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2	Electrodeposition of CuInSe2Thin Films for Renewable Energy Source Applications.	Ranjana Sharma,Dixit Prasher,Deepesh Bhardwaj	Basic Science & Humanities, Institute of Technology & Management, Gwalior	International Journal of Scientific & Technology Research	Feb, 2020	2277-8616
3	Neuroprotective effect of Wogonin on Rat's brain exposed to gamma irradiation	Liying Wang, Chenyu LI, Nagaraja Sreeharsha, Anurag Mishta, Vipin Shrotiya and Ajay Sharma	Basic Science & Humanities, Institute of Technology & Management, Gwalior	Journal of Photochemistry and Photobiology B: Biology	2020	1011-1344
4	Compression of the videos using hybrid method in dither based block truncation technology with improved similarity measurement algorithms	Pradeep Yadav, Rishi Gupta, Mahesh Jangid, Sandeep Chaurasia, Shubhajit Panda	CSE, ITM GWALIOR	International Journal of Advanced Science and Technology	, 2020	2005-4238
5	Modified MPPT Algorithms for Various Step Size and Switching Frequency using MATLAB/SIMULINK	Sampurna Panda, Manoj Gupta, C.S. Malvi	CSE, ITM GWALIOR	Solid State Technology	2020	0038-111X
6	Covid-19: Estimation Of The Severity And Healthcare Utilization- A Model Based Analysis	Rakesh Kumar, Abhinav Singh Bhadoria, Sampurna Panda	CSE, ITM GWALIOR	International Journal of Advanced Science and Technology	2020	2005-4238
7	EEG Based Feature Extraction & ANN	Manoj Kumar Bandil,A. K.	EC & Electrical Engineering ITM	Solid State Technology	Dec, 2020	0038-111x

|	Classifier's Neurons Selection for Epileptic Classification Using Hybrid Soft Computing (ANN & GA)	Wadhwani				

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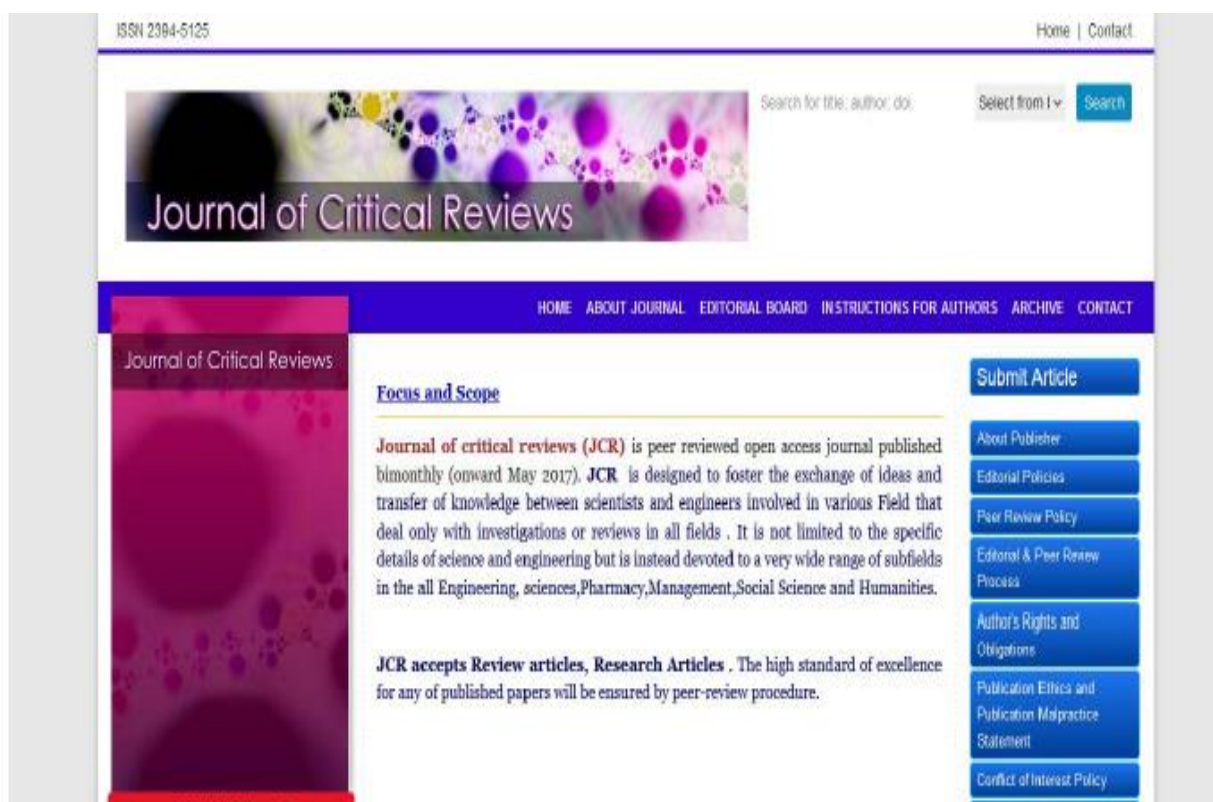
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SOLVOTHERMALLY DERIVED Cu$_2$FeSnS$_4$: A POTENTIAL CANDIDATE FOR PHOTOCATALYSIS AND PHOTOVOLTAICS

