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Research Article

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A geodesic deployment and radial shaped clustering (RSC) algorithm with statistical aggregation in sensor networks

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Abstract: Wireless sensor networks (WSN) comprise a large number of connected tiny or small sensor devices to sense physical phenomenon. In WSN, prolonging the network's lifetime is a biggest challenge due to absence of power harvesting facility and irreplaceable batteries of the sensor devices. Clustering is one of the widely accepted and standard technique to solve the energy issues faced in WSN. In addition to clustering, the shape of the deployment area also plays the major role especially for large scale sensor deployment. This paper proposes a radial shaped clustering (RSC) algorithm with angular inclination routing. The radial shaped deployed area is divided into virtual concentric layers and each layer is further divided into a set of sectors called clusters. Angular routing is applied to achieve multihop routing of packets towards the Sink node. In comparison to fan shaped clustering (FSC), RSC performs better in terms of residual energy and packet received ratio.

Key words: Wireless sensor networks, network lifetime, radial shaped clustering, node deployment, angular routing

1. Introduction to the area

In most of the legitimate applications, the sensor nodes are used in large-scale area and are applied preferably for better reliability and efficiency. WSN comprises of great quantities of sensors with the capability of sensing as well as communication, which means cooperatively collecting data and sending them to the coordinator called Sink. The main objective of sensor node deployment is to monitor the physical phenomenon, to process the sensed information, and to transfer the information to a center known as Sink. In general, the sensor nodes are powered by batteries, which are very limited in power and mostly irreplaceable [1–3]. Sensor nodes, depending on the nature of application, may have very minimum range of transmission. So, the parsimonious utilization of power is of utmost importance. So, a network of sensor nodes is essential to propagate their data to a longer distance.

One of the most widely accepted unique practices for data gathering is clustering where the sensor devices are grouped into a number of clusters that can be used for conserving the energy. Each cluster may have a group of nodes called cluster members and a reporting point to send the sensed data known as cluster head (CH). Each sensing node does its duty and the sensed data is transmitted to the CH located within that cluster. Then, the head collects the entire data, aggregate it by using any aggregation measure, makes them a single unique packet, and transmits data to the coordinator. Here, the capacity of network is balanced in addition

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Predictive Handoff Management in Vehicular Networks Using both Weight Value Based and K-Means Algorithm Based Clustering Algorithm to Meet Desired QoS

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Abstract. Vehicular Ad-hoc Networks is a interesting and key research area which have more number of issues which needs immediate attention when moving towards intelligent transportation system. In this research work, we have proposed a new mechanism of IP scheme which highly helps in handover of vehicle from one RSU to RSU. RSU is playing a key role in delivering of one vehicle from its range to other RSU. Here, how Quality of service can be handled when unexpected handover happens between RSU. So, A new mechanism to predict the vehicles which may enter into handoff process based on its mobility and GPS location. This proposed IP scheme and the predicted handoff is tested through two protocols called Weighted Clustering algorithm and also with Mutated K-Means algorithm to test the performance. The results shows better results to maintain the QoS demands of the vehicle when the handoff is predicted in prior.

1. Introduction

Another important issue that needs immediate attention to the VANET research is Handoff mechanism. The well-known characteristic of the VANET network is the mobility. Clustering of vehicles is an effective way in handling the entire network. Due to this high mobility feature of the VANET vehicles, there is high probability of vehicles to move from one cluster head to another cluster head. This will lead to more number of cluster member exchanges between cluster heads results in routing overhead. This research issue needs more concentration, because handoff in mobile ad hoc network and cellular network was managed and still managing through various possible solutions. The vehicle must be connected to the network to make sure that quality of service demanded by the user who travels in the vehicle got satisfied with that travel and also packet loss in the network should be minimum. Since, the vehicles density increases day by day which leads to increase in single road side unit. This leads to chance of failure of the entire network if the Road side unit gone down. This not only make the network to go done which also leads to packet loss to happen which in turn to make sacrifice in quality of service desired by the vehicular network. So, in this proposed work, cluster-based handoff mechanism is proposed which helps in making smooth handoff vehicles between cluster heads without scarifying the QoS.

Firstly, the clustering mechanism of handling a network is an effective in node management. Because, overhead associated with one particular node is lesser when the network is handled through clusters. Secondly, the road side unit need not to manage all the nodes on the network. There is no

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Hybrid and dynamic clustering based data aggregation and routing for wireless sensor networks

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Abstract. In Wireless Sensor Networks (WSNs), effective transmission with acceptable degradation in the power of sensor nodes is a key challenge. In a large network, holdup is bound to occur in communicating superfluous data. The aforementioned issues namely, energy, delay and data redundancy are interdependent on each other and a tradeoff needs to be worked out to improve the overall performance. The extant methods in the literature employ either centralized or distributed approach to select a cluster head (CH). In this paper, sink originated hybrid and dynamic clustering with routing technique is proposed. The proposed routing algorithm works based on node handling capability of each sensor node in the selection of CH and also helps in identifying the forwarder node. In addition, processing load of a sensor node is also considered for selecting the forwarder. Both space and time correlation is used to collect data from the clusters and then aggregated to provide a proficient communication. The introduced method is evaluated with the performance of the previously available techniques like, Data Routing for In-Network Aggregation (DRINA), Efficient Data Collection Aware of Spatio-Temporal Correlation (EAST), Cluster-Based Data Aggregation (CBDA), Energy-Efficient Data Aggregation and Transfer (EEDAT), and Distributed algorithm for Integrated tree Construction and data Aggregation (DICA). Simulation parameters considered for assess ing the performance of the proposed algorithm are aggregation ratio, routing overhead, packet delivery fraction, throughput, packet delay and consumed energy. The experimental analysis of the introduced algorithm generates paramount outcome of finest aggregation quality with diverse key characteristics and circumstances as required by a sensor network.

Keywords: Wireless sensor networks, clustering algorithms, spatio-temporal phenomena, correlation routing, energy efficiency

1. Introduction

WSNs are the main flourishing area to investigate due to its role in various domains like military surveillance, home healthcare or assisted living, accurate monitoring of any phenomena, real-time monitoring in industrial applications, critical infrastructures

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Novel tri-band series fed microstrip antenna array for THz MIMO communications

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Abstract
A novel tri-band series fed microstrip two-element array antenna is reported in this paper for Terahertz (THz) multiple-input multiple-output (MIMO) communications. Each series-fed array consists of four radiating sections constructed using graphene material. The radiating sections consist of a square loop loaded with a diamond-shaped radiator to offer multi-frequency operation. The proposed antenna operates at 2.3 THz, 3.2 THz and 4.5 THz. The antenna offers an effective 10 dB reflection coefficient bandwidth of 38 GHz, 43 GHz and 60 GHz centred at 2.3 THz, 3.2 THz and 4.5 THz respectively. The isolation enhancement between the antenna elements is achieved using a serpentine resonator. The port-to-port isolation is greater than 15 dB in all the operating bands. The realized antenna gain is greater than 5 dBi in all the operating frequencies. The MIMO metrics of the proposed two-element antenna array is estimated and the results are presented. The envelope correlation coefficient (ECC) is less than 0.2, the diversity gain is close to the theoretical limit of 10 dB and the mean effective gain is close to unity.

Keywords THz antennas · MIMO antennas · Isolation enhancement

1 Introduction

THz communications have received a recent research momentum due to its capability of offering a high data rate. THz occupies the electromagnetic spectrum between the microwave band and the infra-red region. The frequency range between 0.1 and 10 THz has received considerable attention in the recent past due to its attractive features such as good penetration characteristics with minimal attenuation, non-ionizing radiation with very low power level requirement, less scattering and capability to collimate with good ease (Mukherjee and Gupta 2008). These advantages enable the use of THz wave in imaging and spectroscopy applications. Researchers worldwide are currently involved in the design of novel components and circuits that can be used for THz communications. The importance of MIMO systems at the THz spectrum is widely studied by researchers in Faisal

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Network Traffic Prediction Using Radial Kernelized-Tversky Indexes-Based Multilayer Classifier

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Abstract: Accurate cellular network traffic prediction is a crucial task to access Internet services for various devices at any time. With the use of mobile devices, communication services generate numerous data for every moment. Given the increasing dense population of data, traffic learning and prediction are the main components to substantially enhance the effectiveness of demand-aware resource allocation. A novel deep learning technique called radial kernelized LSTM-based connectionist Tversky multilayer deep structure learning (RKLSTM-CTMDSL) model is introduced for traffic prediction with superior accuracy and minimal time consumption. The RKLSTM-CTMDSL model performs attribute selection and classification processes for cellular traffic prediction. In this model, the connectionist Tversky multilayer deep structure learning includes multiple layers for traffic prediction. A large volume of spatial-temporal data are considered as an input-to-input layer. Thereafter, input data are transmitted to hidden layer 1, where a radial kernelized long short-term memory architecture is designed for the relevant attribute selection using activation function results. After obtaining the relevant attributes, the selected attributes are given to the next layer. Tversky index function is used in this layer to compute similarities among the training and testing traffic patterns. Tversky similarity index outcomes are given to the output layer. Similarity value is used as basis to classify data as heavy network or normal traffic. Thus, cellular network traffic prediction is presented with minimal error rate using the RKLSTM-CTMDSL model. Comparative evaluation proved that the RKLSTM-CTMDSL model outperforms conventional methods.

