ENHANCED SALP SWARM ALGORITHM BASED ON CONVOLUTIONAL NEURAL NETWORK OPTIMIZATION FOR AUTOMATIC EPILEPSY DETECTION

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ABSTRACT

Epilepsy is a neurological disorder that occurs due to abnormal activity in the brain. Symptoms can vary, such as uncontrolled movements, muscle stiffness, difficulty breathing, loss of consciousness, and even death. Therefore, the multichannel electroencephalogram (EEG) is very important to understand the pattern of seizure occurrence and non-seizure in epilepsy. In this paper, we determine an automatic epilepsy detection method using enhanced Salp Swarm Algorithm (SSA) CNN-based of EEG signals. The signal is transformed into Low Pass Filter (LPF) and High Pass Filter (HPF) with one level, frequencies, and scales using Wavelet Transform. Enhanced SSA was used to determine the number of neurons and the appropriate number of convolution layers in the CNN algorithm for classifying two classes (epilepsy and epilepsy with seizure) using the CHB-MIT dataset from Children's Hospital Boston. The results of the study show that the proposed method produces the highest accuracy of 99.15% and 89.04% of average accuracy. This result is obtained with a computation time on testing data of 0.0001 seconds using a high-end computer. Enhanced SSA was proven to increase the performance of CNN of 81.13%. The proposed method can be used in the automatic detection of epilepsy.

Keywords: *Epilepsy, CHB-MIT, Wavelet Transform, Convolutional Neural Network, Salp Swarm Algorithm*

1. INTRODUCTION

Epilepsy is a kind of neurological disorder that may manifest at any age and causes dead. This neurological illness is caused by the discharge of excessive electrical charges on brain neurons, which leads to aberrant brain activity. The symptoms may include jerky limb movements, muscular stiffness, trouble breathing, and even transient loss of consciousness. According to statistics from the Epilepsy Foundation, there are now 65 million persons with epilepsy in the world. Epilepsy affects as many as 3.4 million Americans, a number that continues to rise by 150.000 every year[1]. WHO (World Health Organization) statistics indicate that 80% of epileptics live in low and middle income countries[2]. Unquestionably, epilepsy is more prevalent in poor nations than in industrialized nations. There is currently no particular medication or treatment for epilepsy. The medicine administered to the patient is not intended to treat epilepsy, but rather to control its symptoms. Therefore, it is vital to have an appliance for early detection of epilepsy so that persons with epilepsy may be treated

promptly and effectively to prevent potentially deadly circumstances.

The electroencephalogram (EEG) is a test used to diagnose epilepsy in individuals. EEG is performed by connecting electrodes to the patient's scalp and recording electrical activity by constantly monitoring the voltage in the neurons of the brain over a while. The output of the Electroencephalogram (EEG) is a paper printout of a graphic picture, which is subsequently inspected and evaluated to diagnose epilepsy. Nonetheless, the analytical procedure demands a great deal of time and resources. The findings of the manually performed epilepsy analysis were susceptible to human error. Therefore, We want an automated detector that can assist patients in properly diagnosing epilepsy. Based on a study by Shoeibi et al. comparing different Deep Learning approaches, it has been shown that deep learning techniques are capable of processing more complicated data and have great performance, hence reducing the time required for epilepsy analysis[3]. Several further types of study have used automated detection, Using Empirical Mode Decomposition (EMD) for feature extraction and Deep Neural Network for classification producing an accuracy value of 98.60%[4]. Signh has created an epilepsy detection tool that uses machine learning and the cloud. The EEG data is transferred straight to the cloud over a 4G or wifi network, where it is analyzed using Fast Walsh Hadamard transformation and higher-order spectra (HOS) for feature extraction. Using the random forest algorithm, the three-class classification process (normal, interictal, and ictal) obtained an accuracy of 99.40%, sensitivity of 99.40%, and specificity of 99.66%[5].

This article presents a technique for classifying EEG epileptic diseases based on the Salp Swarm Algorithm (SSA) for optimizing hyperparameter through Convolutional Neural Network. Salp Swarm Algorithm is a metaheuristic scheduling method devised by Mirjalili that was inspired by the salp life mechanism in nature. Salp resembles jellyfish in that it is translucent and lives in colonies (Swarm). Moving toward a food source, salp develops a chain. It is known that the SSA method may generate superior hyperparameters than other algorithms such as DE and PSO[6]. In this work, the hyperparameters of CNN were optimized using the SSA technique. On the Bon dataset, a 13-layer Deep Convolutional Neural Network (CNN) is used to categorize EEG signals into three classes: normal, preictal, and seizure. The accuracy, specificity, and sensitivity of the final results were 88.67%, 90.00%, and 95.00%

respectively[7]. Using manual feature extraction and a convolutional neural network to explore three classifications. Manually comparing the frequency and time domains to extract features. Without optimization, the detection accuracy of epilepsy is 62.30%[8]. The research of class 2 epilepsy detection without CNN optimization had an accuracy of 85.60%[9]. The detection research of two classes using DWT for feature extraction and ANN without optimization yielded a 93.00% accuracy[10]. In this work, it is anticipated that the optimization of SSA for epileptic EEG classification using CNN can maximize the accuracy value.

The CHB-MIT dataset's electroencephalogram (EEG) signals are separated into two classes: normal and ictal. The algorithm used by the feature extraction approach is Discrete Wavelet Transform. The accuracy value produced by the epilepsy EEG categorization algorithm will be assessed. This paper's preparation consists of three chapters: chapter 2 describes the materials and techniques, chapter 3 describes the findings and discussion, and chapter 4 describes the conclusions. Salp Swarm Algorithm is a metaheuristic scheduling method devised by Mirjalili that was inspired by the salp life mechanism in nature. Salp resembles jellyfish in that it is translucent and lives in colonies (Swarm). Moving toward a food source, salp develops a chain. It is known that the SSA method may generate superior hyperparameters than other algorithms such as DE and PSO[6]. In this work, the hyperparameters of CNN were optimized using the SSA technique. On the Bon dataset, a 13-layer Deep Convolutional Neural Network (CNN) is used to categorize EEG signals into three classes: normal, preictal, and seizure. The accuracy, specificity, and sensitivity of the final results were 88.67%, 90.00%, and 95.00% respectively[7]. In the literature on classification of detection using CNN, no one applies optimization to provide a low accuracy value. Through CNN, the Salp Swarm Algorithm will be used in this study to discover the optimal hyperparameter for epilepsy detection. The number of neurons in each CNN layer filter serves as the hyperparameter that will be adjusted. As a result, the SSA optimization strategy can improve the accuracy of CNN's ability to detect epilepsy.

The CHB-MIT dataset's electroencephalogram (EEG) signals are separated into two classes: normal and ictal. The algorithm used by the feature extraction approach is Discrete Wavelet Transform. The accuracy value produced by the epilepsy EEG classification algorithm will be assessed. This paper's preparation consists of three chapters:

chapter 2 describes the materials and techniques, chapter 3 describes the findings and discussion, and chapter 4 describes the conclusions

2. MATERIALS AND METHOD

2.1 Materials

The system built consists of hardware, software, and CHB-MIT dataset. The hardware used is on high-end computer and low-end computer with windows operating system. High-end computer with the specifications used in this study having a 3.60GHz Intel (R) Core (TM) i9-9900K computer with 32GB RAM, NVIDIA GeForce GTX 1080 Ti GPU. Low-end computer has specifications a 1.60GHz Intel (R) Core (TM) i5-8265U computer with 8GB RAM, NVIDIA GeForce MX250.

2.1.1 Dataset CHB-MIT Scalp EEG

Children's Hospital Boston gathered data for the CHB-MIT Scalp EEG dataset. This file comprises of 22 pediatric participants with a diagnosis of severe seizures who were examined for many days after the cessation of medication delivery in order to classify the kind of seizure experienced. There are 22 participants in this data collection, including 5 men aged 3 to 22 years and 17 girls aged 1.5 to 19 years. Each file contains information on the age and gender of each subject. Each case (chb01, chb02, etc.) comprises of 9 to 42 continuous .edf files for each topic. The average time required to acquire records was 36 hours. In certain instances, the .edf file includes precisely 1 hour of digital EEG signal for chb04, chb06, chb07, chb09, and chb23, and 2 hours for chb10. The CHB-MIT dataset utilizes 18 seizure channels (FP1-F3, F3-C3, C3-P3, P3-O1, FP2-F4, F4-C4, C4-P4, P4-O2, FP1-F7, F7 -T7, T7-P7, P7-O1, FP2-F8, F8-T8, T8-P8, P8-O2, FZ-CZ, CZ-PZ), whereas the The international standard of 10-20 electrode locations and naming is applied in this record[11]. Figure 2 displays recordings of the patient's normal and aberrant brain activity. Figure 1a shows the outcome of a typical recording made at 1:43 p.m. while the patient slept. Figure 1b depicts anomalous recording findings that were obtained 50 minutes later. Figure 2 demonstrates that it is difficult to determine with certainty the amplitude of the patient's brain activity. Each folder pulls information about time, frequency, and channel data. During the feature extraction phase, the data will be used for the signal cropping procedure.

