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Abstract Index

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Analysis of Catalytic Material Effect on the Photovoltaic Properties of Monolithic Dye-sensitized Solar Cells

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Dye-sensitized solar cells (DSSC) are widely developed due to their attractive appearance and simple fabrication processes. One of the challenges that arise in the DSSC fabrication involves high material cost associated with the cost of conductive substrate. DSSC with monolithic configuration was then developed on the basis of this motivation. In this contribution, titanium dioxide-based monolithic type DSSCs were fabricated on a single fluorine-doped transparent oxide coated glass using porous ZrO2as spacer. Herein, the catalytic material for the counter-electrode was varied using carbon composite and platinum in order to analyze their effect on the solar cell efficiency. Four-point probe measurement revealed that the carbon composite exhibited slightly higher conductivity with a sheet resistance of 9.8 Ω/sq and 10.9 Ω/sq for carbon and platinum, respectively. Likewise, the photoconversion efficiency of the monolithic cells with carbon counter-electrode almost doubled the efficiency of the cells with platinum counter-electrode. Our results demonstrate that carbon could outperform the performance of platinum as catalytic material in monolithic DSSC.

Keywords: carbon, counter-electrode, dye-sensitized, photovoltaic, platinum, solar cell.

Dadin Mahmudin, Shobih, Pamungkas Daud, Yusuf Nur Wijayanto (Research Center for Electronics and Telecommunication (PPET), Indonesian Institute of Sciences (LIPI))

Fabrication of Polyimide Optical Waveguide on Silicon Dioxide Layer Stacked Silicon Substrate

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Optical waveguides are important for guiding lightwave from a place to other places. Propagation and insertion losses of the optical waveguides should be considered to be in low values. Recently, optical waveguides with circular structures, which are optical fibers, are used widely for guiding lightwave in long-distance optical communication with very low propagation and insertion losses. Simultaneously, optical waveguides with planar structure are also developed for short distance communication in optical devices. We have reported design and analysis of the planar optical waveguides. In this paper, fabrication of planar optical waveguides using a polyimide material on thin silicon dioxide combined with the silicon substrate is reported. The polyimide material is used for the core of the optical waveguides. The silicon dioxide located on the silicon substrate and the air is used for cladding of the optical waveguides. Fabrication of the optical waveguides such as oxidation, photoresist coating, masking, ultra-violet exposure, and etching was done. The fabricated optical waveguides were characterized physically using a standard microscope and scanning electron microscope (SEM). The fabrication processes and characterization results are reported and discussed in detail.

Keywords: optical waveguide, polyimide, silicon dioxide, silicon.

Syahroni Hidayat, Habib Ratu P.N., Danang Tejo Kumoro (Program Studi Teknik Informatika STMIK Bumigora Mataram)

Determination of the Optimum Wavelet Basis Function for Indonesian Vowel Voice Recognition

Jurnal Elektronika dan Telekomunikasi, December 2017, e-ISSN : 2527-9955, p-ISSN : 1411-8289, Vol. 17, No. 2, pp. 42 - 47.

Nowadays, wavelet has been widely applied in extracting features of the signal for automatic speech recognition system. Wavelets have many families that are determined by their mother

function and order. The use of different wavelets to analyze the same signal would bring different results. In many cases, a trial and error procedure is used to select the optimal wavelet family. That is because there are no particular wavelet basis functions that can be applied to the entire speech signals. Therefore, it is necessary to analyze the similarity between the speech signal and the wavelet base function. One of the methods that can be used is cross-correlation. In this study, the degree of correlation is determined between wavelet base function and Indonesian vowels. The influence of gender and consistencies of the results are also used in the analysis. The results show that db45 and db44 are most similar to male and female vowels utterance, respectively. For consistencies, only vowel e gives a consistent result. Overall, db44 is most similar to all Indonesian vowels utterance.

Keywords: automatic speech recognition, cross-correlation, Indonesian vowels, wavelet, wavelet basis function determination.

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Tracking System for Indoor TV Antenna Based on CVBS Signal Processing

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Analog terrestrial TV is still a popular choice for urban societies although the migration to digital system has already begun. Video quality of analog TV was heavily influenced by antenna performance. Most users prefer to use indoor antenna due to its simplicity. The disadvantage of this type of antenna is the users may need to change the antenna direction repeatedly when they change to different TV channel. In this research, we designed and developed tracking system that enables indoor TV antenna to adjust its direction automatically to get optimum video clarity. This system is built by several servo motors and telescopic antennas. Composite Video Baseband Signal (CVBS) processing is used to obtain reference information regarding video clarity level conditions on TV screen. The results show that CVBS signal processing has performance in describing video clarity level. System performance has been verified from trial results on some UHF channels. The minimum tracking time was 23.4 seconds and the maximum tracking time was 24.6 seconds.

Keywords: antenna tracking system, analog TV, telescopic antenna, servo motor, CVBS signal.

Rio Anugrah, and Ketut Bayu Yogha Bintoro (Jurusan Teknik informatika, Universitas Trilogi)

Latin Letters Recognition Using Optical Character Recognition to Convert Printed Media Into Digital Format

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Printed media is still popular now days society. Unfortunately, such media encountered several drawbacks. For example, this type of media consumes large storage that impact in high maintenance cost. To keep printed information more efficient and long-lasting, people usually convert it into digital format. In this paper, we built Optical Character Recognition (OCR) system to enable automatic conversion the image containing the sentence in Latin characters into digital text-shaped information. This systemconsists of several interrelated stages including preprocessing, segmentation, feature extraction, classifier, model and recognition. In preprocessing, the median filter is used to clarify the image from noise and the Otsu's function is used to binarize the image. It followed by character segmentation using connected component labeling. Artificial neural network (ANN) is used for feature extraction to recognize the character. The result shows that this system enable to recognize the characters in the image whose success rate is influenced by the training of the system.

Keywords: Optical Character Recognition (OCR), segmentation, feature extraction, artificial neural network (ANN).

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The Editor of JET would like to thank the wisdom and advice of many individuals who dedicated their considerable time and expertise in safeguarding the quality and high standard of academic integrity of the journal. We are greatly indebted to the expertise, dedication, and expeditious response of the following individuals for reviewing at least one and, in some cases, many manuscripts for the journal.

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