Keywords: Cellular network traffic prediction; connectionist Tversky multilayer; deep structure learning; attribute selection; classification; radial kernelized long short-term memory

1 Introduction

Cellular network communication is a most admired and ubiquitous telecommunication technology. A mobile cellular network creates huge spatial and temporal data. Analysis of such a volume of big data

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Energy Efficient QoS Aware Cluster Based Multihop Routing Protocol for WSN

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Abstract: Wireless sensor networks (WSN) have become a hot research area owing to the unique characteristics and applicability in diverse application areas. Clustering and routing techniques can be considered as an NP hard optimization problem, which can be addressed by metaheuristic optimization algorithms. With this motivation, this study presents a chaotic sandpiper optimization algorithm based clustering with groundwater flow optimization based routing technique (CSPOC-GFLR). The goal of the CSOC-GFLR technique is to cluster the sensor nodes in WSN and elect an optimal set of routes with an intention of achieving energy efficiency and maximizing network lifetime. The CSPOC algorithm is derived by incorporating the concepts of chaos theory to boost the global optimization capability of the SPOC algorithm. The CSPOC technique elects an optimum set of cluster heads (CH) whereas the other sensors are allocated to the nearer CH. Extensive experimentation portrayed the promising performance of the CSPOC-GFLR technique by achieving reduced energy utilization, improved lifetime, and prolonged stability over the existing techniques.

Keywords: Clustering; routing; wireless sensor networks; energy efficiency; network lifetime; metaheuristics

1 Introduction

The current development in the area of wireless communications, MEMS (microelectromechanical system), and digital electronics have led to the growth of microsensors. This small sensor comprises multifunction, transfer easily on shorter distance, requires lower power, and inexpensive [1]. The sensor nodes are accountable for sensing, processing, and delivering data to the base station (BS). They must operate together to create a wireless sensor network (WSN). A WSN comprises a huge amount of sensor nodes that are manually/arbitrarily placed in a provided coverage area. The nodes collect the local physical data, aggregate, and transmit them to BS named sink. For public notable events, the BS is linked to the internet. Rather than transmitting raw data to the node accountable for data fusion, the sensor node could utilize their functioning capabilities to execute evaluation, and fusion operation is to transfer the required data [2]. This feature of wireless sensor allows utilizing in several fields particularly for monitoring and surveillance.

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Research Article

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Wireless Communication without the Need for Pre-Shared Secrets is Consummate *Via* the Use of Spread Spectrum Technology.

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Abstract

Researchers describe the utilization of wideband chirp signals in domestic environments for frequency hopping technologies. Chirp transmission and pulse compressing are used in the system principles described. Varied modulating systems for chirp impulses leading to different application performance and complexities are evaluated for AWGN and frequency-dependent inside radio stations, in terms of their bit accuracies. We show similar calculations and measuring findings for the production of the chirp signals using demonstration systems that employ Superficial Auditory Waves (SSAW) sensors. The proposed system is equipped with 2.5 GHz, 358.8 MHa, and 85 MHz of RF and IF frequencies and communication bandwidth. The technology is not susceptible to selected frequency fading, CW interfering and sound owing to a processor increase of 16 dB–enabling its use of SAW devices-as well as the broad communication bandwidth.

Keywords: Wireless communication; Chirp transmission; Superficial Auditory Waves (SSAW)

Introduction

Internal telecommunications has been receiving more and more attention over several years and is expected to a significant increase in its market share over the next few decades, owing to benefits over cable providers, including data movement, wire removal, and flexibility. Principal applications include skilled and flexible data transfer connections among sensors, controllers, robotics, and monitoring systems in commercial processes as well as a wireless, local community network for home-based and workplace applications. The comprehensive communication connection is an incredibly significant element of the WLAN communication network, owing to an unfriendly engineering environment, including harsh electronic emission from other equipment and substantial aberrations caused by multi-path propagation [1].

Even in highly loud radio settings, the spread spectrum technique is ideal for providing such a comprehensive information transmission [2]. Dispersion functions in the transmitter and receiver are the key processes in spread spectrum devices. The unpleasant program is a hard process in general ideas synchronization, requiring significant calculation effort. Another type of propagation-spectrum approach may be implemented with well FM chirp-signals with related pulse compression techniques and their huge computational gain, extensively utilized in radar systems [3-8]. In this system concept, the propagation is utilized exclusively to counteract multi-way aberrations, while the multiplex access (CDMA) code division can only be achieved by the introduction of extra coding.

The spreading and disperse of chirping impulses may simply be achieved by the use of barked signals of the ground transducer. Small and low-cost systems may be used for these devices and the complicated sync circuitry could be reduced because of the analog correlation method. We discuss several incoherently and coherently modulated methods of chirp spreading spectrum systems after insertion into the theory of chirp signals. Simulations and initial observations are provided with a device demonstration.

Chirp Theory

A chirp frequency is written as

$\Omega(T)=A(T)\ COS[\Theta(T)]$.....(1)

where $\Theta(T)$: Phase, and $A(T)$: Chirp signal at 'a' time for length 'T'.

The instantaneous can be stated as:

$F(T)=(1/2\varkappa)\ (d\Theta/dt)$.....(2)

The chirp change value is shown as:

$\mu\ (T)=(dF/dt)=(1/2\varkappa)(d2\Theta/dt2)$.....(3)

Here with $\mu(T)>0$: Upchirps; $\mu(T) < 0$: Down-chirps.

For a linear chirp $\mu(T)$: constant,

Waveform centered (T) = 0

$\delta(T)=a(T)\ COS\ [2\varkappa fT + \varkappa\mu T2 + \Theta0]$.....(4)

$B=\mu(T)$.....(5)

A matching filter's reaction to a nonlinear chirping input is a chirping signal once more, but it has the chirping rate of the negative polarity. The output signal usually has a low IF pitch in the chirm center frequency when a shaft shape is supplied in its filter circuit [9]. If we look at smooth domain waveform and consider the template matching centered in t=0, then an analytical model may be provided for the output voltage g(t) of the filter circuit. We've got

$G(T)=H(T)*A(T)=\mu(T)$.....(6)

Where mue(t)is the relative function of A(T).

$\Theta(T)=(Sq.BT)(sin/\mu BT(1-(t/T)\mu BT)COS\ (2\varkappa FT))$.....(7)

The reference voltage should be specified as 1/B. Consequently, the moment combination TB defined as both the compressive ratio or processing efficiency is the proportion of the outputs and inputs pulses length. An important parameter is the reject of the rectangular time-frequency A, which is around 14 dB in chirp signals (T). The use

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Research Article

Random Forest Bagging and X-Means Clustered Antipattern Detection from SQL Query Log for Accessing Secure Mobile Data

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In the current ongoing crisis, people mostly rely on **m**obile phones for all the activities, but query analysis and mobile data security are major issues. Several research works have been made on efficient detection of antipatterns for minimizing the complexity of query analysis. However, more focus needs to be given to the accuracy aspect. In addition, for grouping similar antipatterns, a clustering process was performed to eradicate the design errors. To address the above-said issues and further enhance the antipattern detection accuracy with minimum time and false positive rate, in this work, Random Forest Bagging X-means SQL Query Clustering (RFBXSQLQC) technique is proposed. Different patterns or queries are initially gathered from the input SQL query log, and bootstrap samples are created. Then, for each pattern, various weak clusters are constructed via X-means clustering and are utilized as the weak learner (clusters). During this process, the input patterns are categorized into different clusters. Using the Bayesian information criterion, the similarity measure is employed to evaluate the similarity between the patterns and cluster weight. Based on the similarity value, patterns are assigned to either relevant or irrelevant groups. The weak learner results are aggregated to form strong clusters, and, with the aid of voting, a majority vote is considered for designing strong clusters with minimum time. Experiments are conducted to evaluate the performance of the RFBXSQLQC technique using the IIT Bombay dataset using the metrics like antipattern detection accuracy, time complexity, false-positive rate, and computational overhead with respect to the differing number of queries. The results revealed that the RFBXSQLQC technique outperforms the existing algorithms by 19% with pattern detection accuracy, 34% minimized time complexity, 64% false-positive rate, and 31% in terms of computational overhead.

