Scholars Journal of Engineering and Technology (SJET) **ISSN 2347-9523 (Print)**
Abbreviated Key Title: Sch. J. Eng. Tech. **ISSN 2321-435X (Online)**

A Unit of Scholars Academic and Scientific Society, India
www.saspublishers.com

Design of LCD Graph Appearance Respiratory Equipment with Patient Data Storage

Torib Hamzah[1*], Sumber[2]
[1,2]Department of Electromedic Engineering, Surabaya Health Ministry Polytechnic, Pucang Jajar Timur 10 Surabaya, East Java, Indonesia

Original Research Article

***Corresponding author**
Torib Hamzah

Article History
Received: 18.09.2018
Accepted: 27.09.2018
Published: 30.10.2018

DOI:
10.36347/sjet.2018.v06i10.001

Abstract: The simplest technique of measuring the rate of breathing is done by placing the soles of the diagframa or the chest where we perform the calculations when the lungs are expired and inspired using a stopwatch. The calculation of each minute's breath using manual methods like this is less effective and still needs to enter data and in inputkan in real time. Therefore, a tool will be made using electronic methods that are easier to use, fast and precise for handling patients through the respiratory rate, the way this tool is to use an oxygen mask that is equipped with a humidity sensor DHT 11 capable of catching breaths that will be counted and is displayed in wave on LCD graph
Keywords: Respiratory rate, health support, blood pressure.

INTRODUCTION

Health is the most important element in every human need. Own health is divided into two parts, namely physical and spiritual health; these two elements must be fulfilled by every human being in order to carry out a good life. Therefore, the health of individuals and society must always be considered and guarded. The development of technology in the health sector also took part in health support processes in Indonesia, ranging from the simplest or conventional tools to tools that are able to provide significant body data of patients.

In the medical world there are four most important physiological parameters that can be used by a nurse or medical personnel in determining the health status of patients in a hospital.

The four parameters are body temperature, heart rate / heart rate, respiratory rate and blood pressure. From the four parameters, the respiratory rate is the most important parameter because the respiratory rate can provide information related to the condition of the heart, nerves and lungs. Respiration is the process that causes oxygen to enter the lungs in reaching the body's cells, as well as the process (in the opposite direction) which causes carbon dioxide to come out of the body through the nose or mouth. The respiratory process itself goes without us knowing that it enters through life - the larynx - pharynx - the trachea - and the lungs. Respiratory rate alone is the amount of breath or respiratory cycle that occurs every minute. Respiratory rate difference is divided into four, namely (Eupnea) calm rhythmic and free, (tachypnea) rapid and superficial breathing, (bradypnea) very slow, (apnea) stop.

From some theories about respiratory rate, there is the simplest method of calculating the rate of respiration that is by performing calculations directly by observing the rise of the surface of the patient's chest or by listening to breathing sounds through a stethoscope. This breathing sound method is very dependent on the concentration of the meter, but sometimes the gauges feel tired, bored and lack of concentration which causes the measurement value of the patient to be irrelevant. Talking about the problem above, the rate of breath measurement is developed using an electronic system that is able to measure accurately and easily. Starting from what type of sensor is used by researchers to display the results of the respiratory rate and use a temperature sensor and the results are displayed on the LCD.

METHODS

The research design used was to use pre experimental method with the type of after-study design because the final result of measurement tool compared with the control group.

Research tools is measuring modul which changes amount of breath of expiration-inpiration patients to DHT humidity sensors - 11. The breath wave

graph is displayed by LCD Graph and data storage using SD Card module.

RESULTS AND DISCUSSION

Breathing is a process of gas exchange that comes from living things that come from living things with gas in their environment. While the process of overhauling food ingredients uses oxygen so that energy is obtained and the residual gas combustion of carbon dioxide (CO_2) is called respiration. The process of respiration that uses oxygen is also called respiration. The respiration process that uses oxygen is also called aerobic respiration while respiration which does not need oxygen is called anaerobic respiration. According to the place where gas exchange occurs, breathing is divided into 2 types, namely external breathing and deep breathing. External breathing is the exchange of air that occurs between the air in the alveolus and blood in the capillaries, while deep breathing is the breathing that occurs between the blood in the capillaries and the body's cells. In the respiratory mechanism, the respiratory organs are involved in air intake (inspiration) and expenditure air (expiration). So that the respiratory mechanism is divided into two types, namely chest breathing and abdominal breathing. Chest and abdominal breathing occurs simultaneously [1].

Chest breathing

Chest breathing is breathing involving the muscles between the ribs. The mechanism can be distinguished as follows.