(a) Normal

(b) Seizure

Figure 2. The visualization of EEG signal: (a) Normal, (b) Seizure
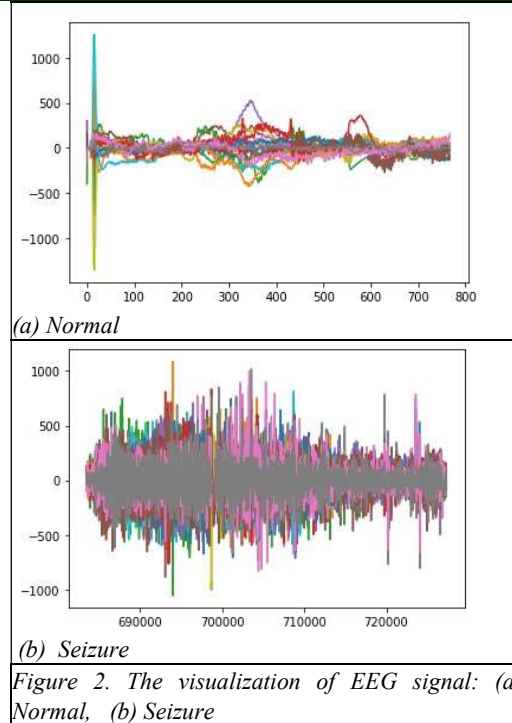
2.2 Proposed Method

2.2.1 Discete Wavelet Transform

Discrete Wavelet Transform (DWT) is a transformation function that separates a signal into its constituent parts. The resolution of each signal component corresponds to its appropriate scale[11]. In Figure 3, the EEG signal data is cropped in search of seizure-related data. The data is processed by severing the signal for three seconds, and each signal fragment is tagged. Figure 3 depicts the input of preprocessed EEG signal data during the early phase of signal decomposition. Low Pass Filter (LPF) and High Pass Filter (HPF) with one level, frequencies, and scales will be used to assess the signal decomposition procedure[12]. The signal that is processed through the LPF will generate an approximation coefficient (cA) that is a close approximation of the signal that will be decomposed at the subsequent level. While the HPF will create a detail coefficient (cD) of the EEG signal at its output. This research will use Discrete Wavelet Transform with Biorthogonal 3.1 level 1 for decomposition by equation (1)

$$WTx(j,k) = \int x(t)\hat{\psi}_{j,k}(t)dt \qquad (1)$$

Where WTx is the feature generated in the feature extraction process, $x(t)$ is the preprocessed EEG signal data, j is the frequency in integers, k is the

time in integers and $\psi(t)$ is the discrete wavelet basis function described by the equation (2). Where is a basic wavelet function such as Haar, Daibechies, Couiflet, Biorthogonal.

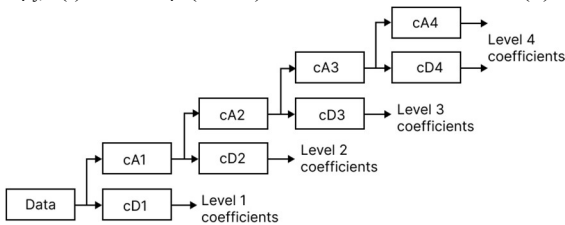$$\hat{\psi}_{j,k}(t) = 2^{-j/2}\hat{\psi}(2^{-j}t-k) \qquad (2)$$

Figure 1. Visualization of DWT Level 4

2.2.2 Convolutional Neural Network 1D

Convolutional Neural Network 1D is the evolution of Multi-Layer Perceptron (MLP) with a deep learning algorithm capable of converting text processing data such as signal vectors[13]. The input data is a vector derived from the process of feature extraction, which will be processed by many hidden layers. Each hidden layer contains neurons, where neurons across adjacent layers have weight and bias values that will be applied to the input data as linear operations. The last layer in a series of linked layers is also known as the output layer or the categorization result of the input data.

In this work, the CNN design consists of an input layer, three convolution layers, a pooling layer, a fully connected layer, and an output layer[14]. The quantity of input data determines the number of neurons in the input layer. While 1 to 2048 initial initiating neurons are used in each convolution layer. Using the Salp Swarm Algorithm (SSA), the number of neurons and the number of convolution layers will be optimized with each iteration. In the convolution layer, a dot multiplication is performed between the vectorized input data and the kernel, which acts as a data filter to generate a feature map. Convolutional data are downsampled at the pooling layer level. The pooling layer has a size and stride 1 filter that will move over the whole feature map. The final output of the convolution will be flattened and joined in a completely linked layer. The most accurate model will be created alongside the best model.

2.2.3 Salp Swarm Algorithm

Salp Swarm Algorithm (SSA) is a metaheuristic scheduling algorithm devised by Mirjalili that is inspired by the mechanism of salp life in the ocean[6]. Salp has a translucent, jelly-like appearance and lives in swarms known as the Salp Chain. Researchers think that the distinctive behavior of swarming Salps is their means of moving and coordinating swiftly in search of food sources[15]. The SSA algorithm's mathematical optimization function was evaluated to determine the optimum solution to the optimization issue. According to the outcomes of these experiments, the SSA optimization method was able to optimally increase the original random and convergent solutions[16]. It is known that the SSA technique may generate better features than other algorithms, such as Dolphin Echolocation (DE) and Particle Swarm Optimization (PSO).
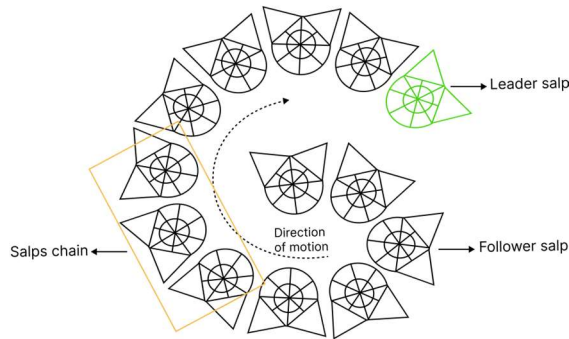

Figure 2. Visualization of Salp Swarm Algorithm

Figure 4 illustrates a Salp chain with a leader and a follower. The leading salp is known as the salp leader (green), while the other salp is known as the salp follower. The foraging position of Salp is specified in n-dimensional terms, where n is the number of identified issue variables. All salp locations are kept in a 2-dimensional matrix named m. In the livelihood space, x is supposed to be the food supply for the herd objective. In equation (3), the location of the Salp leader in the SSA algorithm may be modified.

$$S_j^i = \begin{cases} X_j + c_1\left(\left(ub_j - lb_j\right)c_2 + lb_j\right) & c_3 \geq 0 \\ X_j - c_1\left(\left(ub_j - lb_j\right)c_2 + lb_j\right) & c_3 \geq 0 \end{cases} \qquad (3)$$

Where Mij is the initial location of Salp in the j dimension, Xj is the initial position of the food supply in the j dimension, ubj is the upper limit in the j dimension, and lbj is the lower limit in the j dimension. The variables c1, c2, and c3 are random number generators. The coefficient c1 is an essential parameter for balancing search and usage in the SSA algorithm, as described in equation (4)

$$C_1 = 2e^{-\left(\frac{4I}{L}\right)} \qquad (4)$$

Where l, L represent the current process iteration and the maximum number of iterations, respectively. The parameters c2 and c3s are created uniformly in the interval [0,1]. To find the next dimension location, j must move in either the direction of positive or negative infinity. It may be utilized in Newton's laws of motion to determine the location of the follower. Sij is the location of the Salp follower in dimension j if I is greater than or equal to 2, t is time, V0 is the starting velocity, and an is the acceleration according to the equation (5)

$$a = \frac{v_{final}}{v_0} \text{ where } v = \frac{x - x_0}{t} \qquad (5)$$

Due to the fact that the optimization time is a process iteration, the iteration difference with variable l is the same and V0 = 0 is assumed. The salp position equation may be represented as equation (6)

$$S_j^i = \frac{1}{2}\left(S_j^i + S_j^{i-1}\right) \qquad (6)$$

Where I >= 2 and Sij is the salvage follower's location on dimension j. In this research, SSA optimization will be used to estimate the optimal number of filters and neurons for CNN1D classification in order to get the highest accuracy. The most optimal number of hyperparameters will be determined by comparing accuracy outcomes from each iteration. The flow of the SSA optimization process via CNN can be seen in the following steps:

1. Fetch feature data from feature extraction process, set as hyperparameter on neural network
2. Initiation of the initial amount of salp where Si with i=(1,2,3,4,….,n) and the limit value of ub,lb is between 1-2048
3. When the optimum criteria conditions have not been met, the fitness value will be obtained to update the position of the leader of the salp by equation (3). Update the value of c1 by equation (4)
4. Update the position of the salp in the population:
   a. If the salp position = 1 then update the salp leader position by equation (3)
   b. If the salp position > 1 then the salp leader position is updated by equation
   c. Salp population will be updated according to the upper limit(ub) and lower limit(lb).
5. Update hyperparameter values
6. Updated salp optimization according to process (3)(4). Returns the iteration weight and threshold value for the next iteration
7. Entering the weight and threshold values from the process (6) and then repeating the hyperparameter optimization process until the

iteration ends.
8. The final salp position will be used as the initial value of the model prediction on the training data
9. Perform the data test process and generate accuracy values.

Experimental Setup

The suggested approach of identifying epilepsy utilizing EEG data with two classifications, namely class 0 (normal) and class 1 (seizure), was validated using three experimental scenario. In the first scenario, epilepsy accuracy was compared using wavelet transformation Biorthogonal level 1 and cross-validation-based EEG signal classification. The second scenario compares the performance of classifying epileptic EEG signals using the Convolutional Neural Network 1D approach to other benchmarks. The third scenario involves the optimization of the Salp Swarm Algorithm for the computation time of EEG signal categorization.

There are more non-seizure data in the CHB-MIT dataset than seizure data. Consequently, k-fold cross validation is used in an effort to improve the degree of model performance in order to get the highest level of accuracy. The 10-fold cross-validation will balance the dataset by dividing the data into 10 partitions with a balanced class composition. 90% of the testing data in each partition will be iterated, while the remaining 10% will be utilized as training data to acquire accurate findings for epilepsy. Several libraries, including Numpy, PyWavelets, and Tensorflow, Keras are used in scenario testing .

3. RESULTS AND DISCUSSION

The developed and proposed system will be evaluated. The experiment was undertaken to evaluate the system's performance in a specified test environment. CHB-MIT dataset data were utilized for the experiment.