1. Introduction

In recent years, several databases from different domain areas, especially mobile databases, have been available in public for fast and precise accessibility. They usually provide interfaces and hence are said to be accessed extensively. However, due to the public availability of the database, the interaction between the owners and users is not said to occur. Also, analysing such a log is a cumbersome process, as given in [1].

Apart from the purpose of making a call, mobile phones are used for multipurposes like shopping, mobile banking, ticket booking, and social media applications. These devices can able to run a small business and help to maintain e-records. Where and how these data are stored? How to retrieve the data? And managing to handle the traffic generated by these data is cumbersome. Query analysis plays a vital role in retrieving the data both at the customer end and the developer or service provider. Pattern detection mechanisms are applied to detect the data,

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DTW Algorithm – Dementia Detection For Driving Pattern In Smart Phones

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ABSTRACT ; Dementia is a term that covers a group of symptoms that include memory loss and difficulty, as well as challenges with thinking, problem-solving, and language. Dementia is caused by disorders that break the mind, such as Alzheimer's disease or a series of strokes. There are hundreds of requests available to assist persons who have been diagnosed with dementia. However, there are no apps or multimedia that can tell a person whether or not they have dementia. To recognize dementia, approved approaches include a variety of exams and diagnostic procedures. These dementia tests often include mental ability tests, blood tests, and brain imaging. In this work, an unique technique for detecting dementia is proposed, which involves detecting repeated changes in a person's steering outline using smartphone sensors and the DTW algorithm, as well as prescribing medication before the condition deteriorates if the individual is diagnosed with dementia.
Keywords: Dementia, Alzheimer's, DTW (Dynamic Time warping), accelerometer, magnetometer, gyroscope, SMA (simple moving average).

1. INTRODUCTION

Dementia is a symptom, not a disease. It's a broad word that refers to a slew of symptoms associated with a loss of memory or other thinking skills severe enough to limit a person's ability to carry out daily chores. Due to the wide range of dementia symptoms, at least two of the following core mental functions must be considerably impaired in order to be diagnosed with dementia:

1. Memory
2. Communication and language
3. Ability to focus and wage attention
4. Reasoning and judgment
5. Visual perception

Dementia is caused by damage to brain cells. The ability of mind cells to communicate with one another is harmed as a result of this injury. When brain cells don't interact properly, it might have an impact on one's thoughts, actions, and emotions. There is no single test that

An automatic procedure for crop mapping using agricultural monitoring

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Abstract. IoT and Machine Learning are emerging techniques used in existing days. Agriculture plays a vital role in human survival. Mapping crop according to the current environment is important to improve agriculture. pH sensors, dielectric soil moisture Sensors, mechanical sensors, optical sensors, electro- chemical sensors and air flow sensors are used in this proposed system to gather data about the soil and supervised Learning associated with Association algorithm are used to analyze and predict which crop maps to the soil in the present circumstances. Ensemble Technique is integrated to make accurate classification to select the type of crop. Technology combining both IoT and Machine learning are used to improve the production of the crop which proportionally helps to improve the agricultural yield.

Keywords: Optical Sensors, Soil, Electro-Chemical Sensors, Mechanical Sensors, Association rule mining,

1. Introduction

IoT: Internet of Things is the internet-based technology which uses sensors to collect data and it is sent to IoT Analysis platform which accumulates the data and makes the decision. The workflow of IoT is shown in the Figure 1.

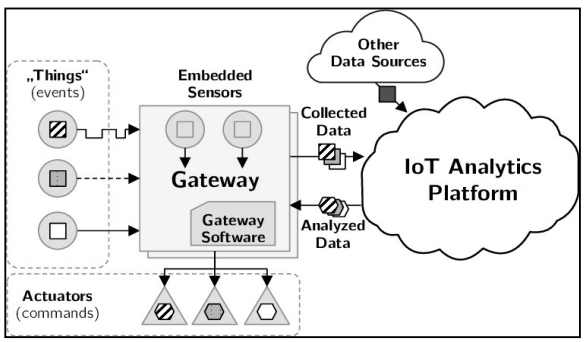

Figure 1. Workflow of IoT.

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ORIGINAL ARTICLE

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Static localization for underwater acoustics sensor networks using Nelder–Mead algorithm for smart cities

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Abstract

Localization is considered as an important research concept for underwater acoustic sensor networks (UASNs). It performs significant role in diverse routing methods, estimating the node position and node recovery. In UASNs, localization methods have different characteristics compared with the terrestrial networks. The challenges involved in UASNs are varying water temperature and pressure, time synchronization of beacon nodes, complicated ocean currents, and positioning of nodes. To overcome these challenges, a virtual node is deployed using the Nelder–Mead algorithm with the static localization method. In this study, two types of localization methods namely static and dynamic methods are considered and a virtual node is deployed in a static localization manner. Since anchor nodes cannot communicate to the entire network for localization additionally, virtual nodes are deployed to measure the received signal strength indicator and error ratio for effective transmission. In addition "GPS node" is equipped with a ship for easy deployment without communication overhead. The simulation result justifies that static localization for an autonomous underwater sensor networks perform

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FOCUS

Multi-criteria-based approach for job scheduling in industry 4.0 in smart cities using fuzzy logic

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Abstract

A flexible manufacturing system (FMS) is the model used for the system produced in the manufacturing industry, and it consists of the number of interconnected workstation. Inflexible manufacturing system scheduling of jobs has become a serious problem, even for a short breakdown of the machine and for the unexpected arrival of the product. To overcome this problem, a flexible manufacturing system using fuzzy rules is proposed. In this proposed model, four input variables are considered: (1) machine allocated processing time; (2) priority of the machine; (3) priority of the due date; and (4) priority of the setup time. The priority based on the job is the fuzzy variable, which shows the status of the job, based on which the next job will be selected for the processing in the machine. In this model, the machine will be selected first, and then, the scheduling is done based on the multi-criteria scheduling system. The obtained results are compared with the existing system and from the results. The improved scheduling strategy provides better results for the scheduling problem.

Keywords Fuzzy logic · Fuzzy scheduling · Multi-criteria scheduling · Processing time · Priority

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1 Introduction

In recent years, wireless sensors have taken an important role in advanced monitoring and measuring sectors. The sensors have turned out to be an essential part of various industries intended to use them in safeguarding and maintaining their assets. The wireless sensors are enabled through data processing along with communication abilities. These tiny devices are useful in the prevention of possible failures in the early stages of safety–critical in industrial and environmental monitoring applications. The wireless sensors are widely used in industrial monitoring: health monitoring of the machinery, industrial asset tracking, and harmful gas leakage detection in industries and environmental monitoring. As the cost of sensors is low, they can be deployed in more numbers in the monitoring area (Saha et al. 2013). This, in turn, poses the challenges in network management like routing, topology control, and data management protocols. The huge counts of SNs (sensor nodes) are randomly deployed to monitor a wide range of geographical space to cover the desired area. These SNs require batteries for their operations, and the life of SN depends on the batteries working condition. Once the batteries dry, battery recharging or installing a

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Protecting Data Mobility in Cloud Networks Using Metadata Security

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Abstract: At present, health care applications, government services, and banking applications use big data with cloud storage to process and implement data. Data mobility in cloud environments uses protection protocols and algorithms to secure sensitive user data. Sometimes, data may have highly sensitive information, leading users to consider using big data and cloud processing regardless of whether they are secured are not. Threats to sensitive data in cloud systems produce high risks, and existing security methods do not provide enough security to sensitive user data in cloud and big data environments. At present, several security solutions support cloud systems. Some of them include Hadoop Distributed File System (HDFS) baseline Kerberos security, socket layer-based HDFS security, and hybrid security systems, which have time complexity in providing security interactions. Thus, mobile data security algorithms are necessary in cloud environments to avoid time risks in providing security. In our study, we propose a data mobility and security (DMoS) algorithm to provide security of data mobility in cloud environments. By analyzing metadata, data are classified as secured and open data based on their importance. Secured data are sensitive user data, whereas open data are open to the public. On the basis of data classification, secured data are applied to the DMoS algorithm to achieve high security in HDFS. The proposed approach is compared with the time complexity of three existing algorithms, and results are evaluated.

