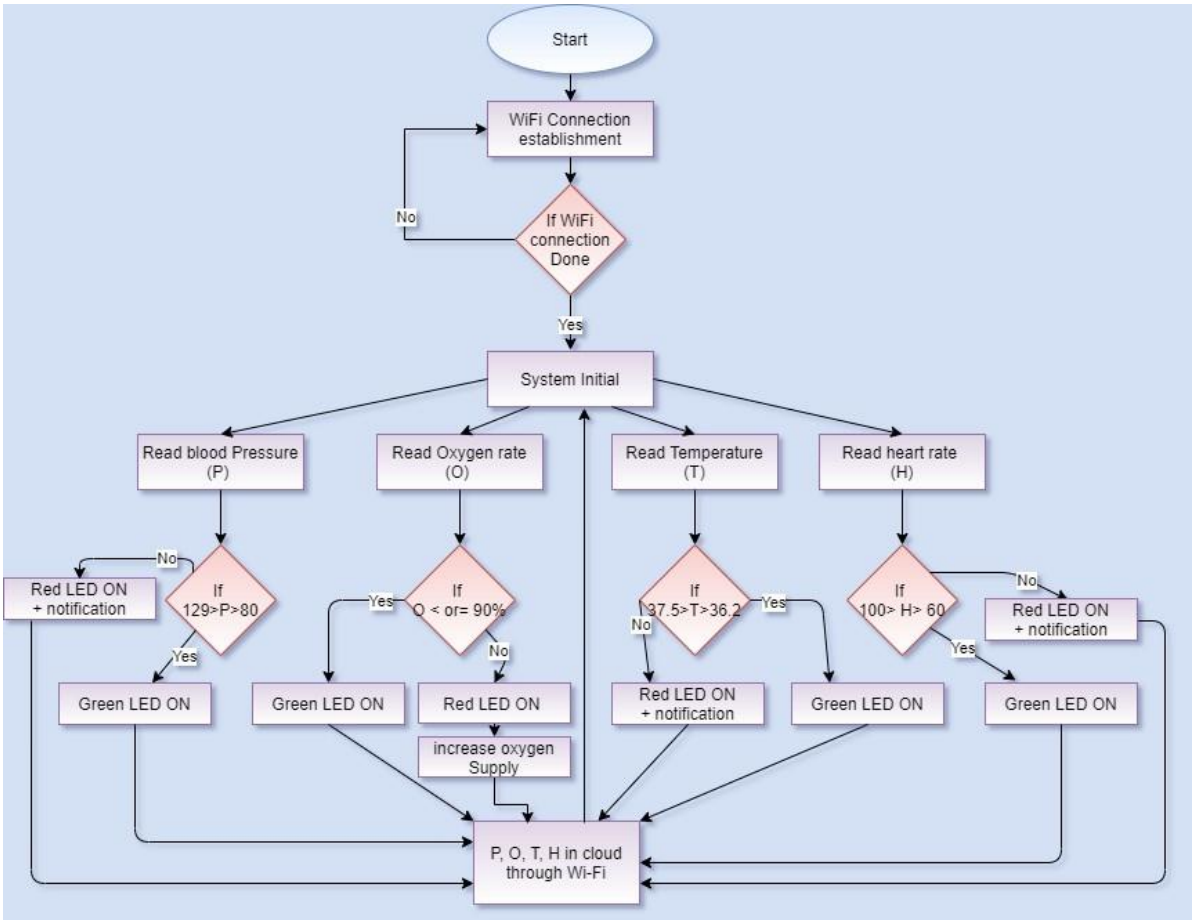


Figure 2: "Circuit System Design"

IV. SYSTEM IMPLEMENTATION

SYSTEM FLOW CHART



Apply electricity to the system to turn it on, then attempt to connect it to Wi-Fi; if Wi-Fi is not connected, the system will restart its attempt; however, if Wi-Fi is connected, the first system will begin to function. Then four procedures are performed simultaneously. The first is to read the patient's heart rate. If the rate is between 60 and 100, the green light will illuminate. If the rate is outside of this range, the red color will illuminate, alerting the doctor that the patient's condition is dangerous, and his heart rate is not regular. The patient's body temperature is measured during the second procedure. The patient's body temperature is measured during the second procedure. The green light will turn on if the heart rate is within the usual range of 36.2 and 37.5. If the rate is higher or lower than that, a warning that the patient's condition is serious and that his temperature is unusual will be visible to the doctor. The third method involves calculating the patient's body's percentage of oxygen. The green light will turn on if the usual rate is more than or equal to 90%. If the rate is different, a warning that the patient's condition is dangerous and that the level of oxygen in the patient's body is low will show, and the red color will light up. This oxygen deficiency can be made up for by the system. Reading the patient's blood pressure is the fourth process. The green light will come on if the rate is between 90 and 129. The red hue will illuminate if the rate is different, and the doctor will see a warning that the patient's condition is risky and that the patient's blood pressure is unstable. These readings (H, O, P, and T) will all be stored in the cloud for future reference. The system will then reset to its initial state.

V. CONCLUSION

As this objective was reached by realizing the notion of separation between people infected with the Coronavirus and the medical professionals and those who are considered soldiers in this war against the disease, this paper intends to deliver a solution of solutions to decrease the spread of Corona sickness. There might be six sections in this report, and the first section covered in the second section, however, a few models were explained in relation to the paper's background, techniques, applications, and constraints before the most suitable model was selected and its benefits and drawbacks were discussed. appropriate for any potential issues. The fourth section, on the other hand, focused on

creating a budget, paper management, time schedule, and a detailed discussion of the topics related to how to implement, design, and transfer the paper was made in the fifth section, which is a crucial section. This section covered risk management as well as the components of an electrical circuit, a block diagram system, a system flow chart, requirements analysis, equations and relations, and a system test plan. In conclusion, our community has a lot to offer, and when everyone does their duties to the best of their ability, everyone's life is improved and developed.

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