International Journal of Electronics and Communication Engineering (IJECE)
ISSN(P): 2278-9901; ISSN(E): 2278-991X
Vol. 4, Issue 5, Aug - Sep 2015, 9-20

International Academy of Science, Engineering and Technology
Connecting Researchers; Nurturing Innovations

MAPPING OF RADIATION PATTERN OF ULTRASONIC PHASED ARRAY FOR OBSTACLE LOCATION FOR VISUALLY IMPAIRED

ASHWINI NAIK & M S PANSE

Department of Electrical Engineering, V.J.T.I., Matunga, Mumbai, Maharashtra, India

ABSTRACT

A real time beam steering characteristics of phased array transducer is implemented to detect and locate the obstacle for visually impaired. The steering performance can be characterized by the directivity pattern and the parameters that influence the wave propagation characteristics. The effects of various transducer parameters such as number of transducer elements, inter-element spacing, steering angle and array aperture are mathematically analyzed and optimal phased array is constructed. The Transmitter array of 6 elements with inter-element spacing of twice wavelength and receiver array with 4 elements of thrice wavelength is constructed with the 40 kHz piezo-sensors. The objective of this work is to determine directive pattern analytically and measure the pattern experimentally for the steering angle from -20 to 20 degrees. Radiation pattern of the array are mapped on the polar plot and the directivity of main lobe, grating lobes and side lobes are observed. These polar plots are simulated using LabVIEW (Laboratory virtual instrument engineering workbench) developed by National Instrument, is a graphical Programming environment suited for high-level or system level design. The obstacles are detected and located in the scanning area from distance of 15cm to 100cm.

KEYWORDS: Beam Steering, Grating Lobes, Radiation Pattern, Ultrasonic Phased Array