Keywords: Data mobility; data security; cloud computing; big data; DMoS algorithm

1 Introduction

Big data are processed in cloud storages using the Hadoop file system. However, providing security to big data in cloud databases is challenging. Content delivery networks in cloud environments are used by service providers and numerous content users, who are connected to the system. Thus, sensitive data in

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Research Article

Optimal Deep-Learning-Enabled Intelligent Decision Support System for SARS-CoV-2 Classification

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Intelligent decision support systems (IDSS) for complex healthcare applications aim to examine a large quantity of complex healthcare data to assist doctors, researchers, pathologists, and other healthcare professionals. A decision support system (DSS) is an intelligent system that provides improved assistance in various stages of health-related disease diagnosis. At the same time, the SARS-CoV-2 infection that causes COVID-19 disease has spread globally from the beginning of 2020. Several research works reported that the imaging pattern based on computed tomography (CT) can be utilized to detect SARS-CoV-2. Earlier identification and detection of the diseases is essential to offer adequate treatment and avoid the severity of the disease. With this motivation, this study develops an efficient deep-learning-based fusion model with swarm intelligence (EDLFM-SI) for SARS-CoV-2 identification. The proposed EDLFM-SI technique aims to detect and classify the SARS-CoV-2 infection or not. Also, the EDLFM-SI technique comprises various processes, namely, data augmentation, preprocessing, feature extraction, and classification. Moreover, a fusion of capsule network (CapsNet) and MobileNet based feature extractors are employed. Besides, a water strider algorithm (WSA) is applied to fine-tune the hyperparameters involved in the DL models. Finally, a cascaded neural network (CNN) classifier is applied for detecting the existence of SARS-CoV-2. In order to showcase the improved performance of the EDLFM-SI technique, a wide range of simulations take place on the COVID-19 CT data set and the SARS-CoV-2 CT scan data set. The simulation outcomes highlighted the supremacy of the EDLFM-SI technique over the recent approaches.

1. Introduction

Intelligent decision support systems (IDSS) has become widely used in several applications of healthcare. Internet of things (IoT), wearables, manual data entry, and online sources are some of the instances of complex data sources for IDSS. The data sustained by IDSS significantly helps in the earlier identification of diseases and equivalent treatments. The coronavirus disease 2019 (COVID-19) epidemic, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), began in Wuhan city, Hubei province, in December, 2019, and has spread throughout China. COVID-19 is an infectious disease caused by the novel coronavirus named SARS-CoV-2. The virus is extremely infectious, and can be transmitted by indirect or direct contact with diseased persons with respiratory droplets while they cough, sneeze,

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Research Article

Machine Learning-Based Secure Data Acquisition for Fake Accounts Detection in Future Mobile Communication Networks

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Social media websites are becoming more prevalent on the Internet. Sites, such as Twitter, Facebook, and Instagram, spend significantly more of their time on users online. People in social media share thoughts, views, and facts and create new acquaintances. Social media sites supply users with a great deal of useful information. This enormous quantity of social media information invites hackers to abuse data. These hackers establish fraudulent profiles for actual people and distribute useless material. The material on spam might include commercials and harmful URLs that disrupt natural users. This spam content is a massive problem in social networks. Spam identification is a vital procedure on social media networking platforms. In this paper, we have proposed a spam detection artificial intelligence technique for Twitter social networks. In this approach, we employed a vector support machine, a neural artificial network, and a random forest technique to build a model. The results indicate that, compared with RF and ANN algorithms, the suggested support vector machine algorithm has the greatest precision, recall, and F-measure. The findings of this paper would be useful in monitoring and tracking social media shared photos for the identification of inappropriate content and forged images and to safeguard social media from digital threats and attacks.

1. Introduction

In the last few years, online social networks (OSNs), including Facebook, Twitter, and LinkedIn, are becoming extremely common. People use OSNs to remain in contact, exchange details, plan activities, and even operate their e-business [1]. The data set created has been preprocessed to identify false accounts on social networking sites, and the intelligent systems have identified false accounts. Random forest, neural network, and help vector machine classification output is used to identify fraudulent accounts. The precision rates of fake accounts are compared using certain algorithms, and the

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Black-Hole Attack Mitigation in Medical Sensor Networks Using the Enhanced Gravitational Search Algorithm

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In today's world, one of the most severe attacks that wireless sensor networks (WSNs) face is a Black-Hole (BH) attack which is a type of Denial of Service (DoS) attack. This attack blocks data and injects infected programs into a set of sensors in a group to capture packets before reached to the target. Therefore, raw data in the BH region is thwarted and is unable to reach its destination. The network is susceptible to various

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A futuristic approach to generate random bit sequence using dynamic perturbed chaotic system

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Abstract: Most of the web applications require security which in turn requires random numbers. Pseudo-random numbers are required with good statistical properties and efficiency. Use of chaotic map to dynamically perturb another chaotic map that generates the random bit output is introduced in this work. Perturbance is introduced to improvise the chaotic behaviour of a base map and increase the periodicity. PRNG with this architecture is devised to generate random bit sequence from initial keyspace. The statistical properties of newly constructed PRNG are tested with NIST SP 800-22 statistical test suite and were shown to have good randomness. To ensure its usability in cryptographic applications, it has been analyzed for the size of its keyspace, key sensitivity and performance speed. The test results provide evidence that newly designed PRNG has a 3.6% increase in keyspace and a 5% increase in its performance speed compared to existing chaotic PRNGs. The novel PRNG can be used for cryptographic applications with a faster generation of keys and increased security.

Key words: Random number generation, logistic map, duffing map, perturbance, chaotic PRNG

1. Introduction

Recent advancements in communications made security a primary concern. Communication of information takes place in multiple forms and to secure the information from adversaries, security techniques like cryptography, digital signatures, hashing, etc are required. Many of these techniques require random numbers in various forms like a secret key, nonce numbers, initialization vectors, one-time passwords, etc. Random numbers are a sequence of numbers with no correlation between any two successive numbers. While used in cryptography, they must have the properties of uniform distribution and independence[1]. Uniform distribution refers to having an equal probability of appearance for all numbers in the given space. Independence refers to the absence of correlation between any two successive random numbers in the sequence. These properties are required to secure the cryptographic algorithms, as they rely mainly on the randomness of the random sequence. Periodicity of a Random Number Generator (RNG) refers to the length of the random sequence until the repetition of number occurs. Size of all possible keys that have the potential to generate random numbers is called keyspace. An ideal RNG is expected to have longer periodicity and larger keyspace.

Generating random numbers from a natural source of randomness is called True Random Number Generator (TRNG) and generating random numbers from deterministic algorithms is called Pseudo Random

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Enhanced multimodal biometric recognition approach for smart cities based on an optimized fuzzy genetic algorithm

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Biometric security is a major emerging concern in the field of data security. In recent years, research initiatives in the field of biometrics have grown at an exponential rate. The multimodal biometric technique with enhanced accuracy and recognition rate for smart cities is still a challenging issue. This paper proposes an enhanced multimodal biometric technique for a smart city that is based on score-level fusion. Specifically, the proposed approach provides a solution to the existing challenges by providing a multimodal fusion technique with an optimized fuzzy genetic algorithm providing enhanced performance. Experiments with different biometric environments reveal significant improvements over existing strategies. The result analysis shows that the proposed approach provides better performance in terms of the false acceptance rate, false rejection rate, equal error rate, precision, recall, and accuracy. The proposed scheme provides a higher accuracy rate of 99.88% and a lower equal error rate of 0.18%. The vital part of this approach is the inclusion of a fuzzy strategy with soft computing techniques known as an optimized fuzzy genetic algorithm.

The future of smart city security is based on multimodal biometrics. A biometric system is an automated system that recognizes a person related to behavioral or physiological characteristics, and it has made considerable progress in a variety of applications, such as surveillance, identification, access control, and protection. Facial characteristics, retinal characteristics, vein patterns, speech patterns, keystroke dynamics, nail bed, ear design, fingerprints, and other biological attributes have also been studied for verification purposes. Among these different traits, fingerprints seem to be a commonly used biometric trait. Additionally, the iris is the most accurate biometric because it is distinctive and consistent over time[1].