3.1. First Scenario Classification 2 Classes

In scenario 1, the accuracy of two kinds of EEG signals, namely seizure and non-seizure signals from the CHB-MIT dataset, is determined. Each seizure file pulls the time, frequency, and channel from the summary.txt file. The data was trimmed for 3 seconds using stride 1 and labeled with seizure and non-seizure categories. The cropping results will be retrieved using a bior 3.1 level 1 wavelet transformation. Convolutional Neural Network will be used to train the collected features to produce the

optimal model for each n iteration. SSA will optimize the hyperparameter for each convolution to discover the optimal hyperparameter. Final findings include seizure accuracy, all accuracy (seizure and non-seizure accuracy), and average accuracy (average between seizure accuracy and all accuracy).

An experiment was previously conducted on the CHB-MIT dataset diagnosing epilepsy using CNN without without using optimization. The all accuracy was 99.07% and the average accuracy was 81.13%. The results acquired from all accuracy without using SSA optimization are comparable to the results obtained from all accuracy utilizing SSA optimization, which are 99.15% and 89.04%, respectively. We used hyperparameter optimization to identify the most optimal neurons during CNN convolution, which led to an increase in the detection of seizures with SSA optimization.

In Table 1, an experiment was conducted in which the starting number of iterations was 4 and the quantity of salp was 3, yielding an average accuracy of 81.50%. The following experiment yielded an average accuracy of 86.31% with 10 iterations and 7 salp. The average accuracy increases by 3.54% age points when the number of iterations and salp are increased.

3.2 Second Scenario Comparison With Existing Methods

In scenario 2, compare the suggested approach to its predecessor using the same dataset. The comparison's findings are shown in Table 2. Similar experiments have been done to categorize epilepsy EEG signals utilizing different signal decompositions using CNN as a classification engine, as shown in table 2 in section 3.2. It is clear that the strategy suggested in this study, which used SSA optimization, produced a bigger rise in the accuracy value than the method used in earlier studies. The addition of the SSA optimization method allows for the discovery of the optimal hyperparameter for a model's training on the CNN layer. To assess the model, SSA will change the hyperparameter or the number of neurons on each CNN filter.The accuracy of the suggested technique using SSA was 99.15%, which was greater than the accuracy of the case studies done by Park et al. and Zhou et al., which were 62.30% and 85.60% respectively. The approach for decomposing the signal used DWT bior 3.1 Level 1 and CNN for identifying two classes. Chen et al., Sallam et al., and Xiang et al. performed research with more precision

than our studies. However, it employs a distinct approach of feature extraction and classifier.

3.3 Third Scenario Computational Processing Time

In scenario 3, computational time testing is performed on signal decomposition, feature extraction, data training, and data testing for the proposed technique. On both low-end and high-end machines, tests were conducted. Table 3 compares the amount of time required to calculate on low-end and high-end machines in getting the optimum accuracy of 99.15%. This demonstrates that the suggested technique may be utilized to create an automated system for detecting epilepsy in clinical practice.

4. CONCLUSION

In this article, we introduce and analyze the application of wavelet transform for feature extraction and the Salp Swarm Algorithm for hyperparameter optimization on CNN1D for identifying EEG Epilepsy data. The suggested strategy for categorizing the CHB-MIT dataset into two groups achieved an overall accuracy of 99.15% (seizure and non-seizure accuracy) and an average accuracy of 89.04%. The presence of SSA in the epilepsy classification process may enhance the performance of deep learning in the model learning process and raise the value of accuracy. Our suggested technique requires 0.0001 seconds to test the data necessary for classifying epilepsy. We feel our technology is very applicable to the automated identification of epileptic convulsions.

4.1 Acknowledgment

4.2 Limitation of the study

There are some limitations that need to be limited for future research. First, the CHB-MIT dataset is the only one to which the suggested method is used to identify epilepsy. The outcomes are not always appropriate for use in studies utilizing datasets other than CHB-MIT. Second, the accuracy of using computers to identify epilepsy can vary depending

on the computer specifications utilized, such as those for high-end and low-end computers as indicated in Table 3.

4.3 Conflicts of interest

The authors declare no conflicts of interest.

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Table 1. Classification Experiment Results with SSA

Number of Iteration (n)	Number of SSA	Accuracy (%)		
		Seizure	All	Average
4	3	0.6388	0.9912	0.8150
10	7	0.7350	0.9912	0.8631
20	10	0.7803	0.9915	0.8859
10	**10**	**0.7894**	**0.9915**	**0.8904**

Table 2. Some previous related studies in EEG signals classification.

Reference	Dataset	Signal Decomposition	Feature	Classifier	Accuracy (%)
[9]	CHB-MIT (normal, interictal, ictal)	Manual feature extraction (compare the frequency and time domains)	-	CNN	62.30%
[17]	CHB-MIT 2 kelas (normal dan ictal)	low-pass filter with cut-off frequency 30 Hz to the signal	-	CNN	85.60%
[18]	CHB-MIT 2 kelas (normal dan ictal)	DWT	-	ANN	93.00%
[19]	CHB-MIT 2 kelas (normal dan ictal)	The Stockwell Transform and DWT	PCA	SVM+Fuzzy	94.00%
[20]	CHB-MIT 2 kelas (normal dan ictal)	-	-	SVM+Fuzzy entropy	98.31%
Proposed Method	**CHB-MIT 2 kelas (normal dan ictal)**	**DWT bior 3.1 level 1**	**-**	**CNN+SSA**	**99.15%**

Table 3. The computational time needed by the proposed method

	Low end computer	High end computer
Signal decomposition	0.003 s	0.002 s
Feature Extraction	0.03 s	0.0218 s
Training Process	1766.607 s	1166.669 s
Testing Process	0.001 s	0.0001 s

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Title:	WAVELET TRANSFORM AND NEURAL NETWORK MODEL FOR STREAMFLOW FORECASTING
Author:	SALIMEH MALEKPOURHEYDARI, TEH NORANIS MOHD ARIS, RAZALI YAKOOB, HAZLINA HAMDAN
Abstract:	Analysis and fast streamflow forecasting are essential. Reliable predicting for river flow, as per the major source of usable water, which can be a crucial factor in the drought analysis and construction of water-related infrastructures. Data-driven and hybrid methods are increasingly being used to address the nonlinear and variable components of hydraulic processes. In this paper, a streamflow forecasting model is built utilizing Neural Network (NN) and Wavelet Transform (WT) at Western Australia for Ellen Brook River with the application of Railway Parade station. Initially, the sequences of signals are applying to the wavelet to be evaluated at several levels and extract a sequence of different features from the chosen output in the wavelet. Then, the obtained output is presented to the neural network for tuning to get the best intermittent streamflow forecasting. The existing input and structures are designed for streamflow forecasting. The proposed model has a better performance compared to the previous models. The proposed model is beneficial for application of forecasts to examine the relation between the characteristics of river flow, optimal decomposition degree, data duration, and the precise wavelet transform form.
Keywords:	Neural Network (NN), Streamflow forecasting, Wavelet Transform (WT).
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Full Text

Title:	BIOINFORMATICS-BASED APPLICATION FOR REDUCING THE RISK OF THE COVID-19 USING FINGERPRINT AND FACE RECOGNITION
Author:	FARHAN ALEBEISAT
Abstract:	In recent years, the use of Global Positioning System (GPS) smart device applications has become increasingly popular, which has emerged significantly during the spread of COVID-19 by reducing interaction and direct contact between humans. Such as tracking students, staff, and vehicles, monitoring soldiers and finding the exact location and distance, among the many software and applications for smart devices. The development of a new technology for a tracking system to monitor students who are training in universities is the goal of this proposal. Users' profiles will be activated by this system when logging in to the system from the site through fingerprint, eye, face recognition, or the traditional way through username and password. Here, the fingerprint is activated and recognized using the device of the fingerprint installed in most of the smart mobiles. Moreover, face recognition is also developed to activate the user. Before activation, the system must confirm the following information: International Mobile Device ID Card ID and Student Subscriber ID Card ID, and this verification will work by translating that information and ID to the server. When students' status becomes active, they can access and use the system to download and upload documents and communicate with their partner and supervisor. This proposed project also reduces the spread of COVID-19 by reducing interaction and direct contact between supervisors and their students, Machine learning and IoT is used.
Keywords:	Smartphones, Global Positioning System, Location, Student, COVID-19
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Title:	EXTENDED DELONE & MCLEAN ISS MODEL TO EVALUATE IT ASSISTANCE APPLICATION USAGE LEVEL
Author:	AYU PUSPITARINI, ASTARI RETNOWARDHANI

| Abstract: | Application usage level is one indicator which can be used to measure the successful implementation of an IS/IT investment. In this study the authors propose to extend of Updated DeLone & McLean ISSM with 2 variables from UTAUT. Then use the propose model to evaluate the factors which influence IT assistance application usage levels. Data collection was carried out using questionnaire distributed via an online platform to 322 respondents. The collected data will be processed and analyzed using the SEM-PLS (Structural Equation Model-Partial Least Square) approach. Based on R-square results found the impact of variables in the proposed model are usage level is 51,6 % , user satisfaction is 65,8 %, and behavioral intention is 49,5 %. This study also finds that adding 2 variables from the UTAUT model, namely performance expectations and business expectations, can improve the capability of Updated DeLone & McLean ISSM in measuring the influence of Behavioral Intention variable into Use variable. |

| Keywords: | Usage Level, IT Assistance, Extend, Application |

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| Title: | USING IOT AND ML FOR FOREST FIRE DETECTION, MONITORING, AND PREDICTION: A LITERATURE REVIEW |

| Author: | MOUNIR GRARI, MIMOUN YANDOUZI, IDRISS IDRISSI, MOHAMMED BOUKABOUS, OMAR MOUSSAOUI, MOSTAFA AZIZI, MIMOUN MOUSSAOUI |

| Abstract: | Forests are large areas gathering trees and other plants. They are so important for protecting the environment; they filter air and water, provide food and shelter for animals, and help regulate the climate. Wildfires are one of major hazards of global warming; they destroy forests and speed up the deforestation phenomenon. Other wildfires are also caused by human errors in wilderness environments. Dry vegetation fuels a wildfire's rapid ignition and spread. It is difficult to extinguish flames even with the best efforts of forest firefighters. Smoke and air pollution from wildfires may harm human health and ruin property. Forest fires are difficult to detect at time or to anticipate it, because they spread rapidly. Early-warning systems that they are more accurate are really needed. These systems could be implemented with IoT (Internet of Things), machine learning (ML), or deep learning (DL). In this paper, we focus on this direction of research and we examine literature proposals utilizing IoT and DL to detect wildfires and their spread via a comprehensive evaluation and comparison of existing works. |

| Keywords: | Forest Fire, Wildfire, IoT, Machine Learning (ML), Deep Learning (DL). |

