Abstract

Electrical Impedance Tomography is a medical imaging technique which maps the resistivity distribution of the body and find the location of abnormalities present in the body part. In present techniques of imaging like CT scan, MRI and Ultrasound the patients have to move in specialized Room and bedside monitoring using these machines are not possible while it is possible by using EIT even in Intensive Care Unit where patients cannot be moved. This paper focuses on Instrumentation for Data acquisition for detection of location of cancerous tumors using Electrical Impedance Tomography. As we cannot experiment directly on the body, we are experimenting on phantom using saline water with adjacent current injection protocol having 16 electrodes attached on the periphery of Phantom. Our proposed research will be low cost, high speed and accurate solution for Data acquisition used in Imaging of EIT. This paper discussed on design of constant current source and Instrumentation for fast and accurate acquisition of voltages. Total 208 readings of voltages are taken by using switching circuit which is developed using Multiplexer, Demultiplexer, myRIO student embedded device and LabView.
References

1. Tushar Kanti Bera, Student Member IEEE and J. Nagaraju: “Switching of The Surface Electrode Array in A 16-Electrode EIT System Using 8-Bit Parallel Digital Data”, 2011 World Congress on Information and Communication Technologies
2. Vidya Sarode, Hema Patil, Alice N. Cheeran: “Labview Based Automatic Data Acquisition system for Electrical Impedance Tomography”, International Journal of Engineering Science and Technology 2014 Vol(5)
3. J. G. Webster, Electrical impedance tomography, Adam Hilger series1221 of biomedical engineering, Adam Hilger, New York (USA), 1990.
4. Tushar Kanti Bera: “Applications of Electrical Impedance Tomography (EIT): A Short Review”, doi:10.1088/1757-899X/331/1/012004, 2018 IOP Conf. Ser.: Mater. Sci. Eng. 331 012004
5. Datasheet Texas instrument CD4067: https://www.ti.com/lit/ds/symlink/cd4067b.pdf, June 2003
6. Gang Ye, Kim H. Lim, Rhett George, Gary Ybarra, William T. Joines & Qing H. Liu, “ A 3D EIT System for Breast Cancer Imaging”, 3rd IEEE Symposium on Biomedical Imaging, pp. 1092-1095, 2006.
7. DatasheettexasinstrumentLM334:http://www.ti.com/lit/ds/symlink/lm334.pdf, May 2013
8. Nick Polydorides and William R B Lionheart: “A Matlab toolkit for three-dimensional electrical impedance tomography: a contribution to the Electrical Impedance and Diffuse Optical Reconstruction Software project”, PII: S0957-0233(02)35899-5, Meas. Sci. Technol. 13 (2002) 1871–1883
9. Vidya Sarode, Priya M. Chimirkar and Alice N. Cheeran: “Electrical Impedance Tomography using EIDORS in a Closed Phantom”, DOI: 10.5120/7460-0526 Volume 48–No.19, June 2012
10. Vidya Sarode, Sneha Patkar and Alice N. Cheeran, “Comparison of 2-D Algorithms in EIT based Image Reconstruction”, International Journal of Computer Applications (0975 – 8887) Volume 69–No.8, May 2013
11. User guide and specification
NImyRIO-1900:http://www.ni.com/pdf/manuals/376047c.pdf, May 2016

Index Terms

Computer Science Data Mining

Keywords
Analog multiplexer, Electrical impedance tomography, LabView, myRIO, Instrumentation