While *unimodal* authentication technologies are more accurate, they only address a few issues, such as spoofing resistance and good privacy. Personal and biological problems, such as limited sample size and noise tracking devices, have a significant impact on the accuracy rate of unimodal biometric systems. Multimodal biometrics has been used to verify people to make authentication easier in smart city environments. Multimodal biometric systems have progressively been introduced to solve these issues. Supplementary traits derived from divergent modalities are used in multimodal biometric systems. Multimodal biometric identification systems outperform *unimodal* biometric security systems in terms of spoofing resistance and improving capabilities[2].

The drawback of the existing approach is that the efficiency of most current multimodal biometric systems is hindered by contradictory classifier ratings. To address this problem, a new multi-biometric system based on a machine learning network is presented.

The most appropriate and effective technique for multimodal biometrics for smart cities has been stated, which presents a convergence of information at the scoring stage. The fusion of several biometric modalities focused on matching rankings is gaining popularity and appears to be a very promising approach to strengthen accuracy. Some score-level convergence techniques have been adopted thus far for this initiative[3]. Fuzzy techniques with optimization strategies offer enhanced security and accuracy of authentication systems[4]. The

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Review Article

Implementation of Whale Optimization for Budding Healthiness of Fishes with Preprocessing Approach

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This article examines distinctive techniques for monitoring the condition of fishes in underwater and also provides tranquil procedures after catching the fishes. Once the fishes are hooked, two different techniques that are explicitly designed for smoking and drying are implemented for saving the time of fish suppliers. Existing methods do not focus on the optimization algorithms for solving this issue. When considering the optimization problem, the solution is adequate for any number of inputs at time *t*. For this combined new flanged technique, a precise system model has been designed and incorporated with a set of rules using contention protocols. In addition, the designed system is also instigated with a whale optimization algorithm that is having sufficient capability to test the different parameters of assimilated sensing devices using different sensors. Further to test the effectiveness of the proposed method, an online monitoring system has been presented that can monitor and in turn provides the consequences using a simulation model for better understanding. Moreover, after examining the simulation results under three different scenarios, it has been observed that the proposed method provides an enhancement in real-time monitoring systems for an average of 78%.

1. Literature: A Brief Review

For applying the proposed indication on monitoring fisheries with smoking and cutting methods, many existing methodologies have been analyzed, and they are discussed in this section. Since many accurate predictions are needed under water, a smart quality sensor has been designed with a new adaptive system model [1]. The major exertion has concentrated on analyzing the varying nature of fishes, and an ice storage system has been used for storage where only a limited number of measurements have been provided. Consequently, association between index quality and

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A machine learning algorithm for classification of mental tasks

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ABSTRACT

In this article, a contemporary tack of mental tasks on cognitive parts of humans is appraised using two different approaches such as wavelet transforms at a discrete time (DWT) and support vector machine (SVM). The put forth tack is instilled with the electroencephalogram (EEG) database acquired in real-time from CARE Hospital, Nagpur. Additional data is also acquired from a brain-computer interface (BCI). In the working model, signals from the database are wed out into different frequency sub-bands using DWT. Initially, updated statistical features are obtained from different frequency sub-bands. This type of representation defines the wavelet co-efficient which is introduced for reducing the measurement of data. Then, the projected method is realized using SVM for segregating both port and veracious hand movement. After segregation of EEG signals, results are achieved with an accuracy of 92% for BCI competition paradigm III and 97.89% for B-alert machine.

1. Classification of mental task- an introduction

Brain-computer interface (BCI) consisting of processors analyses the signals on the brain and decodes the observed signals to a set of commands for enchanting the desired exploit. However, there is no need to use standard paths present at the output of peripheral nerves and muscles for such a conversion process. The EEG signal is a vital part of the correspondence between human considerations and PC. It is also a new research field for neurologists. For classifying various signals depending on mental task, a transformation process is needed where signals monitored on EEG will be converted to control signals, thus, providing robust operation. Few mental states can be dependably recognized by perceiving designs in EEG, at this juncture, a paralyzed individual could communicate to any gadget like a wheelchair by making arrangements out of these psychological states. Estimating mind action through EEG prompts the obtaining of an enormous measure of information. Therefore, to get the ideal exhibitions, it is essential to work with fewer qualities that describe the applicable properties of the signal. Feature extraction can be characterized by an activity that changes one or a few signals into a feature vector. It is conceded by discrete wavelet transform (DWT), which is introduced in 1976, where the main

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RESEARCH ARTICLE

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Blockchain enabled joint trust (MF-WWO-WO) algorithm for clustered-based energy efficient routing protocol in wireless sensor network

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Abstract

In this manuscript, a blockchain enabled joint trust (MF-WWO-WO) algorithm for clustered based energy efficient routing protocol in wireless sensor network (WSN) is proposed for secure data transmission by finding the optimum cluster head (CH) in the network. Here, MayflyWater Wave Optimization (MF-WWO) algorithm is used for CH selection accurately. After the selection of CH, the malicious node occurs in the cluster. Hence, the multi objective whale optimization algorithm is proposed to find the trust path from the several paths. At last, the optimized selected trust paths are given to the blockchain for communications in the network that is safe and more trustworthy. The simulation is done in MATLAB. The proposed MF-WWO-WO achieves high throughput, high efficiency, high network life time, high packet delivery ratio, low delay, low energy consumption, and low packet loss ratio. The outcomes shows the better performance of the proposed approach when compared to the existing approaches, like blockchain and clustered based secured data aware energy efficient using fitness averaged rider optimization algorithm FA-ROA blockchain and clustered based secured data aware energy efficient using trusted moth flame optimization and genetic optimization algorithm TMFO-GOA. Finally, the proposed approach attains better energy efficiency and security.

1 | INTRODUCTION

Wireless sensor network (WSN) is an active field of research due to its emerging importance in many applications including environment and habitat monitoring, health care applications, traffic control, and military network systems.[1] The nodes in the sensor contain several limitations, such as less power, less calculation efficiency, less storage capacity. The cluster-based routing is very essential in WSN to raise the network lifetime.[2,3]The clustering in WSN collected large amount of cluster member and drop node. In cluster based WSN, the cluster head (CH) is a significant part to lead the whole cluster members.[4,5] That's why, the CH selection is the key process of cluster based WSN.

The CH can transmit and receive data to the base station for storage.[6,7] If there is lack of registration as well as verification apparatus in the network nodes, then the malicious nodes arrive in the network.[8,9] Hence, trust path calculation is more important to prevent the network from the malicious node.[10,11] Blockchain is a significant part of WSN, it provides security and privacy. It is organized in base station and also performs transactions.[12,13]The cluster member nodes collect

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Grid Search for Predicting Coronary Heart Disease by Tuning Hyper-Parameters

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Abstract: Diagnosing the cardiovascular disease is one of the biggest medical difficulties in recent years. Coronary cardiovascular (CHD) is a kind of heart and blood vascular disease. Predicting this sort of cardiac illness leads to more precise decisions for cardiac disorders. Implementing Grid Search Optimization (GSO) machine training models is therefore a useful way to forecast the sickness as soon as possible. The state-of-the-art work is the tuning of the hyperparameter together with the selection of the feature by utilizing the model search to minimize the false-negative rate. Three models with a cross-validation approach do the required task. Feature Selection based on the use of statistical and correlation matrices for multivariate analysis. For Random Search and Grid Search models, extensive comparison findings are produced utilizing retrieval, F1 score, and precision measurements. The models are evaluated using the metrics and kappa statistics that illustrate the three models' comparability. The study effort focuses on optimizing function selection, tweaking hyperparameters to improve model accuracy and the prediction of heart disease by examining Framingham datasets using random forestry classification. Tuning the hyperparameter in the model of grid search thus decreases the erroneous rate achieves global optimization.