Vishal Dhiman[1], Deepesh Bhardwaj[2], Tarun Chandel[3], Ranjana Sharma[4], Anuj Dubey[5], Dixit Prasher[6]

[1,4,6]Department of Physics, Maharishi Markandeshwar (Deemed to be University), Mullana, Haryana-India-133207

[2,5]Department of Chemistry, ITM Group of Institutions, Gwalior, India-474002

[3]Department of Physics, Abhilashi University, Mandi H.P. 175033

[6]dixit.prasher@gmail.com

Abstract

The present work reveals the morphological and compositional studies of Solvothermally prepared Cu$_2$FeSnS$_4$ (CFTS) particles. A pale yellow solution was obtained by mixing suitable amount of CuCl$_2$.2H$_2$O for Copper source, FeCl$_2$.4H$_2$O for iron source, SnCl$_2$.2H$_2$O for tin source and Thiourea (SC(NH2)2 for sulfur source in 50 ml Dimethyl formamide (DMF) solvent. The compositional and morphological studies of the grown material were carried out by using Energy Dispersive X-ray Analysis (EDAX) instrument attached with Scanning electron microscope (SEM). SEM studies shows that the CFTS particles are uniformly distributed with average size of around 0.5 microns whereas the particle size of CFTS was reduced to 0.3 microns when PVP (polyvinylpyrrolidone) added in the precursor solution. It was observed that the CFTS particles are Fe poor whereas the other compositions are within in the range of stoichiometric ratio. On the other side Fe content improves when PVP was used as a capping agent. The physical appearance of material shows that the band gap of obtained material may be close to the energy value suitable for Photovoltaic devices.

Keywords: Cu$_2$FeSnS$_4$, Solvothermal synthesis, Scanning electron microscope, EDAX.

1. Introduction

Cu$_2$FeSnS$_4$ (CFTS) belongs to the category of quaternary chalcogenides and considered to be very encouraging material due to its wide applications in photocatalysis, thin film solar cells, optoelectronics etc.[1-3]. Due to its high value of absorption coefficient (10^5 cm^{-1}) and direct optical band gap ranging from 1.2 eV to 1.5 eV, CFTS can be used as a absorber material for the fabrication of thin film solar cells [4-5]. CFTS based dye synthesized solar cells (DSSC) [6] were reported with the power conversion efficiency of about 8%. It is observed that the CFTS may show good results in comparison to Cu$_2$ZnSnS$_4$ (CZTS) both in photo catalysis and in photovoltaics. Different techniques were used to prepare CFTS nanostructures e.g. ball milling [7], hydrothermal [8], Electro spinning , hot injection etc. For large scale fabrication we can use solvothermal method to obtain good quality material. The solvothermal process is a chemical reaction processed in a closed system in a solvent (non-aqueous or aqueous solution).The reaction in solvothermal is processed at higher temperature than the boiling point of the solvent. In

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Electrodeposition Of CuInSe$_2$ Thin Films For Renewable Energy Source Applications

Ranjana Sharma, Dixit Prasher, Deepesh Bhardwaj

Abstract: In the present work the thin films of CuInSe2 were grown by electrodeposition technique on highly conducting tin oxide (Fluorine doped) sprayed over glass substrate and stainless steel substrate. CuInSe2 thin films were deposited on various substrates using an aqueous bath containing Copper chloride, Indium chloride and selenium dioxide in appropriate ratio and pH of the bath was kept at 1.50 using few drops of Hydrochloric acid. To get the structural information, CuInSe2 thin films were undergo X-ray diffraction (XRD) technique. Morphological and compositional investigations were done using scanning electron microscopy (SEM) attached EDAX. The result obtained revealed that films grown are highly adhesive to respective substrates and are of good quality. SEM micrograph shows that the grown particles are shaped as a nanoflakes when grown on FTO. The surface of the flakes distributed to a length of microns range but the width of a flake has a nano range. However for CuInSe2 thin films grown on steel substrate, the morphology is drastically changed, the particles in this case are oval shaped with near stoichiometric atomic % ratio. It was found that CuInSe2 thin films grown on stainless steel were p- type where as those grown on FTO were n-type in nature.

Index Terms: CuInSe2, Thin films, Cyclic Voltammogram, SEM, XRD.