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| Title: | IMPLEMENTATION OF WEIGHTED PRODUCT AND TECHNIQUE FOR ORDER PREFERENCE BY SIMILARITY TO IDEAL SOLUTION IN SELECTING THE BEST PARTICLEBOARD |

| Author: | HANDRIZAL, HAYATUNNUFUS, ALDINO |

| Abstract: | Particleboard is a wood-based panel manufactured with wood chips or non-wood which is pressed and extruded. Particleboard is often used as a wooden board replacement because its material is obtained from wood waste or non-wood waste, is cheap, and the density can be adjusted. Different types of wood particles or non-wood particles, glues, and differences in composition variations are carried out to produce the best quality particleboard. The quality of particleboard affects the quality of the product produced by particleboard. Because of this, a decision-making system is needed to help the decision-maker choose the best particleboard. In this study, the author will use a combination of the Weighted Product (WP) method and Technique for Order by Similarity to Ideal Solution (TOPSIS) method and use three criteria which are physical, mechanical, and appearance properties with all of its sub-criteria. Based on the test, the combination of the WP method and TOPSIS method has an average running time of 185.5 milliseconds and the algorithmic complexity is $\Theta(n+p+1)m$. This system contributes to helping decision makers to recommend particleboard to be used. |

| Keywords: | Weighted Product, Technique for Order by Similarity to Ideal Solution, Particleboard |

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| Title: | DECISION SUPPORT MODEL FOR PURCHASING DECISION IN PHARMACEUTICAL COMPANY |

| Author: | DITDIT NUGERAHA UTAMA, GUROH RAMADHAN |

Abstract:	Purchasing is an important activity carried out by companies and organizations in fulfilling inventory. Today, having the right and accurate inventory of items is imperative, exclusively in large scale companies that have a lot of items. The study proposed a decision support model (DSM) to determine how much of the next number of items purchased by a pharmacy company. Combination of methods mathematics, regression artificial neural network, and fuzzy logic Tsukamoto were successfully operated as a main approach of the model. The main objective of the study is to construct a model and support decision makers in controlling the decision on how many purchases of items. The constructed DSM was determined by five independent parameters (i.e. sales, demand, season, cycle time, and delivery time) and two other dependent parameters. By exploiting five types of item, the model was able to propose an item number should be purchased in next purchasing activity optimally.
Keywords:	Purchasing, Inventory, Decision Support Model, Mathematic, Fuzzy Logic Tsukamoto, Regression Artificial Neural Network, Pharmacy
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

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| Title: | INSTRUCTOR PERFORMANCE MODELING FOR PREDICTING STUDENT SATISFACTION USING MACHINE LEARNING - PRELIMINARY RESULTS |
| Author: | ABDELBASET R. ALMASRI, NOR ADNAN YAHAYA, SAMY S. ABU-NASER |

Abstract:	The use of machine learning techniques in higher education can be beneficial in optimizing teaching and providing higher institutions with the solutions they need, like monitoring student satisfaction with the instructor's performance. In this study, ten machine learning classification methods are employed on a dataset to predict selected aspects of student satisfaction: Logistic Regression, Linear Discriminant Analysis, Kneighbors, Decision Tree, Na�ve Bayesian, Support Vector Machine, Extra Trees, Gradient Boosting, Random Forest, and Multilayer Perceptron. The dataset consists of 5,820 instances obtained from the UCI machine learning repository, and it demonstrates how students rated their instructors in terms of course structure, and behavior. As a result, it was observed that the ten classifiers had better performance in terms of prediction accuracy after balancing the dataset. On the balanced dataset, the ten classifiers were 4% more accurate on average than when they were trained on the imbalanced dataset. In addition, the Extra Trees classifier achieved the highest performance rate based on all the evaluation metrics used in predicting all the targeted features, especially with the balanced dataset. This paper also included the finding of the most important attributes/variables affecting the predictability of the student-satisfaction aspects. As this finding demonstrated, the majority of the important variables were related to instructor characteristics. Moreover, in all cases of the predictions, one variable related to course characteristics (practice-based activities: laboratory work, fieldwork, and group discussions) frequently appeared as the most important attribute compared to other attributes. Thus, and in light of these findings, instructors should plan courses with fieldwork, applications, labs, and group discussion. Instructors should also use up-to-date materials, be well prepared, be friendly, encourage student participation, and give and talk about exam solutions.
Keywords:	EDM (Educational Data Mining), Student Satisfaction, Classification, Machine Learning
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| Title: | ENHANCEMENT OF QUALITY OF SERVICE BASED ON CROSS-LAYER APPROACHES IN WIRELESS SENSOR NETWORKS |
| Author: | DILIPKUMAR JANG BAHADUR, AND DR L. LAKSHMANAN |

| Abstract: | To improve the quality of services (QoS) based on service level agreements, wireless sensor networks (WSNs) are necessary in critical applications. It is difficult to ensure quality of service in wireless sensor networks due to the numerous constraints and demands placed on the resources available to sensors and the various applications that use these networks (WSNs). At the network level, the quality of service was assessed while taking routing, communication methods, scheduling delays, throughput, jitter, and other factors into consideration. In order to meet the requirements for latency and reliability in critical applications, we present an overview of the most recent cross-layer QoS approaches in wireless terrestrial sensor networks in this paper. For cross-layer QoS solutions, our study recommends using the RAS classification, which stands for reliability, availability, and serviceability. We outline many open issues and promising research directions with regard to achieving QoS in WSNs. Alternative middleware is also taken into account. |
| Keywords: | Wireless Sensor Network, RAS, Quality of Service, Cross Layer Scheduling. |

| Title: | COMPARATIVE ANALYSIS OF CLASSIFICATION METHODS OF THE DACTYL ALPHABET OF THE KAZAKH LANGUAGE |
| Author: | NURZADA AMANGELDY, SAULE KUDUBAYEVA, BIBIGUL RAZAKHOVA, MUKANOVA ASSEL, TURSYNOVA NAZIRA |

Abstract: Kazakh Sign Language (KSL) is relatively new, and there is still no full-fledged system that can automatically recognize the Kazakh language's dactylic alphabet since Russian letters in the Kazakh alphabet have been identified until today. In order to prove that the Kazakh sign language can exist as a separate sign language, a comparison of the form of the display was carried out in terms of configuration (arm /forearm), place of execution (localization), the direction of movement, nature of movement and component that cannot be performed manually (facial expression and articulation) of Kazakh, Russian, English, Turkish sign languages. As a result of the study, it was proved that the Kazakh sign language can exist as a separate sign language by observing the forms of demonstration of 1050 words in 4 languages. Further, a comparative analysis of classification methods such as support vector machines, ensemble classifiers and nearest neighbor classifiers of dactyl alphabet letters was carried out to identify the optimal method.

Keywords: Sign Language; Hand Shape; Palm Definition Model; Mediapipe Hands; Support Vector Machines; Ensemble Classifiers; Nearest Neighbor Classifiers Pattern; Recognition; Multiple Classification.

| Title: | A MINING FRAMEWORK FOR REAL BURST LOCATION ESTIMATION AND PORTABILITYOF THE WATER USING DEEP LEARNING |
| Author: | P.VASANTHSENA, DR.P.SAMMULAL |

Abstract: Good health policy requires that all people have access to safe drinking water as a basic human right. In terms of national, regional, and local health and development, this is critical. Water and sanitation improvements have been found to provide a positive return on investment in certain areas, since the reductions in health risks and medical expenses much surpass the costs of making the improvements. To check whether that water is safe or not we have some parameters which need to be checked like pH value which ranges from 6.52 � 6.83 and Hardness, Chloramines, Sulphate, Conductivity, Organic carbon, Trihalomethanes, Turbidity, and at last portability. When we acquire a result of 1, we know that the water is safe to drink. If we get a portability value of 0 it is not safe for water consumption Before checking the quality of water, we need to collect all water bodies' images from Google earth maps and mask them and check their pot ability.The project involves data analysis of the different parameters which are involved in checking the portability of water with proper dataset using data processing methods. Random Forest, Decision Tree and other machine learning algorithms are used to make predictions. With the use of VGG image Annotator and leakage location estimate algorithms such as cross correlation of sinusoidal waves and water bodies are masked out of water distribution pipes.