Keywords: Grid search; coronary heart disease (CHD); machine learning; feature selection; hyperparameter tuning

1 Introduction

Coronary cardiovascular disease (CHD) is one kind of cardiac illness that is seen as a major health concern and one of the world's mortality factors [1]. In recent years, this kind of cardiovascular disease has increased. The death rate of heart disease is estimated at approx. 31% globally, [2–5] according to the World Health Organization (WHO) and over 23.6 million people worldwide may die from this heart condition. Thus, doctors demand that they identify patients with heart disease not just for symptoms but also for medical testing and diagnoses [6,7]. Meanwhile, fatalities from stroke and heart attack have

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Original Article

Effective Autism Spectrum Disorder Prediction to Improve the Clinical Traits using Machine Learning Techniques

Dr. R. Surendiran[1], Dr. M. Thangamani[2], C. Narmatha[3], M. Iswarya[4]

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[2]*Department of Information Technology, Kongu Engineering College, Erode, India. ORCID: 0000-0001-8864-3315*
[3,4]*Department of Computer Technology, Kongu Engineering College, Erode, India.*

[1]Corresponding author: surendiranmca@gmail.com

Received: 17 November 2021 Revised: 03 March 2022 Accepted: 10 April 2022 Published: 30 April 2022

Abstract *- Autism spectrum disorder (ASD) is a neuro-developmental complaint that influences an individual's communication, announcement, and knowledge talents. Analysis of Autism can be completed at any age-group level. Autism patients look at diverse kinds of disputes learning disabilities, and complexity with meditation. Mental health problems, motor difficulties, and sensory problems are some of the problems faced by Autism patients. Earlier diagnosis and proper medication at the early stage are essential to control ASD. The ASD prediction framework is built to support a behavioral aspect-based analysis model without any device in this research. The ASD prediction process is focused on the childhood and adolescent analysis model utilized in the system. The behavioral parameters are collected with the support of the Autism Query collections. The decision tree (DT) and Support Vector Machine (SVM) techniques, K-Nearest Neighbors (KNN), and Artificial Neural Network (ANN) are applied for the ASD prediction process. The Correlated Feature selection based Random Forest (CFS-RT) algorithm is applied for the ASD prediction process, giving an accuracy of 93.03%, and ANN produces 97.68% and outperformance other methods.*

Keywords *- Autism Spectrum Disorder, Decision Tree, Machine Learning, Data Mining, Support Vector Machine.*

1. Introduction

Autism spectrum disorder (ASD) is a progressive disability that can benefit important basis community, contact, and behavioral issues. There are frequent tells how a community with ASD looks that sets them together from new persons. Still, individuals with ASD could converse, interrelate, function, perform and hear in the approach part from mainly individual people. The knowledge, thoughts, and difficulty-resolving facility of persons with ASD can provide a choice from talented to more confronted. An analysis of ASD contains a lot of provisions that applied to be analyzed alone as autistic disorder syndrome. These situations in named ASD.

ASD is a state connected to mind growth that forces how a person recognizes and meet peoples, obtaining difficulty in public contact and dealings. The disorder also contains genetic factors, environmental aspects, biological factors, and inadequate and recurring behavior patterns. In the United States, more children's affected by Autism. Each person with Autism has different issues, like anxiety, seizures, and depression, as shown in Figure 1. Autism can be obtained at two or three and diagnosed as early as before 18 months. Early detection gives a good impact on the life of persons. Persons with ASD may perform work, interconnect, interrelate, and acquire behaviors that are changed from person to person. The skills of a person with ASD can differ significantly. The person with ASD are issues with the social announcement and limited behaviors. The children have varying habits of culture and give less attention. Diagnosing ASD is also a problem because there is no proper medical test or blood test to identify the disorder. Doctors see the child's behavior and can start a diagnosis to increase the quality of life.

Intelligent Automation & Soft Computing
DOI:10.32604/iasc.2022.022339
Article

Tech Science Press

False Alarm Reduction in ICU Using Ensemble Classifier Approach

V. Ravindra Krishna Chandar[1,*] and M. Thangamani[2]

[1]Department of CSE, Paavai Engineering College, Namakkal, 637001, Tamilnadu, India
[2]Department of Information Technology, Kongu Engineering College, Perundurai, 638052, Tamilnadu, India
*Corresponding Author: V. Ravindra Krishna Chandar. Email: ravindrakrishna1234@gmail.com, ravindrakrishna@paavai.edu.in
Received: 04 August 2021; Accepted: 09 December 2021

Abstract: During patient monitoring, false alert in the Intensive Care Unit (ICU) becomes a major problem. In the category of alarms, pseudo alarms are regarded as having no clinical or therapeutic significance, and thus they result in fatigue alarms. Artifacts are misrepresentations of tissue structures produced by imaging techniques. These Artifacts can invalidate the Arterial Blood Pressure (ABP) signal. Therefore, it is very important to develop algorithms that can detect artifacts. However, ABP has algorithmic shortcomings and limitations of design. This study is aimed at developing a real-time enhancement of independent component analysis (EICA) and time-domain detection of QRS that can be used to distinguish between imitation and false alarms. QRS detection is used to examine the waveform values appropriately by calculating the signal values, which are then utilized to identify the areas of high-frequency noise. AHE method is tapped to find the signal saturation values after the removal of such noise values. For artifact detection, Haar Wavelet Transform (HWT) and QRS detection methods are proposed. These operations are performed under the time domain. The classification model is proposed and trained by Fuzzy Neural Network (FNN), Extreme Random Trees (ERTs), and Extreme Learning Machine (ELM).

Keywords: Arterial blood pressure (ABP); haar wavelet transform (HWT); enhanced independent component analysis (EICA); extreme learning machine (ELM); fuzzy neural network (FNN); extreme random trees (ERTs)

1 Introduction

Monitoring patients in the Intensive Care Unit(ICU) is very crucial in today's medical environment. As a result, there is a clinically significant concern that the patients need additional attention. The resulting noise harms both the patients and the staff. New difficulties about this scary condition have been reported in recent years. For example, according to certain studies, a sleeping issue related to noise in the ICU contributes to deliberate recovery. But, the detrimental impact caused by the increased level of noise in the ICU leads to a false alert, which upsets the medical staff more than the patients [1]. These tiredness alarms do not represent a genuine danger to the sufferers, but they do cause severe harm. This may result in complicated circumstances for hospitals as well as patients. The increasing frequency of alarms and false alarms causes medical experts to become desensitized. There has been numerous research conducted to reduce false alarms in intensive care

Cluster Computing
https://doi.org/10.1007/s10586-022-03607-1

A highly secured intrusion detection system for IoT using EXPSO-STFA feature selection for LAANN to detect attacks

M. Jeyaselvi[1] · Rajesh Kumar Dhanaraj[2] · M. Sathya[3] · Fida Hussain Memon[4,5] · Lalitha Krishnasamy[6] · Kapal Dev[7] · Wang Ziyue[8] · Nawab Muhammad Faseeh Qureshi[9]

Received: 18 July 2021 / Revised: 29 November 2021 / Accepted: 6 December 2021

Abstract
The Internet of Things (IoT) is a modern age technology, designed with the vision to connect and also interconnect all the objects everywhere. Technological progressions provide businesses with many comforts as well as helps the attackers and intruders to crack the IoT networks' security. Numerous Intrusion Detection Systems (IDSs) are created aimed to attack prevention systems. Frequently, security stays to be challenging in the IoT networks. The work addressed here presents the new effective secured IDS aimed at IoT environment, which sustains the data's confidentiality, integrity, together with its availability. At first, the data has been pre-processed, which helps in acquiring a clear vision about any attack that is about to occur. The methods are handling of missing and Nan values, date and time variables, categorical features and with scaling of data. Next, aimed at acquiring the data's knowledge, this work has established an Improved Pearson Correlation Coefficient (IPCC), Feature Extraction (FE) method that presents the relation amidst the data by pondering the causative. The features' extraction is next followed by the relevant features' selection aimed at maintaining an efficient computational time and also accuracy utilizing Explorated Particle Swarm Optimization (PSO) centred Sea Turtle Foraging Algorithm (EXPSO-STFA). At last, the feature chosen has been trained and then examined over the Look Ahead Artificial Neural Network (LAANN) classification aimed at identifying the attacks. The LAANN method offers lesser error rate and also evades False Alarm Rate's (FAR's) chances and also locates the attack much effectively and also reliably. Moreover, the work administers the malicious attacks' and random behaviour, and also yields an accurate outcome with the help of evaluation parameters such as Accuracy, Specificity, Sensitivity, Precision, F-Measures, FPR, FNR and MCC. Experiential examination exhibits that the work yields 95.65% accuracy, and also attains 98.16% average Attack Detection Rate (ADR), and the work stays to be much scalable and also secured analogized to the existent top-notch techniques.