---

1 INTRODUCTION

Presently, CuInSe$_2$ is the leading material for the fabrication of solar cells due to its high value of optical absorption coefficient ($>10^5$ cm^{-1}) and band gap of around 1.0 eV. It is direct band gap material and belongs to the family of copper based chalcogenide semiconductor. In recent years some members of this family have gained considerable attention because of their potential applications, mainly in opto-electronic devices, non-linear optics and solar cells [1-7]. In particular solar cells fabricated using CuInSe$_2$ are already reported to reach efficiencies above 18% in laboratory cells [8-9]. The Electrodeposition technique has developed into a competitive process for fabricating low cost thin film photovoltaic cells. Nearly all photovoltaic materials can be electrodeposited; however, no significant effort was devoted to obtaining photovoltaic quality material until a few years ago. Electrodeposition is an easily automated and controlled process that could be expected to produce photovoltaic cells in sufficient quantity to have an impact on solar to electrical energy conversion by the end of this century. There are various factors on which the electrodeposition of the required film depends such as concentration of various chemicals in the bath, suitable deposition potential, current density, bath temperature, and pH of the solution. Electrodeposition is an easily controlled and automated process. All these parameters can be optimized easily for a single metal deposition. The different metals have different Reduction/oxidation potentials, so co-deposition of different metals is quite difficult to form various alloys. Now, it is necessary to bring the reduction potential of different metals at single deposition potential which can be possible by varying deposition parameters (10-14).

Electrodeposition is based on two/three electrodes system and a very economical method. This technique is very easy to operate, requires less wastage of material and frequently used to fabricate low cost thin films and its instrumentation is very attractive [15-17].

2 EXPERIMENTAL DETAILS

The three electrode system were used for the co-deposition of Copper ions, Indium ions and Selenium content by electrodeposition method. The saturated calomel electrode (SCE) was used to keep the potential of bath constant and named as a reference electrode, to measure the bath potential platinum electrode was used and refer as counter electrode. For the electrodeposition of CuInSe$_2$ thin films highly conducting tin oxide (Fluorine doped) sprayed over glass substrate and stainless steel substrate were used and refereed as a working electrode. The aqueous bath for CuInSe$_2$ thin films consisted of .020M CuCl$_2$,0.05M InCl$_3$ and 0.020 SeO$_2$ with 1:3:1 ratio for Cu:In:Se contents and for stainless steel ratio was 1:5:3. To get the suitable potential for the growth of CuInSe$_2$ thin films cyclic voltammogram was recorded using computer controlled potentiostat and same set up was used for the co-deposition of required ions. The Voltammetry graph shows the plateau region at around -650mV and the same potential was chosen for the deposition versus a saturated Calomel Electrode (SCE). The growth of the films were carried out at room temperature and pH of the bath was kept at 1.50 using few drops of Hydrochloric acid. After electrodeposition, the CuInSe$_2$ films were vacuum annealed at 300 °C to improve the crystallinity of the film for two hours. X-ray diffractometer was used to get the structural information of the films and model of the XRD instrument used was Bruker D8 advance. Morphological and compositional studies were done on the SEM/EDAX instrument of model Philips SEM/EDAX Model - Quanta 200 FEG.
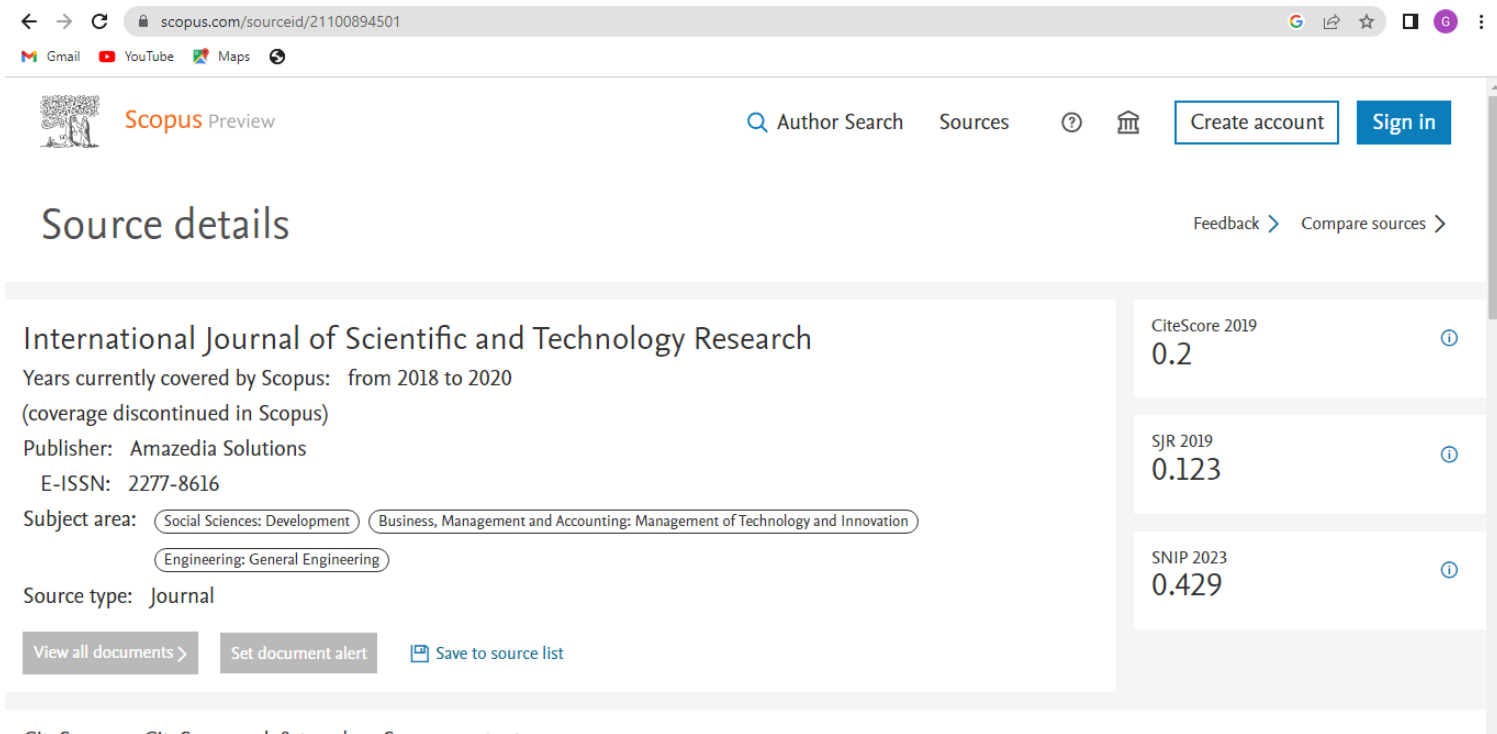
3 RESULTS & DISCUSSION

