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## Abstract Index

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Improved FMCW Radar System for Multi-Target Detection of Human Respiration Vital Sign

Jurnal Elektronika dan Telekomunikasi, December 2019, e-ISSN: 2527-9955, p-ISSN: 1411-8289, Vol. 19, No. 2, pp. 38 - 44.

Frequency Modulated Continuous Wave (FMCW) radar system has been developed and applied for various needs. Based on the conventional FMCW radar concept, a large bandwidth is needed to detect small displacements in the chest wall or abdomen related with respiratory activity. To overcome the need for large bandwidths in detecting vital respiratory signs, several improvements to the FMCW system are proposed in this paper. The phase-detection concept has been elaborated in improving the capability of FMCW to detect the small displacement. In developing multi-target detection capability, range detection capability through beat frequency output needs to be combined with the phase-detection method. Theoretical and simulation studies were performed to investigate the concept of combining range detection and phase detection for detecting respiration on multi-target. The results show that the proposed method is well-performed in detecting the multi-target respiration in high noise reflection.

Keywords: Human respiration, FMCW, small displacements, multi-target detection.

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Deep CNNBased Detection for Tea Clone Identification

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One factor affecting the quality of tea is the selection of plant material that would be planted on the field. Clonal selection is a common way to produce tea with better quality. However, as a natural cross pollination species, tea often consists of various clones or progenies of cross-pollinated process. This commonly occurs on plantations owned by smallholder farmers. To produce a consistent quality tea, the clones or progenies need to be identified. Usually, human experts distinguish the plants from leaves by visual inspection on the physical attributes of the leaves, such as the textures, the bone structures, and the colors. It is very difficult for non-experts or common farmers to do such identifications. In this, we propose a deep learning-based identification of tea clones. We apply deep convolutional neural network (CNN) to identify 3 types of tea clones of Gambung series, a series of tea clones developed at Research Institute of Tea and Cinchona. Our study indicates that the performance of the CNN systems are affected by the depth of the convolutional layers. VGGNet, a popular CNN architectures with 16 layers, achieves better accuracy compared to AlexNet, a CNN with 6 layers.

Keywords: Convolutional neural network, deep learning, gambung clone series, tea clones identification.

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Active Filter Analysis on Designing Electronic Stethoscope

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Early heart disease detection could be vital and some other diagnostic ways are being developed. In

this paper, a low-cost tool for a diagnostic that analyzes the digitized heartbeat sound is given. This can be used to detect heart anomalies. The instrument shows the heart sound and also keeps a patient's long-term record for future use. The signal from the heart provides a lot of knowledge about the heart and offers an initial diagnosis recommendation. The electronic stethoscope uses the condenser microphone, preamplifier circuit, and filter circuit. The optimum filter is Butterworth with a fourth-order Sallen key low pass filter topology with a gain of 0.707 volts, -3.01 dB, and a fourth-order high pass filter with a gain of 0.782 volts, -2.137 dB. The frequency of the heart sound is about 20 Hz – 120 Hz in general. Therefore, the lower cutoff frequency of the filter is set to 20 Hz, while the higher cutoff frequency set to 120 Hz. The evaluation used to measure the performance of an electronic stethoscope is to compare with a conventional stethoscope, the recorded sound is the same.

Keywords: Filter, amplifier, condenser mic, electronic stethoscope.

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Comparison Study of Time Synchronization in NC-OFDM Systems Based on Symmetric Correlator.

Jurnal Elektronika dan Telekomunikasi, December 2019, e-ISSN: 2527-9955, p-ISSN: 1411-8289, Vol. 19, No. 2, pp. 57 - 63.

NC-OFDM as one of the candidates for the Cognitive Radio (CR) system has many challenges in the synchronizing time. This is due to the frequency sharing which can cause Narrowband Interference (NBI), which causes a very significant time synchronization error. Large errors in time synchronization can reduce overall NC-OFDM system performance. In this study, we evaluate the time synchronization performance of NC-OFDM systems on the multipath channel in the present of NBI. We provide an evaluation of the time synchronization performance by comparing the time synchronization algorithm that has a timing metric such as an impulse-like (Symmetric correlator). Here, we present three algorithms that use the symbol training to calculate the arrival time of the NC-OFDM symbol. The simulation conducted by considering the effects of multipath channel, Signal to Noise Ratio (SNR), Carrier Frequency Offset (CFO), and SIR (Signal to

Interference Ratio). SIR is modeled with NBI. Algorithm performance is measured by MAE (Mean Absolute Error) and MSE (Mean Squared Error). Simulation results show that the autocorrelation-based method has very poor performance in MAE and MSE tests, so it is not suitable for NC-OFDM-based Cognitive Radio systems. The GLRT (Generalized Likelihood Ratio Test) method and Iterative Normalization method perform well in case the NC-OFDM Cognitive Radio systems.

Keywords: NC-OFDM, time synchronization, CR, NBI.

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Performance Evaluation of A2-A4-RSRQ and A3-RSRP Handover Algorithms in LTE Network

Jurnal Elektronika dan Telekomunikasi, December 2019, e-ISSN: 2527-9955, p-ISSN: 1411-8289, Vol. 19, No. 2, pp. 64 - 74.

