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Glass breaks detection system using deep auto-encoders with fuzzy rules induction algorithmby: Naing, WYN (Naing, Wai Yan Nyein)^[1]; Htike, ZZ (Htike, Zaw Zaw)^[1]; Shafie, AA (Shafie, Amir Akramin)^[1]

INTERNATIONAL JOURNAL OF ADVANCED AND APPLIED SCIENCES

Volume: 6 Issue: 2 Pages: 33-38

DOI: 10.21833/ijaas.2019.02.006

Published: FEB 2019

Document Type: Article

Abstract

Main uses of glass windows in commercial and residential buildings are prevalent. While a glass-based material has its advantages, it also poses security risks. Therefore, glass break detectors play an important role in security protection for offices and residential buildings. Conventional vibration-based and acoustic-based glass break detectors are designed to detect predetermined temporal and frequency feature thresholds of glass breakage sound signals. This leads to the inability to differentiate glass break from environmental sounds (such as the sound of striking objects, heavy sounds and shouted sounds) that are similar in their amplitude threshold and frequency pattern. Machine learning based acoustic audio classification has been popular in security surveillance applications. Researchers are interested in this research area, and different approaches have been proposed for anomaly event detection (such as gunshots, glass breakage sounds, etc.). This paper proposes a new design of a glass break detection algorithm based on Fuzzy Deep Auto-encoder Neural Network. The algorithm reduces false alarms and improves detection accuracy. Experimental results indicate that proposed fuzzy deep auto-encoder network system attained 95.5% correct detection for the proposed audio dataset. (c) 2019 The Authors. Published by IASE.

Keywords

Author Keywords: Glass break detection; Deep auto-encoder neural network; Fuzzy rule induction algorithm

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Funding

Funding Agency	Grant Number
Ministry of Higher Education Malaysia	PRGS17-002-0042
International Islamic University Malaysia	RIGS16-350-0514

[View funding text](#)**Publisher**

INST ADVANCED SCIENCE EXTENSION, PO BOX 23-31,, TAIPEI, 00000, TAIWAN

Categories / Classification

Research Areas: Science & Technology - Other Topics

Web of Science Categories: Multidisciplinary Sciences

Document Information

Language: English

Accession Number: WOS:000457887200006

ISSN: 2313-626X

Citation Network

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Cited References

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