Fig 1 shows the cyclic voltammogram of the copper indium

• Ranjana Sharma is currently working as Assistant Professor in Department Of Physics, Maharishi Markandeshwar (Deemed to be University), Mullana-Ambala, Haryana, E-mail: ranjanadixit2417@gmail.com
• Dixit Prasher is currently working as Associate Professor in

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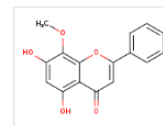
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Title of paper	Name of the author/s	Department of the teacher	Name of journal	Calendar Year of publication	ISSN number
Compression of the videos using hybrid method in dither based block truncation technology with improved similarity measurement algorithms	Pradeep Yadav, Rishi Gupta, Mahesh Jangid, Sandeep Chaurasia, Shubhajit Panda	CSE, ITM GWALIOR	International Journal of Advanced Science and Technology	, 2020	2005-4238

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Compression of the videos using hybrid method in dither based block truncation technology with improved similarity measurement algorithms

Pradeep Yadav et al.

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Abstract

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Compression of the videos using hybrid method in dither based block truncation technology with improved similarity measurement algorithms

Pradeep Yadav[1], Rishi Gupta[2], Mahesh Jangid[3], Sandeep Chaurasia[4] and Shubhajit Panda[5]

[2]Corresponding author, E-mail: genieousrishi@gmail.com

[1]Assistant Professor, Department of Computer Science and Engineering, ITM GOI, Gwalior, India

[2,3] Assistant Professor, Department of Computer Science and Engineering, Manipal University Jaipur, Rajasthan, India

[4] Associate Professor, Department of Computer Science and Engineering, Manipal University Jaipur, Rajasthan, India

[5] Research scholar, Department of Computer Science and Engineering, Manipal University Jaipur, Rajasthan, India

Abstract

The Content based image and video (Sequence of images) retrieval has been progressively more used to describe the way toward retrieving the required images or pictures and videos from a huge collection of dataset based on features that are separated from the sequence of images. Several methods has been developed in which image retrieval using different features, there are also different methods by which we can retrieve videos also. Three image features are extracted from the video key frames namely block YCbCr color feature, bit feature and hybrid(combined) feature from dither based block truncation code.

Keywords: YCbCr color feature, Hybrid(combined) feature, Video retrieval.

1. Introduction

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Modified MPPT Algorithms for Various Step Size and Switching Frequency using MATLAB/SIMULINK	Sampurna Panda, Manoj Gupta, C.S. Malvi	CSE, ITM GWALIOR	Solid State Technology	2020	0038-111X

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Modified MPPT Algorithms for Various Step Size and Switching Frequency using MATLAB/SIMULINK

Sampurna Panda, Manoj Gupta, C. S. Malvi

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Abstract

In this paper two modified MPPTs have been proposed. Modifications are done to Perturb and Observe algorithm and Incremental Conductance algorithm. These algorithms have been simulated in MATLAB/SIMULINK for fixed and variable step size and at two different switching frequencies (1 kHz, 10kHz) as well. Conventional PO and INC are compared with the modified algorithms. Their simulated results have been analyzed in many ways to find out the most efficient condition for a Maximum Power Point Tracker. The Modified INC is proved to be improved algorithm with 96.26% tracking efficiency for non-uniform insolation at 1 kHz switching frequency and 97.44% at 10 kHz respectively.