Keywords: Deep Learning, water portability, image masking, Google earth map, image processing.

| Title: | BIMODAL EMOTION RECOGNITION USING TEXT AND SPEECH WITH DEEP LEARNING AND STACKING ENSEMBLE TECHNIQUE |
| Author: | STEPHEN WILLIAM, AMALIA ZAHRA |

Abstract: Understanding human emotion means communicating with our fellow humans on a deeper level. Unfortunately, understanding human emotion is not as easy as it sounds. As humans, we express our emotions in different ways, be it using our tone of speech, words of choosing, or facial expressions. To just pick one over the many ways we express emotion and draw a conclusion would mean that we lose out on information causing us to arrive at the wrong conclusion. This research shows that fusing two modalities, text and speech, with a stacking ensemble method, shows leap and bounds improvements in its accuracy when compared to the unimodal approach. Tested on the IEMOCAP dataset with a 4 emotions subset of anger, happy, sad, and neutral, the text model of BERT (Bidirectional Encoder Representations from Transformer) managed to achieve an accuracy score of 65.4%, and

the audio model of CNN (Convolutional Neural Network) + Bi-LSTM (Bidirectional Long Short-Term Memory) with the implementation of LFLB (Local Feature Learning Block) managed to achieve an accuracy score of 60.6%. These results were then combined into one with a stacking ensemble method and achieved an accuracy of 75.181%.

Keywords:	Audio Processing, Deep Learning, Ensemble Technique, Emotion Recognition, Natural Language Processing
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Title:	MOTIVATION, ENGAGEMENT, ENJOYMENT, AND LEARNING ACHIEVEMENT TOWARD GAMIFIED CLASSROOM VIA LEARNING MANAGEMENT SYSTEM TO ENHANCE LEARNING ATTITUDE
Author:	SITI NAZLEEN ABDUL RABU, NOOR HANIM ISMAIL, NUR IZZAH OSMAN, SITI KHADIJAH MOHAMAD
Abstract:	This study investigates postgraduate students� attitudes toward a gamified classroom approach. Sixteen Malaysian postgraduate students were involved in this study. A case study research design with quantitative and qualitative data was adopted through questionnaires, focus group interviews, and data log to explore students� motivation, engagement, enjoyment, and learning achievement, as well as their scoring and engagement profiling via the Schoology platform. The findings indicate that most of the students have a positive attitude toward the gamified classroom. Game mechanics, such as Challenges, Team, and Leaderboard helped to promote the success of the gamified classroom. Students enjoyed completing Challenges and agreed that the gamified classroom approach had improved their learning and perceptions of gamification. Gamified classroom was more enjoyable than the traditional classroom and had influenced students to be highly motivated and engaged in learning. Several suggestions to enhance students� attitude and engagement toward gamified classroom as well as its relation in the information technology perspectives are also described.
Keywords:	Gamification, Gamified Classroom, Attitudes, Motivation, Engagement, Enjoyment, Learning Achievement
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Title:	PRINCIPAL COMPONENT REGRESSION WITH VARIATIONAL BAYESIAN PRINCIPAL COMPONENT ANALYSIS APPROACH TO HANDLE MULTICOLLINEARITY AND MISSING DATA
Author:	NABILA AZARIN BALQIS, SUCI ASTUTIK, SOLIMUN, NURJANNAH4, HENNY PRAMOEDYO
Abstract:	Principal Component Regression (PCR) is a combination method of Principal Component Analysis (PCA) and linear regression that aims to deal with multicollinearity in regression data. Classical PCA has the disadvantage that when faced with missing data. Missing data becomes a weakness in PCA where the resulting principal component will lose a lot of information so that the principal component cannot really describe the original variable properly. The method that can be used to deal with these problems and overcome overfitting is Variational Bayesian Principal Component Analysis (VBPCA). This study aims to modeling PCR using VBPCA with Ordinary Least Square (OLS) as a regression parameter estimation method to overcome multicollinearity at various levels of missing data proportions. The data used in this study are secondary data and simulation data which has been contaminated with collinearity in the predictor variables with various levels of the proportion missing data of 1%, 5%, and 10%. The results of this study indicate that in estimating the PCR parameters with VBPCA method using OLS, the estimated regression parameter coefficients have a constant value at the proportion of missing data up to 5%. This is influenced by missing data where the greater proportion of missing data, then the estimation results of the regression parameters are less constant and have a large standard error value of the regression parameters. Multicollinearity in secondary data and simulation data can be optimally overcome as indicated by the smaller standard error value of the regression parameter for the PCR method using VBPCA. VBPCA can handle the proportion of missing data to less than 10%. This is due to the large proportion of missing data as evidenced by the larger MAPE value, the cross validation (Q^2) and the adjusted R^2 value which are getting smaller as the proportion of missing data increases.
Keywords:	Missing Data, Multicollinearity, PCA, PCR, VBPCA
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Title:	QOS AWARE WEB SERVICES COMPOSITION PROBLEM IN MULTI-CLOUD ENVIRONMENT USING HYBRID OPTIMIZATION ALGORITHM
Author:	G. AMIRTHAYOGAM, DR. C. ANBU ANANTH, P. ELANGO
Abstract:	Information technology is building communications networks for a company, safeguarding data and information, and creating and administering databases. Currently, cloud computing provides a single set of physical resources for providing multiple information technology (IT) services to a large user base with varying needs. With the advent of multi-cloud computing, abundant web services are published by several providers to their worldwide users. Web service composition technology attracted a lot of attention for the sake of reduction in software development costs. In a multi-cloud environment (MCE), each atomic web service published by any cloud provider with the same functionality has a different price and quality of service (QoS). Service discovery and composition are the key challenges for web services development. The challenges in the composition of services distributed in multi-cloud environments include increased cost and a reduction in its speed due to the increasing number of services, providers, and clouds. Consequently, to overcome these challenges, the QoS-aware multi-cloud web service composition is presented in this work. The research work initially proposed a Deep Neural Network (DNN) aim of the study is to recommend the web service composition. The proposed method recommends the matched services to the user based on the user's need. Subsequently, a Hybrid Firefly and Bee Colony Optimization Algorithm is introduced for the Multi-cloud service composition problem of NP-Hard in a multi-cloud environment. The proposed optimization algorithm reduces the number of cloud providers to provide the best services. Additionally, the security of multi-cloud web service composition is important, to provide this security, a Fuzzy Generalized Rough Set Theory is presented in this paper. Accordingly, this fuzzy rough set theory eliminates insecure services. Subsequently, the proposed work is implemented using Python software. The performance metrics are throughput, response time, availability, feasibility, efficiency, etc. The proposed method is compared with the existing BOTV-PSO, MLTS-MCSC, IWD, and GNN-QSC. Subsequently, compared to these existing methods, the proposed method is 2% more than the existing methods for execution time, for response time, the proposed method is approximately 3% higher than the existing methods. The proposed method is 5% higher than the existing methods for availability and 4% higher for throughput. The proposed work performs the best service composition to the user and in future determines the minimum and maximum allowable used clouds to minimize the communication costs in a multi-cloud environment respectively.
Keywords:	Web Services Composition, Service Recommendation, Deep Neural Network, Hybrid Algorithm, Fuzzy Generalized Rough Set Theory, QoS Metrics.
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Full Text

Title:	A MULTI-AGENTS SYSTEM BASED APPROACH TO WEB SERVICE DISCOVERY
Author:	MOHAMED HALIM, NOUHA ADADI, MOHAMMED BERRADA, DRISS CHENOUNI
Abstract:	A growing number of companies are using web services to make their expertise and data available through the network. The current problem is that the content of these web services remains inaccessible to machine processing. Only humans can interpret their contents. The Semantic Web is the new vision of the Web that promises to overcome this difficulty. The concept of semantic web services, is the result of the convergence of the field of web services with the semantic web, indeed its objective is to automate the discovery, selection and composition of web services. In this work, we are interested in the semantic discovery of Web services. The main problem is to automate the discovery of web services to respond to a request from a client. In this sense, firstly we present a conceptual framework and architecture to carry out our approach. The originality of the proposed solution lies in the use of mixed technical tools ranging from semantic models to multi-agents systems, including Matchmaking algorithms. Afterwards, we implement our proposed architecture. To validate our work, we conduct tests with a variety of user queries and a panel of Web services. As part of a case study we consider an online travel organization problem. This problem is a typical web services discovery scenario to apply the concepts of our approach.
Keywords:	Semantic Web, Web services, Semantic discovery, Multi-agents systems, Matchmaking algorithms
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Full Text

Title:	CHATBOTS FOR CUSTOMER SERVICE: A COMPREHENSIVE SYSTEMATIC LITERATURE REVIEW

Author:	JAVIER GAMBOA-CRUZADO, PAULO CARBAJAL-JIM�NEZ, MIGUEL ROMERO-VILL�N, OSCAR HUGO MUJICA RUIZ, JOS� COVE�AS LALUPU, MAR�A CAMPOS MIRANDA
Abstract:	Customer service oriented technical support is common, but it has a high demand of users who need to be attended to simultaneously and at any time. This paper presents a systematic literature review showing a broad perspective on chatbots applied to customer service. Searches were conducted in: IEEE Xplore, Taylor & Francis, ETHzurich, Wiley Online Library, Science Direct, ERIC, ERIC, Microsoft Academic, Google Scholar, ACM Digital Library, and ARDI. This review presents discussions on the feasibility of implementing chatbots in customer service. The results of the systematic review conclude that chatbots are constantly improving with respect to the technologies used for their implementation, consequently, there is an improvement in the application of customer service, which has also caused the expansion of the scope of application reaching sectors such as health, transportation, education, among others. This application is booming in all countries of the world; however, the United States is the one that has more research, due to the great demand of customers and the great technological advancement, therefore, this country is the one who is at the forefront when it comes to chatbots.
Keywords:	Chatbots, Customer Service, Virtual Assistant, Bibliometric, Systematic Review
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Full Text

