ABSTRACT

The background of this research is to help people who suffer from respiratory problems and find it difficult to get a breathing apparatus that can adjust the fraction of inspired oxygen and humidity. To achieve this goal, the author makes a ventilator that uses control using the fuzzy logic method.

In this study the authors used fuzzy logic to control the level of inspired oxygen fraction on the ventilator. The set point used is the value of the fraction of inspired oxygen and humidity from the ventilator. The input of the inspired oxygen fraction control is the oxygen fraction level obtained from the oxygen fraction sensor. The data is then processed using Arduino Uno with fuzzy logic method. From the fuzzy logic method, the results obtained are the length of time it takes for the valve connected to the oxygen cylinder to open so that oxygen can flow. The output is the value of the fraction of inspired oxygen. While for humidity, the input is the humidity value obtained from the humidity sensor. The humidity value is compared with the set point, if it is below the set point, Arduino Uno turns on the steam-forming device, the ultrasonic mist maker, which uses ultrasonic waves to convert liquid into steam. Steam is used to increase the humidity of the gas supplied to the ventilator user so that the inhaled gas does not dry out. The output of the humidity control is the value of the humidity of the gas delivered to the user. The resulting inspired oxygen and humidity fraction level data is displayed on the Arduino Uno serial monitor.

At the end of this study found a ventilator that can control the fraction of inspired oxygen and humidity at the 3 desired values. The implementation of fuzzy logic is able to make the ventilator able to control the level of the inspired oxygen fraction at values of 30%, 60%, and 80% of the oxygen fraction with an accuracy rate of 96.68%. For humidity, relative humidity is at a value of greater than 90% with an accuracy rate of 99.9%.

Keywords : *fraction oxygen inspiration, humidity control, fuzzy logic, ventilator*