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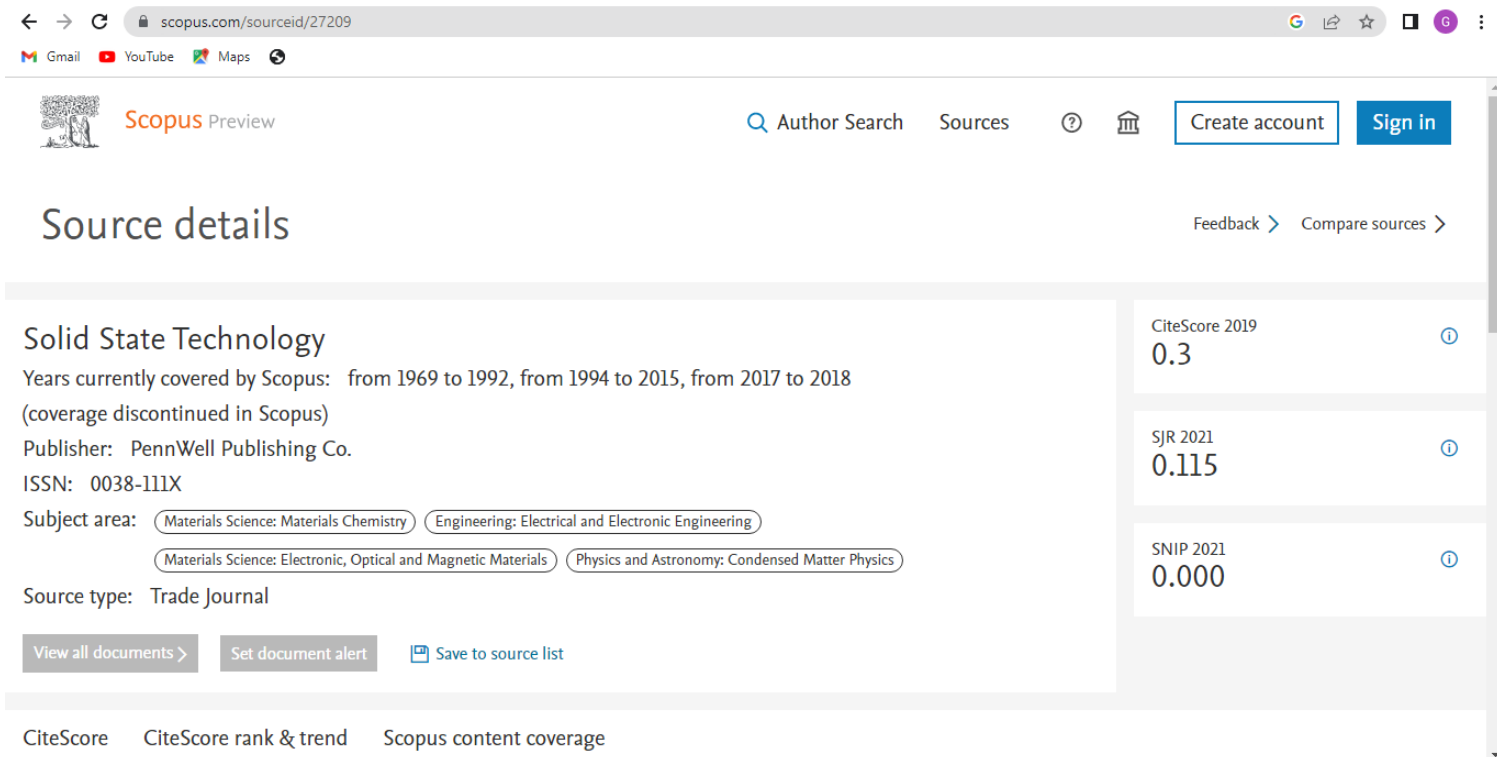### Important Links