Title:	HOW FUZZY LOGIC ANALYSIS IMPACT MATERIALITY LEVEL CONSIDERATION IN FINANCIAL AUDIT
Author:	BAMBANG LEO HANDOKO, ANG SWAT LIN LINDAWATI
Abstract:	Materiality has a significant role in the course of accounting, especially when it comes to auditing. It helps the auditor by holding the limitations of time and resources of the auditor�s capabilities in evaluating the financial misstatements. The amount of audit procedures and evidence is determined depending on the materiality of misstatements. However, some cases have shown that misstatements that happened below the materiality could eventually lead to a financial shenanigan. Our quantitative research tries to analyze the factors that could affect materiality level. We use agency theory as the foundation of this research. Several variables that relate to the auditor�s judgment of materiality are used to gain an understanding of its impact on materiality considerations. We use primary data from audit questionnaires and perform a statistical analysis to assess our hypothesis. The results suggest that the auditor�s ability to understand audit risk, auditor�s competency, and fuzzy logic analysis have a significant effect on the materiality level consideration. More than that, this research also suggests that fuzzy logic analysis could be used to help auditors in determining materiality level and it is able to drive qualitative factors of materiality.
Keywords:	Risk, Competency, Auditor, Materiality.
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Full Text

Title:	EMOTION DETECTION USING CONTEXT BASED FEATURES USING DEEP LEARNING TECHNIQUE
Author:	SOHIT AGARWAL , DR. MUKESH KUMAR GUPTA
Abstract:	Detection of emotion from various aspect is the most important thing in social media environment. Numerous research has gone into giving robots the ability to recognize emotions. Most prior computer vision attempts focused on assessing facial expressions and, in certain circumstances, body position. This strategy works nicely in certain situations. Their performance is restricted in natural settings. Studies suggest that the scene setting, together with facial expression and body stance, helps us perceive people's emotions. However, owing to a paucity of data, the context processing for automated emotion identification has not been fully studied. In this paper we proposed a system for detection of emotion using real time visual and context-based features. The major objective of this research to identify the sentiment from large video based on context. To achieve this functionality, it needs to extract numerous frames from video and validate all frames using proposed algorithms. This research basically carried out the extraction of hybrid features from real time image as well as video dataset and build classifier to selective features. The hybrid deep learning classification algorithm has used for predict the correct sentiment with Hybrid Convolutional Neural Network (H-CNN) and Recurrent Neural Network (RNN). In extensive experimental analysis evaluation has done in terms of accuracy which obtains better than traditional machine learning and deep learning classification algorithms.
Keywords:	Context Aware Emotion Detection, Feature Extraction, Classification, Sentiment Classification, Machine Learning

Full Text

Title:	ENHANCED SALP SWARM ALGORITHM BASED ON CONVOLUTIONAL NEURAL NETWORK OPTIMIZATION FOR AUTOMATIC EPILEPSY DETECTION
Author:	DWI SUNARYONO, RIYANARTO SARNO, JOKO SISWANTORO, AGUS BUDI RAHARJO, SHOFFI IZZA SABILLA, RAHADIAN INDARTO SUSILO, KANA REKHA

| Abstract: | Epilepsy is a neurological disorder that occurs due to abnormal activity in the brain. Symptoms can vary, such as uncontrolled movements, muscle stiffness, difficulty breathing, loss of consciousness, and even death. Therefore, the multichannel electroencephalogram (EEG) is very important to understand the pattern of seizure occurrence and non-seizure in epilepsy. In this paper, we determine an automatic epilepsy detection method using enhanced Salp Swarm Algorithm (SSA) CNN-based of EEG signals. The signal is transformed into Low Pass Filter (LPF) and High Pass Filter (HPF) with one level, frequencies, and scales using Wavelet Transform. Enhanced SSA was used to determine the number of neurons and the appropriate number of convolution layers in the CNN algorithm for classifying two classes (epilepsy and epilepsy with seizure) using the CHB-MIT dataset from Children's Hospital Boston. The results of the study show that the proposed method produces the highest accuracy of 99.15% and 89.04% of average accuracy. This result is obtained with a computation time on testing data of 0.0001 seconds using a high-end computer. Enhanced SSA was proven to increase the performance of CNN of 81.13%. The proposed method can be used in the automatic detection of epilepsy. |

| Keywords: | Epilepsy, CHB-MIT, Wavelet Transform, Convolutional Neural Network, Salp Swarm Algorithm |

Full Text

Title:	NEW SCHOOL CULTURE IN POST COVID-19 ERA: VICE-PRINCIPALS PERSPECTIVE OF UTAUT MODEL IN THE CONTEXT OF ICT FOR LEARNING
Author:	SANTI RATNANING TIAS, DEWIE TRI WIJAYATI, NUNUK HARIYATI

| Abstract: | Information and Communication Technology [ICT] has affected many sectors during the Covid-19 pandemic. The education sector has also experienced significant changes, especially in the change in school culture in the post-covid-19 era in the use of ICT for learning. This study aims to explore changes in school culture in the use of ICT for learning, which is reviewed based on the Unified Theory of Acceptance and Use of Technology [UTAUT] model, from the point of view of Vice Principals [VP]. This research is qualitative research with a phenomenological approach to define the vice principals� response to the new school culture in the post-Covid-19 pandemic, due to the implementation of the distance learning policy during the Covid-19 pandemic by the Indonesian government. The informants of this study consisted of 260 vice-principals of Junior High Schools in Mojokerto Regency and City, East Java, Indonesia. The stages of data analysis are to do data reduction, determine themes, explore engagement between themes, and make conclusions. This study concludes that there is a new school culture in the post-Covid-19 pandemic where all school residents, teachers, students, and school leaders are accustomed to using technology to support learning in schools. The new culture created due to the Covid-19 pandemic is not fully implemented by all schools, but most schools have a new culture in the use of ICT for learning, especially the use of educational platforms that support the process of achieving competence by students. Schools with a high culture of innovation for all school members tend to have high acceptance and use of technology in every learning carried out by students. Furthermore, parents who have forward-thinking, and have a high tendency to accept and use technology, encourage their children to take part in learning on educational platforms. The new school culture positively impacts needs in schools and the need for learning loss if this new culture is widespread and has reached all levels of education in Indonesia. |

| Keywords: | School Culture, Post Covid-19 Era, UTAUT, Vice-Principals Perspective |

Full Text

Title:	MODELING OF THE INTERPRETATION PROBLEM BY THE RADAR RESEARCH METHOD
Author:	OMARKHANOVA DINARA, ZAKIROVA ALMA, ABDYGALIKOVA GULNAR, SERIKBAYEVA ASSEM

| **Abstract:** | Georadar is a modern technological device that is able to probe, that is, to conduct non-destructive monitoring of any environment, regardless of its chemical composition and physical state. The hardware part of georadar today, in general, has reached a certain perfection and has not undergone noticeable improvements for a number of years. GPR capabilities are expanding in the software area - existing signal processing algorithms are being improved, and new technologies for analyzing and converting GPR information are being developed. The use of ground penetrating radars does not harm the environment and does not violate the ecological balance. The use of ground penetrating radars does not require additional equipment and powerful power sources. Ground penetrating radars are equally effective in the study of vertical, horizontal and inclined surfaces. Compared with other methods, georadolocation diagnostics, which is the basis of ground penetrating radars operation, is characterized by high power, as well as low energy consumption. In the far and near abroad there are various modifications of devices that have found wide commercial application. It is known, conducting field experiments is often difficult under the influence of objective and subjective external factors. For example, the accuracy of measurement instruments, random errors of personnel should be the same with the repetition of experiments, experimental conditions may affect the results of calculations, but this is not always the case in practice. Therefore, the experimental curves obtained for sufficiently flat dependencies do not always have a smooth appearance and are often random errors, that there are called noisy. In such cases, there is a problem of noise cleaning of experimental data, correction of random fluctuations of schedules. In such cases, the numerical finite element method is useful for correcting numerical series. |

| **Keywords:** | Ground penetrating radar, Experiment, Geodata, Radarogram, Data Interpretation. |

Full Text

| **Title:** | INTRUSION DETECTION IN WIRELESS SENSOR NETWORKS USING FUZZY RELATED FEATURE SELECTION TECHNIQUE WITH OPTIMIZED CLASSIFICATION |

| **Author:** | GIRIBABU SADINENI, DR. M. ARCHANA, DR. RAMA CHAITHANYA TANGUTURI |

| **Abstract:** | The internet related data processing system has several kinds of threats that direct to huge damages in major loss of data in Wireless Sensor Networks. Additionally, the group of data transmission with WSNs is huge in size that will target by the group of attackers regularly. The highest amount of security will be provided for secured data transmission with WSNs. The intrusion detection should be provided for necessary element in network communication, there are several techniques have been developed for effective intrusion detection constantly. This paper proposes Fuzzy related feature selection technique with Optimized classification in spite of selecting a large amount of attack data for detection of attacks in WSNs. Fuzzy related feature selection technique is used for identifying the intrusion and monitoring the network to protect from the malicious activity and unauthorized access. The efficiency of the proposed technique is enhanced according to the utilization of data which also enhances the detection rate and minimizes the error rate. |

| **Keywords:** | Intrusion Detection, Fuzzy Set, Wireless Sensor Networks, Feature Selection. |

Full Text

| **Title:** | INTILLEGENT WATER DROP ALGORITHM BASED WEB PAGE RECOMMENDATION USING LINEAR REGRESSION LEARNING |

| **Author:** | PAVITHRA B , NIRANJANAMURTHY M |

| **Abstract:** | Analysis of website visitor for improving the performance of user experience on web portal is primary requirement in this online world. Hence number of web-based feature was used for the study of user behavior and recommend page accordingly. The problem is we don�t have any sophisticated method to predict the pages with greater precision value in association with the faster accessing speed of the webpages this research work presents the utilization of weblog feature for analysis and pattern learning. Proposed model extract association rule forms the weblog with text pattern format on the web page. Here we have considered the input data set from a live website�s weblogs called as project tunnel.com. As an output the model gives the probability of pages predicted in a sequence manner, thus increasing the precision values of predicted pages and also it increases the chromosome page quality involving a minimal value of fitness function with the regression value. The proposed work has concluded with having increasing precision value with minimal fitness value of a precision value when to compare with existing methods like Genetic feed forward association and Particle swam optimization. Association rule and text URL patterns were used for learning multi-Regression probability generation. Once the regression value is set than Intelligent Water Drop Algorithm will be applied for predicting or recommending the next page as per user previous set of pages, where IWD algorithm increases the accuracy of prediction by utilizing the regression values in fitness function. Live websites weblogs were |

analyzed for the experiment and comparison of proposed WPPIWD (Web Page Prediction Intelligent Water Drop) has improved the work efficiency when compared to other existing methods. Results shows that proposed intelligent water drop based Web Page Prediction Model (IWD) for next page prediction system has improved various evaluation parameters like precision, coverage, metric.

