Asthma Assessment by Using Sternocleidomastoid Muscle Contraction

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ABSTRACT

Both exteriority of the neck is paired with the muscle called Sternocleidomastoid Muscle (SCM). The SCM muscle is attachment of inhalation. During asthma the SCM muscle contraction is abnormal. Monitoring of SCM muscle contraction has more importance in asthma assessment. We develop a wearable monitoring system based on an accelerometer sensor. Sensor detects the SCM muscle contraction in the form of analog signal and the signal is given to the input of the microcontroller and then output will be displayed by LCD display.

Keywords - Sternocleidomastoid muscle, Asthma, PIC microcontroller, Power supply.

I. INTRODUCTION

Asthma is an provocative lung disease, which causes due to abnormal breathing, cold, wheezing, etc. The frequency and meticulous of the disease based on age group. In recent days most doctors prefers diagnose and monitoring of severe symptoms via spirometry and PEF tests. While performing these two measurements require continuous observation. This drawback is overcome by using this monitoring device. The SCM muscle starts with temporal bone at the cranial base and end in between the manubrium and inner portion of the clavicle. The SCM acts as unilaterally, causes lateral flexion, that rotates head to the conflicting side. In bilateral, elevation of the head, that support inspiration.
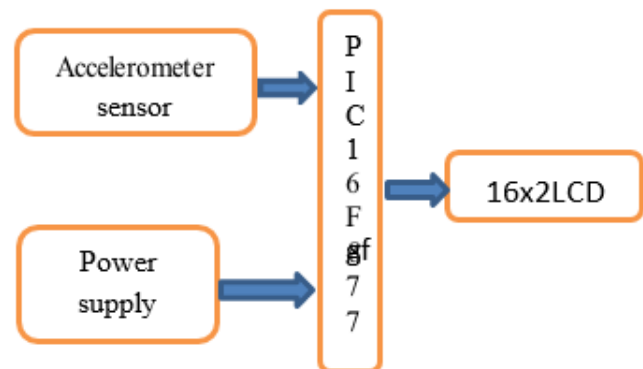
II. METHODS AND MATERIAL

BLOCK DIAGRAM

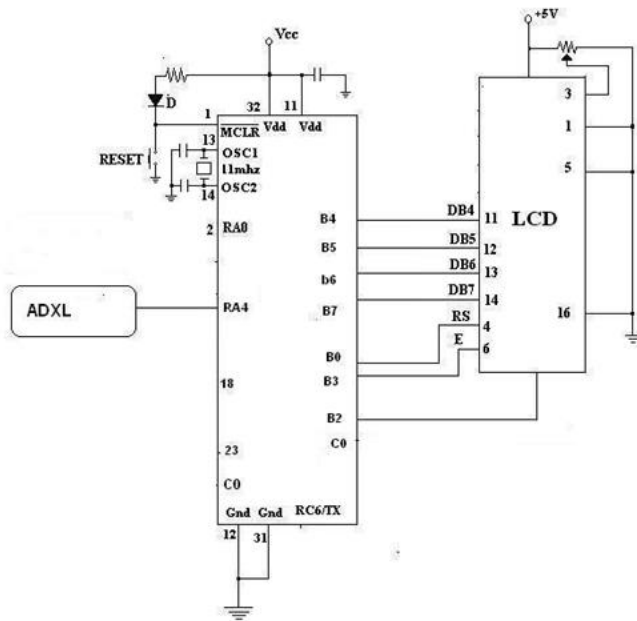
Fig. 1 Block Diagram

CIRCUIT DIAGRAM

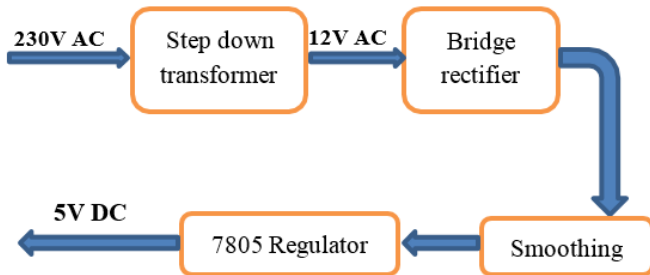**Fig. 2** Circuit Diagram

POWER SUPPLY

Fig. 3 Power Supply

In this circuit we need 5V DC supply, so we can convert 230V AC to 5V DC by using transformer, rectifier, smoothing and regulator. Here, first we can reduce the voltage by the help of step-down transformer. It converts 230V AC into 12V AC. Then the output of the transformer is fed to the rectifier called as Bridge Rectifier, it converts 12V AC into 12V DC. Smoothing process wanted to make less ripple or noise and to increases the capacitance .Here, 470 micro farad filter capacitor is used for smoothing process. Then, the output of the capacitor is given to the 7805 regulator, it converts the current from 12V DC to 5V DC.

III. RESULTS AND DISCUSSION

Fig.4 Result (Model)

By using PIC16F877 microcontroller helps to find out the asthma intensity. It displayed throughout the LCD display. It requires low power.

IV. CONCLUSION

From this work we develop a vesture monitoring system for asthma detection. It is a patient free device and takes less expensive.

V. REFERENCES

[1]. S. G. Kelsen, D. P. Kelsen, B. F. Fleeger, R. C. Jones, and T. Rodman,"Emergency room assessment and treatment of patients with acuteasthma. adequacy of the conventional approach." Am J Med, vol. 64,no. 4, pp. 622–628, Apr 1978.

[2]. J. O. Commey and H. Levison, "Physical signs in childhood asthma."Pediatrics, vol. 58, no. 4, pp. 537– 541, Oct 1976.

[3]. I. Stockman, "Neck muscle influence in rear impacts–a sled test study using the BioRID," 2010.

[4]. T. Rusch, R. Sankar, and J. Scharf, "Signal processing methods forpulse oximetry,"

Computers in Biology and Medicine, vol. 26, no. 2, pp. 143 – 159, 1996. [Online]. Available: http://www.sciencedirect.com/science/article/pii/001 0482595000496

[5]. A. Gelmetti, M. E. Giardini, P. Lago, R. Pavesi,D. Zambarbieri,R. Maestri, and G. Felicetti,

[6]. "Preliminary study of muscle contraction assessment by nir spectroscopy," pp. 61–67, 1998. [Online]. Available: http://dx.doi.org/10.1117/12.301108

[7]. H. Han and J. Kim, "Novel muscle activation sensors for estimating of upper limb motion intention," in Engineering in Medicine and Biology Society, 2009. EMBC 2009. Annual International Conference of the IEEE, Sept 2009, pp. 3767–3770.

[8]. T. Bianchi, D. Zambarbieri, G. Beltrami, and G. Verni, "NIRS monitoring of muscle contraction to control a prosthetic device," pp. 157–163, 1999. [Online]. Available: http://dx.doi.org/10.1117/12. 336926

Cite this article as :

V. P. Krishnammal, C. Midhun, V. E. G. Ponmurugan, K. Poovarasan, M. Ragul, "Asthma Assessment by Using Sternocleidomastoid Muscle Contraction", International Journal of Scientific Research in Science and Technology (IJSRST), Online ISSN : 2395-602X, Print ISSN : 2395-6011, Volume 5 Issue 5, pp. 124-126, March-April 2020.
Journal URL : http://ijsrst.com/EBHBM014