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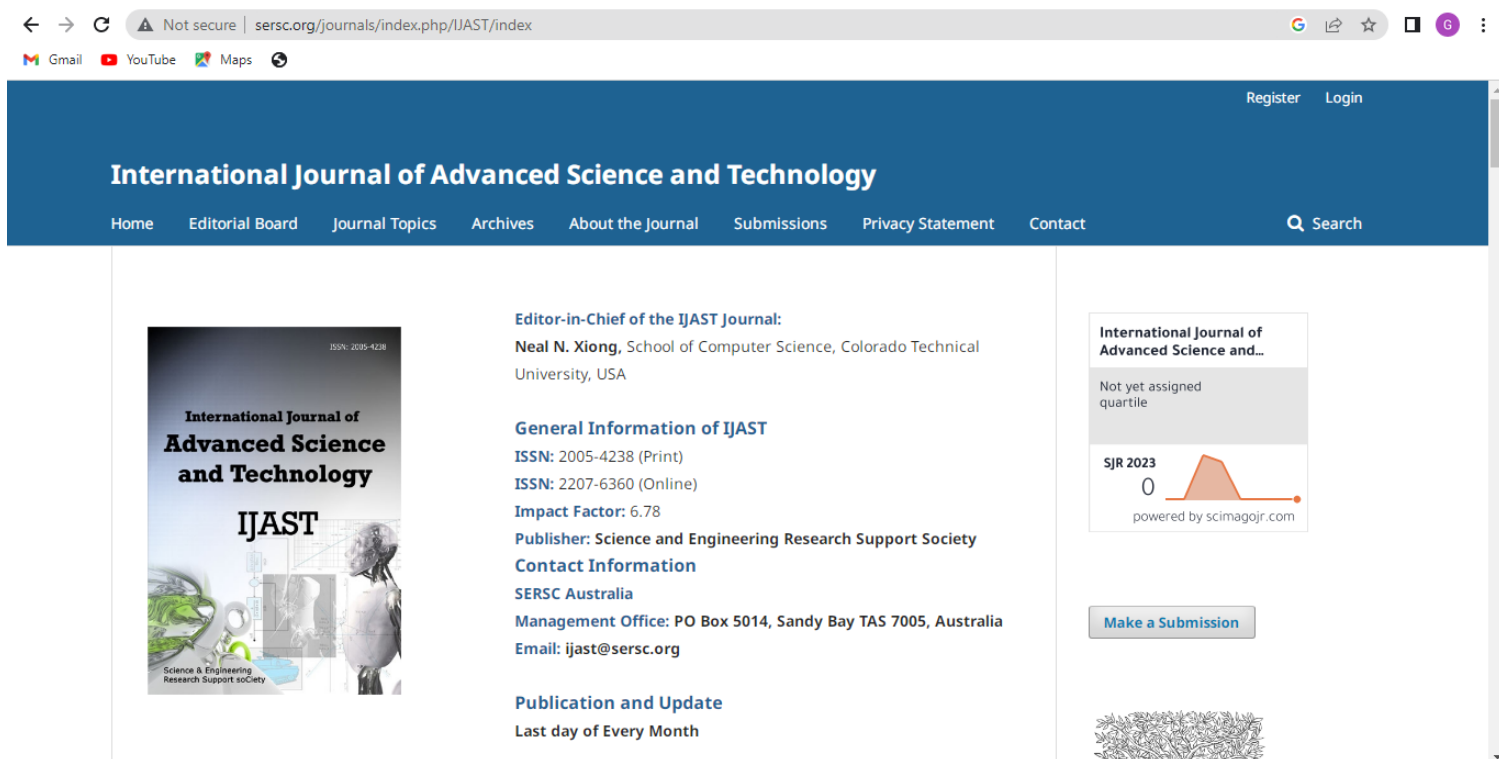CiteScore   CiteScore rank & trend   Scopus content coverage

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Covid-19: Estimation Of The Severity And Healthcare Utilization- A Model Based Analysis

Rakesh Kumar
Assistant Professor
Tutor
School Of Nursing Sciences,
ITM University, Gwalior