In LTE Network, users can move freely in the network through fast and seamless handover (HO). This research focuses on intra-LTE handover which occurs using interface X2 to move an EU between two eNBs, i.e. source eNB and target eNB without any changes in MME and SGW at EPC level. Two popular algorithms of intra-LTE handover namely A2-A4-RSRQ and A3-RSRP were evaluated and compared through simulations as well as direct measurements in the field. Simulation is conducted using NS3 simulation tool where performances of various scenarios from both algorithms were evaluated. The performance metrics studied include the average number of HOs that occur, throughput and optimized ratio. Simulations carried out for various scenarios in term of EU numbers, user speeds, and channel conditions. In addition, the results of one-month measurement of three eNBs were also presented. The measurement results are then compared and used to verify the simulation results. Furthermore, by using the optimizing ratio metric, the optimal pair of parameter values of Threshold as well as Offset and Handover Margin (HOM) along with Time-to-Trigger (TTT) are sought for the A2-A4-RSRQ and A3-RSRP respectively.

Keywords: LTE, Intra-LTE Handover, A2-A4-RSRQ, A3-RSRP.

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Programmable Syringe Pump for Selective Micro Droplet Deposition.

Jurnal Elektronika dan Telekomunikasi, December 2019, e-ISSN: 2527-9955, p-ISSN: 1411-8289, Vol. 19, No. 2, pp. 75 - 82.

Micro/nanopatterns with micro deposition techniques have been used in various applications such as flexible electronic devices, biosensing, and biological tissue engineering. For depositing a small size of droplets that can be controlled, structured and patterned precisely is a very important process for microfabrication. In this study, we developed a low cost and simple system for fabricating micro/nanostructure by a selective micro deposition process using a syringe pump. This method is an additive fabrication method where selective droplet materials are released through a needle of the syringe pump. By translating the rotating stepper motor into a linear movement of the lead screw, it will press the plunger of the syringe and give a force to the fluid inside the syringe, hence a droplet can be injected out. The syringe pump system consists of a syringe, the mechanical unit, and the controller unit. A stepper motor, the lead screw, and the mechanical components are used for the mechanical unit. Arduino Uno microcontroller is used as the controller unit and can be programmed by the computer through GUI (Graphical User Interface). The input parameters, such as the push or pull of flow direction, flow rate, the droplet volume, and syringe size dimension can be inputted by the user as their desired value via keypad or the computer. The measurement results show that the syringe pump has characteristics: the maximum average error value of the measured volume is 2.5% and the maximum average error value of the measured flow rate is 14%. The benefits of a syringe pump for micro deposition can overcome photolithography weaknesses, which require an etching and stencil process in the manufacture of semiconductors. Combining two or more syringes into one system with different droplet materials can be used as a promising method for 3D microfabrication in the future.

Keywords: Droplets, GUI processing, micro deposition, syringe pump.

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A Simple Real-Time Energy Analytics Model for Smart Building Using Open IoT Platforms.

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Monitoring energy in buildings can ease us to have a better understanding of electricity consumption patterns to support efficiency and avoid potential damages. However, indoor installations are mostly unmonitored because their panel meters are usually difficult to access. Yet, indoor maintenance tends to be more difficult since the cables are inside the wall, ceiling, or concrete. Internet of Things and big data analytics can be used to track electricity usage either in residential, commercial, or industrial buildings. This paper presents how a simple real-time energy data analytics was built at a low cost and high accuracy to inspect energy fluctuations, anomaly, and its significant pattern. We proposed 3 layers of architecture namely acquisition, transportation, and application management. An electronic module named PZEM004T was used to sense voltage, current, and other electrical parameters. Through a microcontroller ESP8266, the data was processed and sent it to an application layer via an existing wireless network. The actual and historical data of electricity were visualized on high-resolution graphs. The experiment was conducted at our office building. The experimental results showed that data of electrical energy usage can be captured close to real-time and power anomaly and pattern can be figured. Performance and functionality testing showed acceptable use of this system with more than 99% accuracy. This system is intended to empower building managers in evaluating the electrical network balance as well as anticipating damage due to overload, overvoltage, and voltage drop. If this model is widely implemented it will produce big data that is useful for advanced analysis.

Keywords: Energy data analytics, energy management, Internet of Things, smart building.

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# Author Guidelines

Writing should be submitted according to the following restrictions:

1. Manuscript should be written in English or Bahasa Indonesia and be submitted online via journal website. Online Submission will be charged at no Cost. An author must login in order to make submission. Manuscripts content should be arranged as the following order: **Title, author(s) Name and institutions, Abstract, Introduction, Method/Design/Model Design, Results/Implementation and Discussion, Conclusion, Acknowledgment, and References.**
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    - o **An introduction** describes a brief background of the research, novelty, state of the arts, and objective(s). It should be written efficiently and supported by references. Extensive discussion of relevant literature should be included in the discussion, not in the introduction.
    - o **Method/Design/Model System** describes research chronological, including research design, research procedure (in the form of algorithms, Pseudocode or other), how to test and data acquisition. The description of the course of research should be supported references, so the explanation can be accepted scientifically.
    - o **Result/Implementation and Discussion** describes the results of research and at the same time is given the comprehensive discussion. Results can be presented in figures, graphs, tables, and others that make the reader understand easily. The discussion can be made in several sub-chapters.
    - o **A conclusion** should be written briefly in a single paragraph but reflects the experimental results obtained.
    - o **Acknowledgement** to person(s) or institution(s) who help the experiment should be stated.
    - o **References** We suggest authors to use reference management software like EndNote or Mendeley to prepare citations in **IEEE style** and have minimum 10 references with 80% reference from journal/conferences within 10 years publication.
  2. Manuscript should contain at least 2.000 words and should have **minimum 6 pages** including embedded figures and tables, without any appendix, and the file should be in Microsoft Office Word 93-2007(.doc) format. It should be prepared in A4 paper (21cm x 29.7cm) using 2.5 cm for inside margin and 2 cm for top, bottom, and outside margins.
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  9. Heading should be made in four levels. Level five cannot be accepted.
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  19. Primary references should be **at least 80% from at least ten references within 10 years.**
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