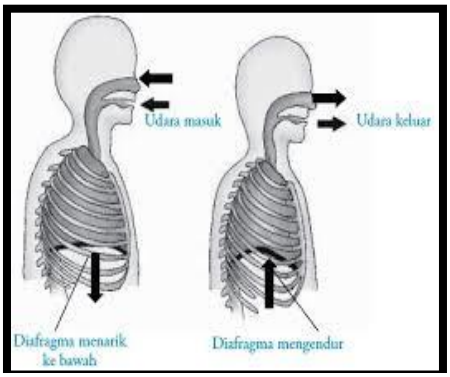

Fig-1: Respiratory process in the human body

Inspiration Phase

This phase is the contraction of the muscles between the ribs so that the chest cavity enlarges, as a result the pressure in the thoracic cavity becomes smaller than the pressure outside so that the oxygen-rich outer air enters

Expiration Phase

This phase is the relaxation phase or the return of the muscle between the rib cage to its original position which is followed by a decrease in the rib cage so that the thoracic cavity becomes small. As a result, the pressure inside the thoracic cavity becomes larger than the external pressure, so that the air inside the chest cavity that is rich in carbon dioxide comes out

Stomach Respiratory

Abdominal breathing is breathing which the mechanism involves the activity of diaphragmatic muscles which restrict the abdominal cavity and chest cavity. Abdominal breathing mechanism can be divided into two stages, as follows.

Inspiration Phase

In this phase the diaphragm muscles contract so that the diaphragm is flattened, as a result the chest cavity enlarges and the pressure becomes small so that the outside air enters.

Expiration Phase

The expiratory phase is the phase of the activation of the diaphragm muscle (returning to its original position, expanding) so that the chest cavity shrinks and the pressure becomes larger, resulting in air coming out of the lungs

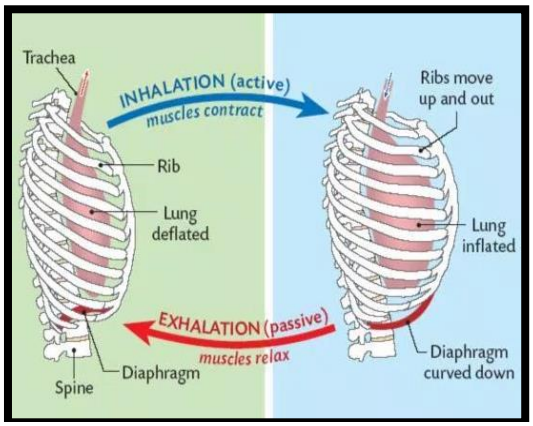

Fig-2: The respiratory process in the human body

Tables-1: Human Respiratory Frequency

RR	Classification
< 12	*Bradipnea*
14 – 20	*Eupnea*
>20	*Takipnea*

Factors that influence respiratory factors include:

- Age of increasing age, the lower the frequency of interpretation
- Genders in general are more mobile, so they need more energy
- Body temperature the higher the body temperature the faster the respiratory frequency
- The position of the body is affected by the mechanism of inspiration and expiration
- Human activity.

Tables-2: Respiratory Frequency Interpretation [2]

No	Human Age	Times / Minute
1	Newborn baby	35 times / minute
2	Babies 1 week - 1 month	30 times / minute
4	Children 4 - 12 years	19 – 23 times / minute
5	Teenagers 4 - 12 years	16 – 18 times / minute
6	Adult	times / minute

Respiratory rate

Respiratory rate is a physiological parameter that is very important to monitor the condition of the patient both in health and critical conditions. Respiratory rate serves to provide information about the condition of the respiratory system's performance. Respiratory rate is to calculate the amount of breathing in one minute. The value of respiratory examination is one indicator to determine the function of the respiratory system which consists of maintaining oxygen exchange and carbon dioxide in the lungs and acid-base regulation [3, 4].

Block Diagram Device

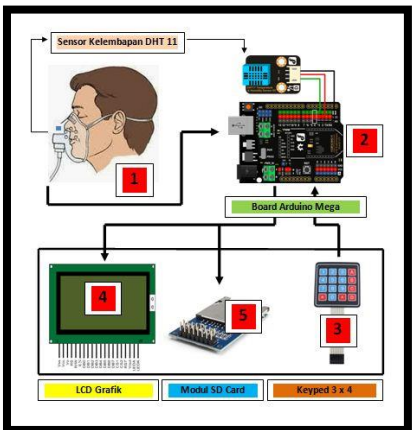

Fig-3: Block Diagram

Block Diagram Work

Changes in the amount of breath of expiration-inpiration patients will be read by DHT humidity sensors - 11. (1) DHT-11 sensors have 3 foot pins namely VCC, Ground and Logic Output. This logic output will enter at the foot of the ADC port on the Mega Arduino board (2). Arduino mega itself is a microcontroller device that has the task of initializing - processing data - processing output from programs that have been downloaded in it. But before observing the number of breaths of patients we must input patient data via 3 x 4 (3) keyped. While the breath wave graph is displayed by LCD Graph (4), for data storage using SD Card module (5)

Arduino Mega Test with RTC (Real Time Clock)

The RTC module used to provide a timer for a program system that can calculate seconds, minutes, hours, months, months, days of the week and years. Material needed for testing (Arduino Mega, TRC DS 3231, Jumper Cable, and Computer Software IDE). To make it easier to assemble can be seen in Figure 4.