Abhinav Singh Bhadoria
Tutor
School Of Nursing Sciences
ITM University, Gwalior

Sampurna Panda
Assistant Professor
Department of EEE
ITM GOI, Gwalior

Abstract

Overview: In the face of rapidly changing data, a scope of case casualty proportion estimates for coronavirus illness 2019 (COVID-19) or Nobel coronavirus have been delivered that vary generously in extent. We meant to give strong estimates, representing controlling and ascertainment inclinations. The current study planned to look at the risk factors for death due to Covid-19 and its impact on people and Healthcare utilization for Covid-19.
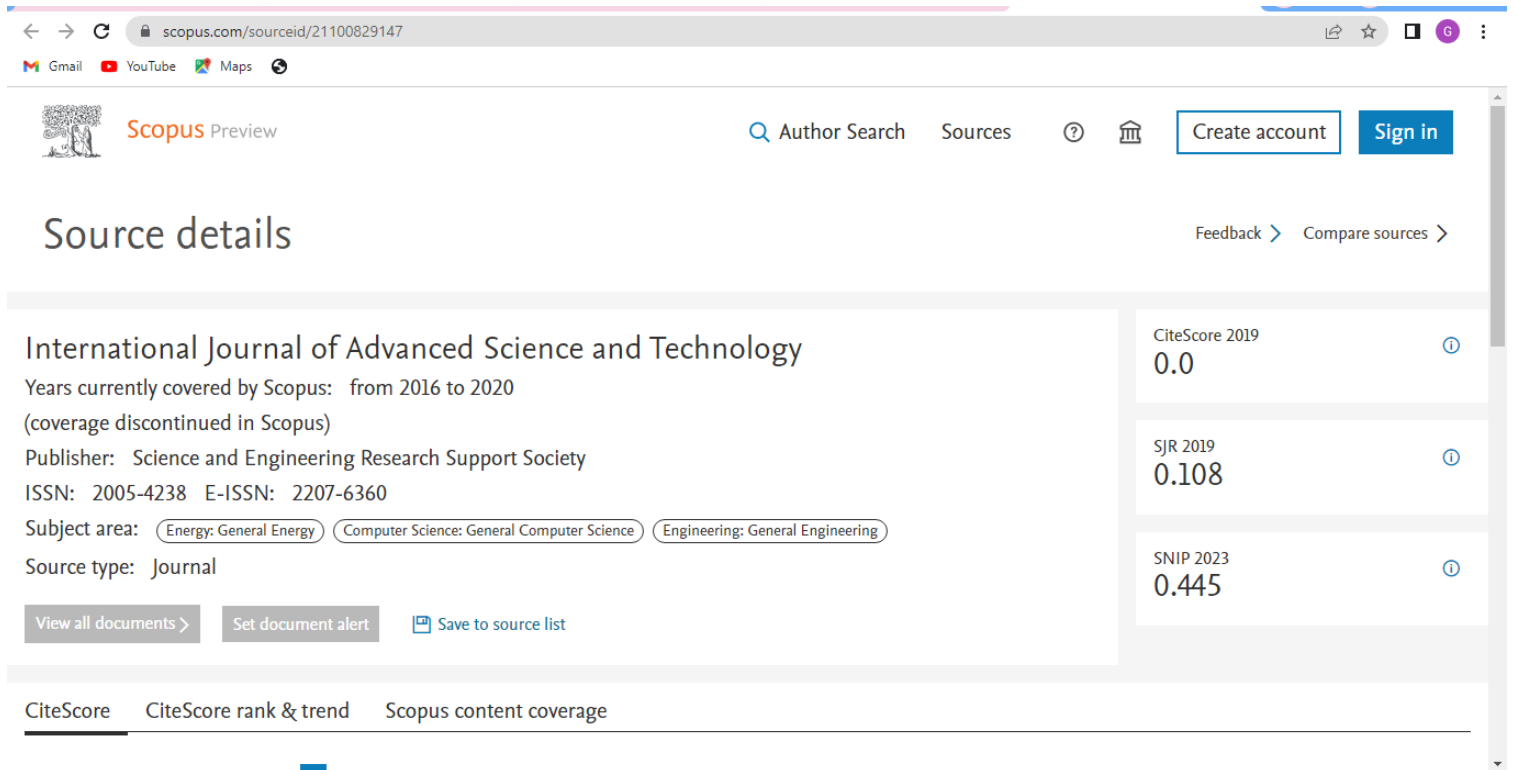
Method: We collected individual-case information for patients who who died from COVID-19 in Mainland, and for cases outside of Mainland from government or ministry of health websites and media reports for 37 countries.

These individual-case information were used to estimate the time between start of symptoms and result (death or discharge from emergency clinic). We next gained age-defined estimates of the case casualty extent by relating the all out scattering of cases to the watched all out deaths in Mainland, expecting a consistent ambush rate by age and changing for demography and age-based and region based under-ascertainment. We moreover estimated the case casualty extent from singular line-list information on 1334 cases perceived outside of Mainland. Using information on the inescapability of PCR-asserted cases in worldwide inhabitants repatriated from Mainland, we procured age-defined estimates of the sickness casualty extent. In addition, information on age-delineated reality in a subset of 3665 cases from Mainland were used to estimate the

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EEG Based Feature Extraction & ANN Classifier's Neurons Selection for Epileptic Classification Using Hybrid Soft Computing (ANN & GA)	Manoj Kumar Bandil,A. K. Wadhwani	EC & Electrical Engineering ITM	Solid State Technology	Dec, 2020	0038-111x

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EEG Based Feature Extraction & ANN Classifier's Neurons Selection for Epileptic Classification Using Hybrid Soft Computing (ANN & GA)