Keywords:	Information Extraction, Neural Network, Recommendation, Regression, Weblog.
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Title:	MOOD-BASED MUSIC RECOMMENDATION SYSTEM USING FACIAL EXPRESSION RECOGNITION AND TEXT SENTIMENT ANALYSIS
Author:	MADIPALLY SAI KRISHNA SASHANK, VIJAY SOURI MADDILA, PALETI KRISHNASAI, VIKAS BODDU, G KARTHIKA
Abstract:	In today�s fast-paced world, everyone is under a ton of stress for different reasons. Listening to music to reduce stress and detox has become a regular activity among people of all ages. However, if the music doesnt suit the user�s mood, it can have the reverse effect of aggravating the stress in the user�s mind. Moreover, there are no music applications available to the users that recommend songs based on the user�s mood or emotion. Hence, in this work, we propose a mood-based music player application that suggests songs based on the user�s emotion. The application can detect three emotions: angry, happy, and sad. To detect the emotion, the user has the choice of taking a selfie/providing an old image of their face or write a text stating how or what they are feeling. The application uses Deep Learning models (Facial Expression Recognition and Text Sentiment Analysis) to predict the user�s emotion and populates a playlist of songs based on the emotion of the user.
Keywords:	Stress, Text Sentiment Analysis, Facial Expression Recognition, Mood-Based Music
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Title:	A NOVEL APPROACH USING INCREMENTAL MULTI MODAL OVERSAMPLING FOR DATA STREAM MINING
Author:	ANUPAMA N, RAVI SANKAR V, SUDARSON JENA
Abstract:	Data mining is the process of discovering hidden knowledge from the existing datasets. The process of knowledge discovery is a complex task when the data source is in the form of data streams and more tough when the data source is of class imbalance in nature. To find an optimal solution for these problems many research proposals are formulated by researchers. Some of the unsolved problems in the literature for the above said problem are for very large data sources of data streams with class imbalance nature. In this paper, a novel proposal for class imbalance large data streams is presented with novel techniques of oversampling and a unique multi modal filtering technique known as Multimodal Increment over Sampling for Data Streams (MIOSDS). The experimental simulations are conducted on three large datasets with different domains with high class imbalance ratio. The results generated are very impressive in terms of accuracy, AUC, precision, recall and F-measure validation metrics.
Keywords:	Knowledge Discovery, Data Streams, Imbalanced data, oversampling, Multimodal Increment Over Sampling for Data Streams (MIOSDS).
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Title:	THE IDENTIFICATION ELEMENTS OF COGNITION AND MOTIVATION: THE MANIFEST EMERGENCE OF NEW E-COMMERCE VENTURES IN MALAYSIA
Author:	AHMAD FIRDAUSE MD FADZIL, MOHD RAFI YAACOB, DZULKIFLI MUKHTAR, HASIMI SALLEHUDIN, ROGIS BAKER, MAHWISH JAMIL
Abstract:	Forming a venture is very challenging, and a lot of thinking. Particular attention is required to create a new venture especially in this highly profitable e-commerce field. But the cognitive aspects of an entrepreneur have only been examined with little attention in most established studies. Moreover, previous researchers have tended to ignore how the motivational questions of the entrepreneur influence the creation of a new e-commerce venture. There is still considerable uncertainty, and therefore this study aims to explore the role of cognitive and motivational factors in effect the creation of e-commerce ventures in

	Malaysia. This research employs a case-study methodology in which data were collected by interviewing 12 e-commerce entrepreneurs from May 2013 through December 2014. The findings showed that personal backgrounds (education and family), as well as job and business experiences, are the most important factors by cognitive entrepreneurs in Malaysia. There are three aspects of entrepreneurial motivation, namely the need for an entrepreneur to achieve his goals, strong business interest and a network external support. Malaysia's new e-commerce venture creation strongly impact to Malaysia growth of economy. Therefore, it is better for government to encourage entrepreneurial activity in the region, underlining entrepreneurs cognitive skills and motivational elements. Therefore, the government should encourage entrepreneurial activity in the region, highlighting entrepreneurs' cognitive skills and motivational elements.
Keywords:	Entrepreneurship, New Venture Creation, Psychology and E-commerce
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Full Text

Title:	NETWORKING AS A MARKETING STRATEGY: A CASE STUDY ON THE INDONESIAN NETFLIX SUBSCRIBER COMMUNITY
Author:	IVANDER WILSON SAPUTRA, Z. HIDAYAT
Abstract:	This study aims to find out how a digital marketing strategy can affect the Indonesian Netflix subscriber community and create a strong interaction within it. The theory used in this research is the network society, digital marketing & reception theory. This research is used the qualitative approach with the case study method. The subject of this research is the Indonesian Netflix Subscriber with the object of Netflix Indonesia. Collecting data through online research, interviews, and literature studies. The interviewees in this study were several subscriber members, media or digital marketing observers, and copywriters. Data analysis will be carried out by interactive model data and triangulation of source data with the results that have been obtained. Based on the results of this study, it can be concluded that networking as a marketing strategy is the right and appropriate choice of steps to reach and maintain Indonesian Netflix subscribers.
Keywords:	Network Society, Digital Marketing, Reception Theory, Netflix Indonesia, Subscriber, SVoD
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Full Text

Title:	REQUIREMENTS PRIORITIZATION IN AGILE PROJECTS: FROM EXPERTS PERSPECTIVES
Author:	NOOR HAZLINI BORHAN, HAZURA ZULZALIL, SAADAH HASSAN, NOR HAYATI, MOHD ALI
Abstract:	Software becomes an essential part of our lives because of the required automation in every field. A software requirement plays an important role in its development. In Requirement Engineering (RE), requirement prioritization (RP) is the crucial activity to successfully deliver the software system. Recently, Agile Software Development (ASD) methods have become a widespread approach used by the software industry. ASD stresses the importance of providing the customer with a product of a maximized business value. To achieve that, RP is used. The aim of this study is to investigate the current practice related to RP process, including its timing, participants, criteria used and prioritization techniques applied. An online questionnaire (based on literature review) has been designed and a survey has been conducted with the focus group which mainly involving some practitioners or experts from industry (domain experts) together with academicians (knowledge experts) in few parts of Malaysia. The researchers received 20 valid responses indicating RP practices in agile projects. The researchers found out that despite the fact that business value is the most common criterion used to prioritize requirements; other criteria like important, complexity and cost are considered as well. Other findings indicate that consideration of such multiple criteria requires different viewpoints, thus making RP a process that has to involve many participants of different roles in prioritizing the requirements. While the most popular technique used by the practitioners in this study is MoSCoW technique. Besides, the survey study also asking on any special attention given to the non-functional requirements (NFRs) or user stories in prioritization process in agile projects, since commonly known, due to the nature of the agile environment itself, the NFRs are nearly always neglected during the RP process. The results shown that over 85% of respondents giving attention to NFRs during prioritization in agile projects and less than 15% stated that there are a few reasons why their team did not pay much attention on NFRs during the prioritization process.
Keywords:	Requirement Prioritization, Agile Software Development, Functional Requirements, non-Functional Requirements, Requirement Engineering
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Full Text

Title:	DESIGNING A NEW CRYPTOCURRENCY WITH HARD FORK AND STABLECOIN APPROACH AS A DISRUPTIVE INNOVATION IN PAYMENT SYSTEM OF INTERNATIONAL TRADE
Author:	MARDI TANDRA, JAROT S. SUROSO
Abstract:	For many years, banks and central authorities had always monitored the activities of international trade by enforcing a series of strict regulations. Payment is made secure but difficult and slow at the same time. Faster option is only available for high fees. This research is intended to discuss blockchain and cryptocurrency as a possible alternative to replace the intermediated system of banks within international trade. Two methods would be used, namely hard fork and stablecoin to create a cryptocurrency as the foundation of payment system design for international trade that can complement or replace banks as financial intermediaries in international trade. Hard fork splits an existing blockchain to create a cryptocurrency with one half of the blockchain whereas stablecoin is the state where a cryptocurrency is tied with a reserve asset in an attempt to stabilize its value. The results of this study produced a design for international trade payment system capable of operating without supervision of banks. The designed stablecoin serve as an exchange medium in a payment system revolving around blockchain network. Most processes of the international trade apart from compliance and payment remain the same after application of design.
Keywords:	Disruptive Technology, Blockchain, Decentralized Finance, Cryptocurrency, International Trade
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Full Text

Title:	FACTORS ANALYSIS AFFECTING SMART HOME ACCEPTANCE IN JAVA ISLAND, INDONESIA
Author:	MICHAEL HENRY WIJAYA, RIYANTO JAYADI
Abstract:	This research aims to determine the factors that influence the acceptance of IoT smart homes in Indonesia, including the desire to use and perceived benefits. Therefore, this research was conducted using Technology Acceptance Model (TAM) Theory and conducted a survey method and resulted in 100 respondents indicated. In this study, it was found that the Perceived compatibility variable for the Perceived Ease of Use and Perceived Usefulness variables and the Perceived enjoyment variable for Perceived Usefulness did not affect - the use of IoT Smart Home. At the same time, other external variables show that external variables affect the use of IoT Smart homes. The results of this study can be used as a research reference on the acceptance of IoT Smart homes in Indonesia. They can enrich theories about the acceptance of IoT Smart homes in Indonesia.
Keywords:	Technology Acceptance Model, Acceptance, Smart Home, Internet of Things
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Full Text