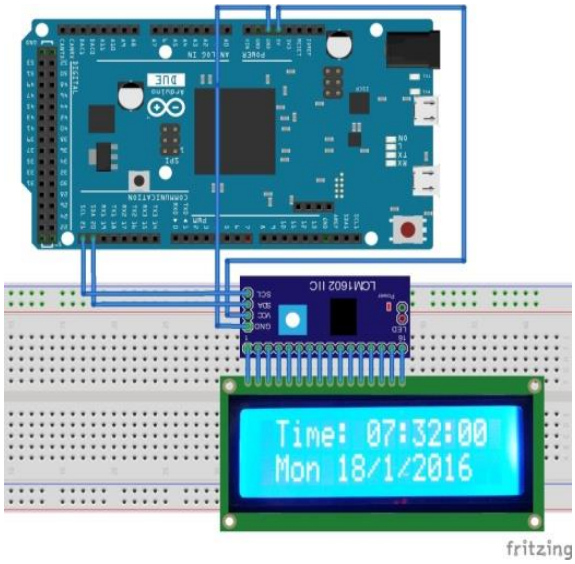

Fig-4: RTC circuit to Arduino Mega

To test the run, an RTC program on Arduino can be seen in Figure 5 below which displays the day, month and year. As well as a timer consisting of minutes and hours.

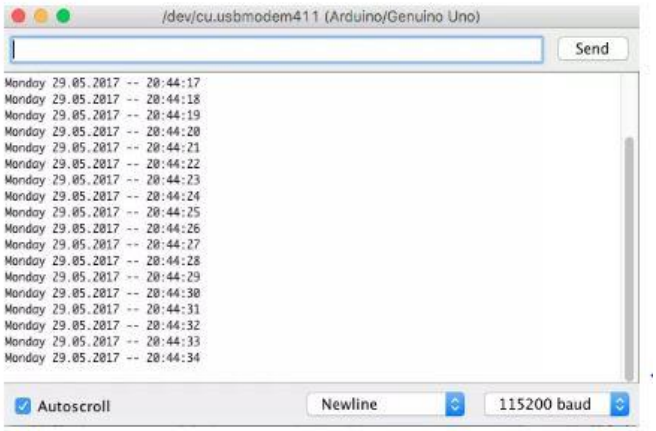

Fig-5: RTC Program Testing

Arduino IDE Program Testing

This test aims to find out whether the arduino IDE (Intergrated Development Environment) program that will be uploaded to Arduino is correct or needs improvement. This test is done by verify / compile it will look like picture 6

Fig-6: Compile Process Done

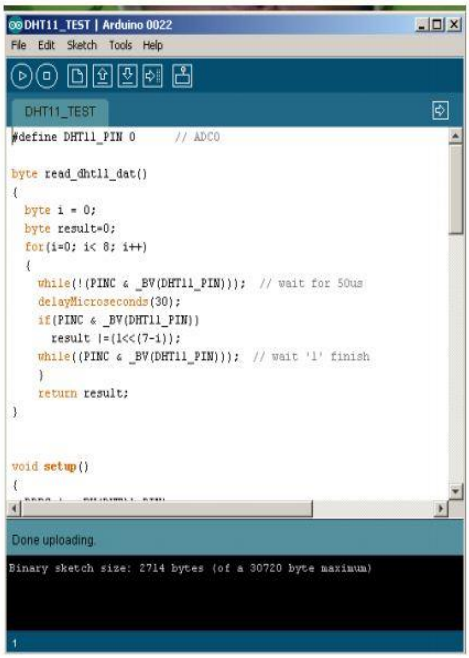

Fig-7: Upload Process Completed

After the compile goes well, the next step is to upload the program in a way connect the Arduino Duemilanove to the computer using a USB cable, then click upload on the Arduino IDE program, but before uploading the program, we have to check what port Arduini uses by starting /My computer/ properties/ Hardware / Device Manager / Ports (COM & LPT), then make adjustments to the serial port in the Arduino IDE. After that, the program can upload. If the upload process is successful, it will look like Figure 7.

CONCLUSIONS

Based on the results of module creation can be summarized that changes in the amount of breath of expiration-inpiration patients will be read by DHT humidity sensors - 11. But before observing the number of breaths of patients we must input patient data via 3 x 4 keyped. While the breath wave graph is displayed by LCD Graph for data storage using SD Card module.

REFERENCES

1. Persion. Normal and Abnormal Respiratory Rates and Patterns. Education Inc. 2007.
2. Royal College of Nursing. Standards for Assessing, Measuring and Monitoring Vital Signs In Infants, Children and Young People, London, Inggris. 2013.
3. Karthik Mohan Rao, BG. Sudarshan. A Review On Different Technical Specifications Of Respiratory Rate Monitors. International Journal of Research in Engineering and Technology. 2015 4(4):424-429.
4. Braun SR. Clinical Methods: The History, Physical, and Laboratory Examinations, Butterworth Publishers, Stoneham MA. 1990.