Manoj Kumar Bandil, Dr. A. K. Wadhwani

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Abstract

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e-mail: manojbandil@gmail.com
Dr. A. K. Wadhwani, Professor - Department of Electrical Engineering, Madhav Institute of Technology & Science, Gwalior– 474001, Madhya Pradesh, India, e-mail: wadhwani_arun@rediffmail.com
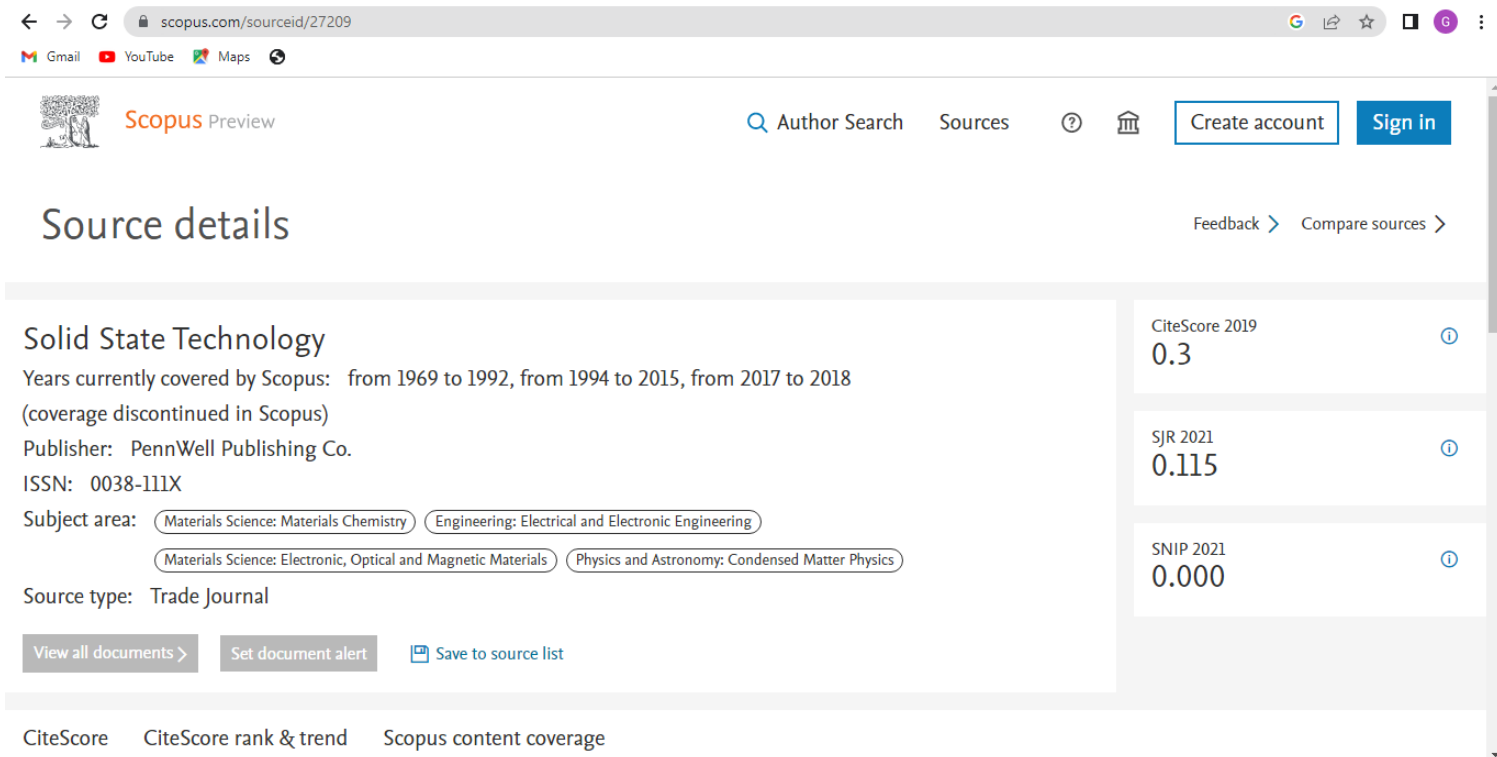
Abstract—Nervous system cells including neurons and neurons or nerve cells transmit information and non-neuronal cells from the brain. They organize themselves into complex network that performs nervous system functions.. Execute half breed processing strategy utilizing Genetic Algorithms (GA) and Artificial Neural Networks (ANN) for determination of features and no of neurons in the shrouded layers of ANN classifier to improve classification exactness for epileptic cases. Looking at epileptic classifications results for single concealed layer and twofold shrouded layer ANN classifier after determination of features and no of neurons in the concealed layer by utilizing half and half calculation presumed that twofold concealed layer ANN classifier shows improved precision in arranging EEG signals.The main purpose of our research is to use signal processing tools to analyze the obtained EEG signals, such as wavelet transforms, and classify them into different classes. The features of the EEG were extracted using wavelet transform and autoregressive models. After feature extrusion, the secondary goal is to improve the accuracy of the classification. To achieve this, we applied a neural network classifier based on reverse propulsion. Characteristic infarctions and classifications from 100 subjects in each group were analyzed and the data was divided into training, testing and verification of the proposed algorithm.

Index Terms—Epilepsy, Discrete wavelet transform (DWT), Electroencephalogram (EEG), Genetic Algorithm (GA) and Artificial Neural Networks (ANN).

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