Ultrasonic Gas Leakage Detection

S. Larkin
CEO of Africa New Energies Limited, London, 533416, United Kingdom

M. Omar
United Arab Emirates University, AL-Ain UAE,15551 UAE

K. Zaman
Department of Electrical Engineering, University of Engineering and Technology, Taxila, 47080, Pakistan

M. Usman
Department of Electrical Engineering, National University of Computer and Emerging Sciences, Islamabad, 44000, Pakistan

S. S. Khan
Department of Electrical Engineering, College of Engineering, United Arab Emirates University, Al-Ain 15551, United Arab Emirates

Z. H. Qawareer
Department of Electrical Engineering, National University of Sciences and Technology, Islamabad, 44000, Pakistan

Abstract:

Gas leakage is a serious issue that can harm the environment and living beings. Therefore, detecting and preventing gas leakage immediately and accurately is essential. The proposed work involves the development of a device that detects gas leakage using an ultrasonic sensor array. The proposed setup does not require any user to send alerts over the internet. It ensures immediate response through an alarm system and digital alerts over the web server and the app. The IoT platform provides a user interface to monitor and receive real-time gas leakage notifications. The main purpose of this paper is to identify the state-of-the-art in leak detection and localization methods. This paper proposes an ultrasonic leak detection method based on the Time Difference of Arrival (TDoA) Algorithm in 3D space to obtain accurate and precise information about gas leakage and to find the exact location of the leakage hole.

Keywords:

3D space, leak location, TDoA algorithm, ultrasonic gas, ultrasonic sensor array.