Keywords Robust Scaler · Intrusion detection system (IDS) · Attacks · Improved Pearson Correlation Coefficient (IPCC) · Explorated Particle Swarm Optimization based Sea Turtle Foraging Algorithm (EXPSO-STFA) · Look Ahead Artificial Neural Network (LAANN) · False Alarm Rate (FAR)

1 Introduction

The IoT is a smart network that linked everything into the internet aimed at exchanging information with the agreed protocols [1]. Consequently, anybody can access whatever they need, at any instance and as of anyplace. Things or else objects prevalent inside an IoT network are connected wirelessly utilizing the smart tiny sensors. IoT devices can interact with one another with no human intervention [2, 3]. IoT presents diverse applications, namely smart homes, health monitoring, smart cities, smart environment, and also smart water [4]. Numerous problems arise with the IoT applications' advancement. Among many other issues, the IoT's security issue cannot be ignored [5]. IoT devices can be accessed from anywhere via an untrusted network, like the internet, so IoT networks are not protected from numerous malevolent attacks. The confidential information can be spilled at any instance, if the security complications aren't labelled. Therefore, the security complications should be labelled in the IoT networks [6].

Guaranteeing the IoT networks' security aimed at detecting the intruders is a vital step. IDS is amidst the

Extended author information available on the last page of the article

Published online: 21 May 2022

From,

Janani.C.K,

IV'th IT – 'A',

Department of Information Technology,

Kongu Engineering College,

Perundurai. 638052

Date: 13/07/2021

To,

The Principal,

Kongu Engineering College,

Perundurai. 638052

Respected Sir,

Subject: Request for permission to attend the Grootan Technologies Internship – reg

With due respect, my name is Janani.C.K. from the Department of Information Technology, having roll number 18ITR039 of the 2018-2022 batch. I am writing this letter to request permission for attending an internship physically. I recently got selected as a "Junior Engineer" at Grootan Technologies. The Internship period is for 3 months starting from 02/08/2021 (Monday).

This internship being really important and integral part of my learning procedures, I request you to consider my situation and grant me permission for giving me the attendance. I'll surely attend the CAT and Semester as per schedule without fail. I have enclosed my offer letter along with this mail.

Look forward to your kind consideration.

May be Permitted

15/7/21

Yours Sincerely,

Janani

Janani.C.K. (18ITR039)

IV'th IT- 'A'

Department of Information Technology.

June 21, 2021
To: Janani C K

Congratulations **Janani**! We are happy to welcome you to Grootan Technologies and we are pleased to offer you the role of **Junior Engineer.**

With reference to the same, mentioned below are the details of your joining the company:

1. **Internship Start Date: August 02,2021**
2. **Stipend:10K Per Month (During Internship Period)**
3. **Location: Grootan Technologies Pvt Ltd, #364 & 365, Vaibogh,5th Link Street Nehru Nagar, Perungudi-600096**

Your role carries a total annual compensation and benefits of INR **5,00,004** (refer to the breakup of salary components). Below package will be applicable once you join the company full time.

Salary Break-Up	**Per Month**	**Per Annum**
Basic	16,667	200,004
House Rent Allowance	10,000	120,000
Conveyance Allowance	1000	12,000
Professional Dev Allowance	2,500	30,000
Performance Allowance	7,500	90,000
Attire Allowance	1,000	12,000
Business Communication	1,000	12,000
Medical Reimbursement	2,000	24,000
Gross Salary	**41,667**	**500,004**

Please keep the salary information confidential. As a token of acceptance, please sign a copy of this document and email to hr@grootan.com within three days of receiving this letter else this offer will be deemed to be cancelled.
Wishing you all the best and let's "Grow together" !

Thanks,

Lokesh Ravichandru
Co-Founder & CTO

Sasikumar T
Director of Project Delivery & HR

From,

Karthick.M,

IV'th IT – 'A',

Department of Information Technology,

Kongu Engineering College,

Perundurai. 638052

Date: 12/07/2021

To,

The Principal,

Kongu Engineering College,

Perundurai. 638052

Respected Sir,

Subject: Request for permission to attend the MAERSK Internship – reg

With due respect, I am Karthick.M from the Department of Information Technology, with roll number 18ITR043 of the 2018-2022 batch.

I recently got selected as an "Identity and Access Management Intern" at Maersk Global Service Centres. The Internship period is for 6 months started from 31/05/2021 (Monday). This internship being really important and integral part of my learning procedure. I request you to consider my situation and grant me permission to attend this internship.

Looking forward to your kind consideration.

Thank you,

May be Permitted

15/7/21

Yours Sincerely,

Karthick.M (18ITR043)

IV'th IT- 'A'

Department of Information Technology.

MAERSK

Dear Karthick M,

Date: 17 May 2021

We are pleased to confirm your Internship with Maersk Global Service Centers (India) Pvt. Limited (hereinafter referred as "Company") on the following terms and conditions with effect from **31 May 2021** for a period of six months. Accordingly, your internship will come to an end on **30 November 2021**.

1. **Scope**: You will perform internship in **Maersk Platform** on **Access Management & KYC** and such other scope of work as intimated by the Company from time to time.

2. **Location:** Your location for Internship with the Company will be **Bangalore**.

3. **Intern Mentor:** An employee from **Harsha Alakeshwar**'s team will act as your 'Mentor' during the tenure of your internship with the Company and will supervise all aspects of your internship. If for any reason, the assigned Mentor is unable to continue to serve as your Mentor, the Company shall appoint another person as the Mentor under whose aegis you shall continue your internship. Your assignment and schedule would be as per the discussions with your Mentor.

4. **Business hours:** Unless otherwise agreed upon, the working hours during your internship would be from 9:30 a.m. to 6:30 p.m. from Monday to Friday.

5. **Review meetings**: The Intern Mentor along with such other individuals as deemed appropriate by the Company may conduct periodic review meetings (as needed) with you to discuss on progress of various parameters agreed upon, assessment of milestones as well as any issues arising from your internship.

6. On completion of your internship you will be required to submit the project report (if applicable) to your Mentor and the HR team, basis which the Company will issue the internship completion certificate.

7. You will perform your assignments in an independent capacity, and nothing in this offer/ Agreement shall be construed to give you the power or authority to act for, bind, or commit on behalf of the Company in any way. Nothing herein shall be construed to create the relationship of partners, employer and employee, or principal and agent.

8. **Stipend**: In consideration of your performance during the internship, the Company agrees to pay a fixed sum of **INR 40,000** per month as Stipend with effect from the Effective Date, subject to deduction of applicable taxes. The above sum represents the entire compensation for your internship with the Company for the tenure agreed upon.

MAERSK

You are kindly requested to confirm your agreement to the above terms and conditions, by signing and returning the duplicate of this Letter.

We welcome you to our organization and trust that your association with us will be a happy and mutually rewarding one!

Yours faithfully,
For MAERSK GLOBAL SERVICE CENTRES (INDIA) PVT LTD

Gautam Shetty
India Hiring Lead

Agree _____ Date _____

KARTHICK M

MAERSK GLOBAL SERVICE CENTRES (INDIA) PVT LTD
Ground Floor, Block 1, Milestone Buildcon SEZ, Bhartiya City
Thanisandra Main Road, Chokanahalli, Bangalore- 560064
Regd. Office : 4th & 5th Floor, Prudential Building, Central Avenue Road, Hiranandani Business Park, Powai,
Mumbai – 400 076. India. Phone : 91-22-6679 9999 Fax : 91-22-6679 9030/40 - www.maerskline.com
Corporate Identity Number (CIN) : U72900MH2003PTC143195

From,

Giridharan P,

IV'th IT – 'A',

Department of Information Technology,

Kongu Engineering College,

Perundurai. 638052

Date: 14/07/2021

To,

The Principal,

Kongu Engineering College,

Perundurai. 638052

Respected Sir,

Subject: Request for permission to attend the MAERSK Internship – reg

With due respect, my name is Giridharan P from the Department of Information Technology, having roll number 18ITR024 of the 2018-2022 batch.

I am writing this letter to request permission for attending an internship. I recently got selected as a "**GCD/Customs Compliance on Development & Testing**" at **Maersk Global Service Centers**. The Internship period is for 6 months started from 31/05/2021 (Monday).

This internship being really important and integral part of my learning procedures, I request you to consider my situation and grant me permission for the same.

Look forward to your kind consideration.

May be Permitted

15/7/21

Yours Sincerely,

P Giridharan

Giridharan P (18ITR024)

IV'th IT- 'A'

Department of Information Technology.

MAERSK

Dear Giridharan P,

Date: 17 May 2021

We are pleased to confirm your internship with Maersk Global Service Centers (India) Pvt. Limited (hereinafter referred as "Company") on the following terms and conditions with effect from **31 May 2021** for a period of six months. Accordingly, your internship will come to an end on **30 November 2021**.

1. **Scope**: You will perform internship in **GCD/Customs Compliance** on **Development & Testing**, and such other scope of work as intimated by the Company from time to time.

