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Fall Detection System for Elderly based on 2D LiDAR: A Preliminary Study of Fall Incident and Activities of Daily Living (ADL) Detection

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Abstract

FDS (Fall Detection System) is a technology that is very essential for the elderly, in order to immediately get help when the fall incident happens. This paper aims to build a FDS dedicated to the elderly. We propose 2D LiDAR as the main sensor in FDS. In this case, 2D LiDAR has the duty to obtain information data in a room. FDS is demanded to be able to distinguish between fall incidents and ADL (Activities of Daily Living). This paper presents trials on various positions of the human body that can be detected as fall incidents or ADL. The trials aim to produce a dataset that will later be processed using K-NN and RF as a fall detection algorithm. From the results of the trials, 2D LiDAR sensor data can describe two information as detection points. RF produces accuracy up to 94% and K-NN produces maximum accuracy of 100%. © 2020 IEEE.

Author keywords

2D LiDAR; Elderly; Fall Detection System; K-Nearest Neighbor; Random Forest

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Fall detection; Nearest neighbor search; Optical radar

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ADVANCED SEARCH

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Design of Post-stroke Upper Limb Rehabilitation Game using Functional Electrical Stimulation for Hemiplegic Patient

Publisher: IEEE

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Steven Seaver Wiarta ; Achmad Arifin ; Siti Halimah Baki ; Fauzan Arrofiqi ; Muhammad Hilman Fatoni ; Takashi Watanabe All Authors

1 Paper Citation

103 Full Text Views

Abstract

Document Sections

I. Introduction

II. Design

III. Methods

IV. Results and Discussion

V. Conclusion

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Abstract:
Stroke is a cerebrovascular disease which could lead to physiological impairment, which affects one's ability to do activities of daily living. Several previous studies state that only small number of patients regain useful motoric abilities. This is due the fact of which patients' psychological needs are often neglected in a conventional rehabilitation. Hence, the development of rehabilitation methods which ease patient's psychological burden is necessary. The system used functional electrical stimulation with PID control, combined with repetitive game scenario. Seven normal subjects participated in this study. Average impaired hand movement error was 5.68° from target and range-of motion of 87.86% maximum flexion. Game object control accuracy reached 100%. Moreover, subjects showed improved accuracy by 37.18% at the end of the rehabilitation sessions. Impaired hand trajectory also follows control hand movement, proving the system feasibility for rehabilitation use. Future studies with real hemiplegic patient may provide further validation to the system effectiveness.

Published in: 2020 International Conference on Computer Engineering, Network, and Intelligent Multimedia (CENIM)

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ISBN Information:

INSPEC Accession Number: 20264877

DOI: 10.1109/CENIM51130.2020.9297963

Publisher: IEEE

Conference Location: Surabaya, Indonesia

I. Introduction

Stroke is a cerebrovascular disease involving blood vessels inside the brain, hence giving it ability to impair one's motoric ability if damaged. Two main causes of stroke attack are [illegible] vessel ruptures [1]. According to World Health Organization (WHO), stroke world's second large [illegible] disabilities [2]. Negative effects on stroke are multidimensional, affecting the patient's life quality, as well as their families and caregiver.

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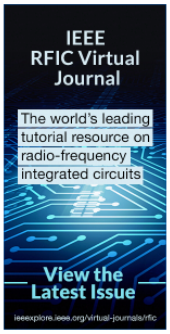

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ADVANCED SEARCH

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Indonesian Halal Food Integrity: Blockchain Platform

Publisher: IEEE

Cite This PDF

Iwan Vanany ; Nur Aini Rakhmawati ; Sukoso Sukoso ; Jan.Mei Soon All Authors

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I. Introduction

II. Research Design

III. Results

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Abstract:

Blockchain application provides potential benefits to the food industry and its supply chain. Several studies have been conducted to develop the model of blockchain application for the food industries and supply chain. However, very few studies proposed the model of blockchain application for halal food integrity. The purpose of this paper is to propose the conceptual framework and blockchain architecture, and Hyperledger fabric for Indonesian halal food integrity. Review of previous literature and interview with government authority were conducted to verify the proposed framework and blockchain architecture. Business players, including halal supervisor and Indonesian halal authority, are the two main layers which affect the Indonesian halal food integrity based on the blockchain platform.

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ISBN Information:

Publisher: IEEE

Conference Location: Surabaya, Indonesia

I. Introduction

Halal food integrity is a new issue that has emerged following food integrity. Ali and Suleiman [1] believed that religious factors also influence the importance of the integration of [illegible] health, and quality of food. This issue is closely related to the supply chain and requires [illegible] one concept from another. Managing food integrity is the responsibility of all actors in the [illegible] and comply with an assurance system [2]. Traceability, visibility, quality, and risk assessment concepts are needed to ensure the integrity of the supply chain [3]

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Anomaly-based Intrusion Detection Approach for IoT Networks Using Machine Learning

Publisher: IEEE Cite This PDF

Pascal Maniriho ; Ephrem Niyigaba ; Zephanie Bizimana ; Valens Twiringiyimana ; Leki Jovial Mahoro ; Tohari Ahmad All Authors

3 Paper Citations

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Abstract

Document Sections

I. Introduction

II. Related Works

III. Problem Definition and the Proposed Method

IV. Experimental Results and Discussion

V. Conclusion

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Keywords

Metrics

Abstract:
The proliferation of the Internet of Things (IoT) devices in smart environments such as smart cities or smart home facilitate communication between various objects. Nevertheless, this technological advancement comes with security challenges of IoT devices. Thus, current attacks targeting IoT networks have become motivating factors in implementing security mechanisms. Such attacks come in the form of intrusion or anomalies. Anomaly detection mechanisms have been implemented to prevent confidential resources from malevolent users. Therefore, this paper presents a new anomaly-based approach for IoT networks which is implemented with a hybrid feature selection engine that only selects most relevant features; and the Random Forest algorithm which classifies each traffic as normal or anomalous. The performance was evaluated using IoTID20, one of the latest anomaly detection datasets collected in the IoT Environment. The experimental results show that the proposed method achieves relatively high accuracy while detecting DoS (99.95%), MITM (99.97%), Scanning (99.96%) attacks.

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Conference Location: Surabaya, Indonesia

I. Introduction

The concept of the Internet of Things (IoT) was first introduced in 1999 by Kevin Ashton, a member of the Radio Frequency Identification (RFID) development community. Since then, it has emerged rapidly due to the technological advancement of the internet-based applications and exponential growth of smart computing devices (mobiles, computers, wearables, etc.), cloud computing, pervasive and ubiquitous communica[illegible] Things refers to the network of various types of physical devices (also called objects) su[illegible]ents, home appliances, buildings, digital cameras, industrial systems, vehicles, people, a[illegible]sensors, electronic circuits, and software including network connectivity technologies that allow these devices to be connected with each other, sense their environment, collect and exchange data from anywhere and anytime through the Internet [2] [3]. It is expected that the number of devices

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