Title:	ASPECTS DETECTION MODEL FOR USERS� REVIEWS USING MACHINE LEARNING TECHNIQUES
Author:	SAAD MOAWAD KHALIFA, MOHAMED IBRAHIM MARIE, MAI MAHMOUD EL-DEFRAWI
Abstract:	Over time, sentiment analysis and opinion mining emerged as significant study areas. In order to determine a person's mood from a written text, sentiment analysis examines texts, feelings, and views and divides them into positive and negative categories. Sentiment analysis is used on social media sites, where enormous amounts of data are created daily. Fewer studies have been conducted on the Arabic language compared to those conducted on the English language because of how difficult and complicated sentiment analysis is in the morphologically complex Arabic language. The Coronavirus pandemic was one of the factors that increased the amount of research being published in the area of sentiment analysis, which was then utilized to identify and categorize people's emotions throughout the Coronavirus era. In order to categorize a group of brief texts about employees' opinions on working from home during the coronavirus pandemic into binary positive and negative feelings and to identify the challenging aspects, or the issues that employees face while working from home, so that business owners can review and address them, machine learning algorithms were used in this study. Additionally, other lengthy writings on the same subject were subjected to the same algorithms so that we could monitor the model's progress while we worked on both short and long texts. With the aim of determining if text length may affect efficiency and accuracy, it was discovered that working with lengthy texts increased accuracy. The machine learning techniques Logistic Regression (LR), Random Forest (RF), Multinomial Naive Bayes (MNB), and Support Vector Classification (SVC) have been chosen and used. According to the results, MNB performs best when dealing with short

texts, outperforming the competition with an accuracy rate of 88.5 %. It is followed by LR, RF, and SVC, which each achieve accuracy rates of 87.6 %, 78.1 %, and 87.6 %. SVC wins the competition when applied to lengthy texts, with an accuracy rate of 98.5 %, followed by LR, MNB, and RF, with accuracy rates of 97.6 %, 96.6 %, and 97.5 %, respectively.

Keywords:	Sentiment Analysis, Machine Learning, Opinion Mining, Social Media, Coronavirus.
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Full Text

Title:	DEEPREPOMEDUNM: A TRAIN DEEP LEARNING NETWORK AND EXTRACTION FEATURE FOR THE CLASSIFICATION OF PAP SMEAR IMAGES
Author:	DWIZA RIANA, SRI HADIANTI, SRI RAHAYU, FARUQ AZIZ4, FRIEYADIE, OEMIE KALSOEM
Abstract:	The Pap smear test is still the best method for early detection of cervical cancer and preventing the fatal occurrence of cancer in women. Routine examinations can be carried out immediately to detect pre-cancerous lesions and take treatment measures. Although the Pap smear test is a superior test, it still has a weakness in the form of high false positive results due to human negligence. Advances in technology allow the use of deep learning and identification of cell features to classify Pap smear cells. Pap smear cells were acquired to produce Pap smear images. In the process, it generated multiple datasets like RepoMedUNM. The purpose of this study was to classify two classes and four classes of cells consisting of Normal class and three Abnormal classes, namely L-sil, H-sil, and Koilocyt. DeepRepoMedUNM is a classification process that uses VGG16, VGG19, Alexnet, ResNet50, and Euclidean distance methods on 60 Pap smear cell image features. The classification results obtained were compared and analyzed for two classes and four classes. For the RepoMedUNM dataset, we have obtained up-to-date classification accuracy of 96% for two-class and 91% four-class classification using VGG16 model.
Keywords:	Cervical Cancer, Classification, Ensemble Learning, Feature Fusion, Deep Learning, Pap Smear, Late Fusion Cervical Cell
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Full Text

Title:	RECOMMENDING COLLEGE PROGRAMS TO STUDENTS USING MACHINE LEARNING
Author:	AISHA GHAZAL FATEH ALLAH, GHAZALA BILQUISE
Abstract:	The decision to choose a program of study is a major one since a student must commit to it for four years, until graduation. Hence it is a crucial decision for academic as well as future career success. Despite this, students often make academic choices without careful thought mainly due to lack of proper advice and support. In this paper, we use four methods that utilize students� data such as their performance in high school, college placement test, and standardized IELTS exam to recommend a college program as well as predict the students GPA in those programs. Using the four methods utilizes the advantages of each of them and provides insight into the reason for the recommendation. The four methods that we used, evaluated, and compared are Decision Trees (DT), Neural Network (NN), K-Nearest neighbor (KNN), and Linear Regression (LR). To the best of our knowledge, this is the first study that utilizes and compares the different approaches.
Keywords:	Machine Learning, Classification, Decision Tree, Neural Network, k-NN, Linear Regression, Collaborative Filtering, Recommender Systems
Source:	Journal of Theoretical and Applied Information Technology 15th October 2022 -- Vol. 100. No. 19-- 2022

Full Text

Title:	PARASOCIAL RELATIONSHIP INFLUENCE ON THE UPCYCLED FASHION PURCHASE INTENTION AMONG IGENERATION IN MALAYSIA POST-COVID-19: AN EMPIRICAL STUDY
Author:	NORNAJIHAH NADIA HASBULLAH, AG KAIFAH RIYARD KIFLEE, MASTURA RONI, NUR HAFIDZAH IDRIS, IRFAH NAJIHAH BASIR MALAN, OLAKUNLE JAYEOLA, MUHAMMAD FAIRUZ JAMIL, AHMAD FADHLY ARHAM
Abstract:	The coronavirus disease (COVID-19) pandemic has impacted the pursuit of sustainable development in various ways. Current consumer trends suggest an increased awareness of sustainable consumption or fashion consumption. Past studies have focused more on general concepts of sustainable fashion consumption (SFC), including environmental, ethical, second-hand, and recycling while neglecting upcycling fashion. Therefore, the study investigated the Malaysian iGeneration purchase intention of upcycled fashion products post-COVID-19. The study extended the moderating role of parasocial relationship based on the

Theory Planned Behaviour (TPB). A quantitative online survey was conducted among 230 respondents from IGeneration between 10 to 25 years old in Malaysia. The hypotheses were tested using Partial Least Squares Structural Equation Modelling (PLS-SEM). The study outcomes exhibited empirical support for the proposed research model. Two out of six hypothesized relationships were accepted. Specifically, subjective norm was positively linked to the purchase intention of upcycled fashion products. Meanwhile, parasocial relationship moderated subjective norm and purchase intention. The study provided insights into the application of TPB-based framework and enhanced knowledge of fashion industry players, educators and communities.

Keywords:	Post Covid-19; Upcycling Fashion; Sustainable Fashion; Theory Planned Behaviour; Parasocial Relationship; iGeneration
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Title:	DIGITAL FORENSIC ANALYTICS IN SOCIAL MEDIA ENVIRONMENT USING DNN APPROACH
Author:	OHOUD ALSHABIB, RANDA AHMED JABEUR, FAEIZ MOHAMMED ALSERHANI
Abstract:	Cyberbullying has increased due to the digital growth of Social Networking Applications �S.N.Apps�. As a result, criminal activities in cyberspace became a cause of concern, particularly towards the start of 2022. Thus, a digital forensic analyst's task of acquiring digital evidence can be challenging. The purpose of this paper is to design an intelligent digital system for analysis by using an Artificial Neural Network �ANN� as a deep learning approach. Additionally, this study is to provide insight into the practical processes required criminal legislation enacted against cybercrimes. In ANN training process, we obtained detection accuracy rates of 99.63% for Twitter, Facebook, and Instagram applications and tested the proposed system with a 94.02% accuracy. And one of the Kali Linux commands was used to speed up access during the Phase I of digital forensic �Gathering Information� regarding the suspect. With the investigation Crowdsourcing system , it allows for better judgment of cyberbullying crime behaviors.
Keywords:	Cyberbullying ,Social Media Application (S.M.Apps) ,Crowdsourcing, Kali Linux, Intelligent-system.
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Title:	A CASE STUDY ON THE IMPACT OF VIDEO GAMES TOWARDS MALAYSIAN YOUTH
Author:	CALEB CHU KEN LUN, TANG HANG RONG, LEE KHAR SENG, COURTNEY CHEW CHEAH NI, RAJERMANI THINAKARAN, TING TIN TIN, MALATHY BATUMALAY
Abstract:	Due to the rapid growth of technology in recent years, the technology is revolutionising the video game industry and opening the door for a new generation of gamers. However, spending hours a day playing video games could possibly affect our life as we indulge ourselves in video games for a long period of time. So, we would like to provide some insights on the effects of video games in this study. The aim of this study was to determine the effect of video games towards youth on academic performance, prosocial behaviour, physical health and mental health. The data collection was carried out by sending questionnaires to youths in Malaysia, aged 15 to 24. There were a total of 201 respondents who completed the questionnaire and the data collected were analysed using a bivariate correlation test. Pearson correlation between the level of video games addiction and each independent variable (academic performance, social behaviour, physical health and mental health) are calculated for the results. The results of our study showed that there is a moderately weak positive correlation between the level of video games of addiction and prosocial behaviour ($r = 0.231$, $p = 0.001$). The correlation between video games and academic performance ($r = -0.119$, $p = 0.092$), physical health (in terms of BMI ($r = 0.123$, $p = 0.081$) and physical health score ($r = -0.138$, $p = 0.051$)) and mental health are not statistically significant. The results proved that video games will positively affect prosocial behaviour. The results of this research can help in expanding the knowledge of the positive effects of video games towards the youth on prosocial behaviour.
Keywords:	Video Game, Academic Performance, Prosocial Behaviour, Physical Health, Mental Health)
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