2. **Location:** Your location for Internship with the Company will be **Bangalore**.

3. **Intern Mentor**: An employee from **Avinash Seetharamu's** team will act as your 'Mentor' during the tenure of your internship with the Company and will supervise all aspects of your internship. If for any reason, the assigned Mentor is unable to continue to serve as your Mentor, the Company shall appoint another person as the Mentor under whose aegis you shall continue your internship. Your assignment and schedule would be as per the discussions with your Mentor.

4. **Business hours:** Unless otherwise agreed upon, the working hours during your internship would be from 9:30 a.m. to 6:30 p.m. from Monday to Friday.

5. **Review meetings**: The Intern Mentor along with such other individuals as deemed appropriate by the Company may conduct periodic review meetings (as needed) with you to discuss on progress of various parameters agreed upon, assessment of milestones as well as any issues arising from your internship.

6. On completion of your internship you will be required to submit the project report (if applicable) to your Mentor and the HR team, basis which the Company will issue the internship completion certificate.

7. You will perform your assignments in an independent capacity, and nothing in this offer/ Agreement shall be construed to give you the power or authority to act for, bind, or commit on behalf of the Company in any way. Nothing herein shall be construed to create the relationship of partners, employer and employee, or principal and agent.

8. **Stipend**: In consideration of your performance during the internship, the Company agrees to pay a fixed sum of **INR 40,000** per month as Stipend with effect from the Effective Date, subject to deduction of applicable taxes. The above sum represents the entire compensation for your internship with the Company for the tenure agreed upon.

MAERSK GLOBAL SERVICE CENTRES (INDIA) PVT LTD
Ground Floor, Block 1, Milestone Buildcon SEZ, Bhartiya City
Thanisandra Main Road, Chokanahalli, Bangalore- 560064
Regd. Office : 4th & 5th Floor, Prudential Building, Central Avenue Road, Hiranandani Business Park, Powai, Mumbai – 400 076. India. Phone : 91-22-6679 9999 Fax : 91-22-6679 9030/40 - www.maerskline.com
Corporate Identity Number (CIN) : U72900MH2003PTC143195

P. Giridharan.

MAERSK

You are kindly requested to confirm your agreement to the above terms and conditions, by signing and returning the duplicate of this Letter.

We welcome you to our organization and trust that your association with us will be a happy and mutually rewarding one!

Yours faithfully,
For MAERSK GLOBAL SERVICE CENTRES (INDIA) PVT LTD

Gautam Shetty
India Hiring Lead

Agree P.Giridharan. Date 18/05/2021

GIRIDHARAN P

MAERSK GLOBAL SERVICE CENTRES (INDIA) PVT LTD
Ground Floor, Block 1, Milestone Buildcon SEZ, Bhartiya City
Thanisandra Main Road, Chokanahalli, Bangalore 560064
Regd. Office : 4th & 5th Floor, Prudential Building, Central Avenue Road, Hiranandani Business Park, Powai, Mumbai – 400 076. India. Phone : 91-22-6679 9999 Fax : 91-22-6679 9030/40 - www.maerskline.com
Corporate Identity Number (CIN) : U72900MH2003PTC143195

From,

Vishva bharathi.C.,

IV'th year IT – 'B',

Department of Information Technology,

Kongu Engineering College,

Perundurai. 638052

Date: 13/07/2021

To,

The Principal,

Kongu Engineering College,

Perundurai. 638052

Respected Sir,

Subject: Request for permission to attend the Maersk Internship – reg

With due respect, my name is Vishva bharathi.C. from the Department of Information Technology, having roll number 18ITR113 of the 2018-2022 batch. I am writing this letter to request permission for attending an internship. I recently got selected as a "Intern on Service Operations on Developing Script" at Maersk Global Service Centres. The Internship period is for 6 months started from 24/05/2021 (Monday). This internship being really important and integral part of my learning procedures, I request you to consider my situation and grant me permission for the same.

Look forward to your kind consideration.

May be Permitted

15/7/21

Yours Sincerely,

Vishva bharathi.C. (18ITR113)

IV'th year IT- 'B'

Department of Information Technology.

MAERSK

Dear Vishva Bharathi C,

Date: 17 May 2021

We are pleased to confirm your Internship with Maersk Global Service Centres (India) Pvt. Limited (hereinafter referred as "Company") on the following terms and conditions with effect from **24 May 2021** for a period of six months. Accordingly, your internship will come to an end on **23 November 2021**

1 **Scope**: You will perform internship in **Service Operations** on **Developing Scripts**, and such other scope of work as intimated by the Company from time to time.

2 **Location**: Your location for Internship with the Company will be **Pune**.

3 **Intern Mentor**: An employee from **Wilson Michael Fernandes** team will act as your 'Mentor' during the tenure of your internship with the Company and will supervise all aspects of your internship. If for any reason, the assigned Mentor is unable to continue to serve as your Mentor, the Company shall appoint another person as the Mentor under whose aegis you shall continue your internship. Your assignment and schedule would be as per the discussions with your Mentor.

4 **Business hours**: Unless otherwise agreed upon, the working hours during your internship would be from 9:30 a.m. to 6:30 p.m. from Monday to Friday.

5 **Review meetings**: The Intern Mentor along with such other individuals as deemed appropriate by the Company may conduct periodic review meetings (as needed) with you to discuss on progress of various parameters agreed upon, assessment of milestones as well as any issues arising from your internship.

6 On completion of your internship you will be required to submit the project report (if applicable) to your Mentor and the HR team, basis which the Company will issue the internship completion certificate.

7 You will perform your assignments in an independent capacity, and nothing in this offer/ Agreement shall be construed to give you the power or authority to act for, bind, or commit on behalf of the Company in any way. Nothing herein shall be construed to create the relationship of partners, employer and employee, or principal and agent.

8 **Stipend**: In consideration of your performance during the internship, the Company agrees to pay a fixed sum of **INR 40,000** per month as Stipend with effect from the Effective Date, subject to deduction of applicable taxes. The above sum represents the entire compensation for your internship with the Company for the tenure agreed upon.

MAERSK GLOBAL SERVICE CENTRES (INDIA) PVT LTD
Ground Floor, Block 1, Milestone Buildcon SEZ, Bhartiya City
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Regd. Office : 4th & 5th Floor, Prudential Building, Central Avenue Road, Hiranandani Business Park, Powai, Mumbai – 400 076. India. Phone : 91-22 6679 9999 Fax 91-22-6679 9030/40 - www.maerskline.com
Corporate Identity Number (CIN) U72900MH2003PTC143195

MAERSK

You are kindly requested to confirm your agreement to the above terms and conditions, by signing and returning the duplicate of this Letter

We welcome you to our organization and trust that your association with us will be a happy and mutually rewarding one!

Yours faithfully,
For MAERSK GLOBAL SERVICE CENTRES (INDIA) PVT LTD

Gautam Shetty
India Hiring Lead

Agree _____ Date 18/05/2021

VISHVA BHARATHI C

MAERSK GLOBAL SERVICE CENTRES (INDIA) PVT LTD
Ground Floor, Block 1, Milestone Buildcon SEZ, Bhartiya City
Thanisandra Main Road, Chokanahalli, Bangalore- 560064
Regd. Office : 4th & 5th Floor, Prudential Building, Central Avenue Road, Hiranandani Business Park, Powai,
Mumbai – 400 076. India. Phone : 91-22-6679 9999 Fax : 91-22-6679 9030/40 - www.maerskline.com
Corporate Identity Number (CIN) : U72900MH2003PTC143195

From,

Uthaya Sankar. N

IVth IT – 'A'

Department of Information Technology

Kongu Engineering College

Perundurai. 638052.

Date: 13/07/2021

To,

The Principal

Kongu Engineering College

Perundurai. 638052.

Respected Sir,

Subject: Request for permission to attend the Grootan Technologies Internship – reg.

With due respect, I am Uthaya Sankar. N. from the Department of Information Technology, having roll number 18ITR108 of the 2018-2022 batch. I am writing this letter to request permission for attending an internship physically. I recently got selected as a "junior Engineer" at Grootan Technologies. The Internship period is for 3 months starting from 02/08/2021 (Monday). This internship being a really important and integral part of my learning procedures, I request you to consider my situation and grant me permission for giving me the attendance. I assure that I'll attend the CAT and the Semester as per schedule without fail. I have enclosed my offer letter with this mail. Look forward to your kind consideration.

Yours Sincerely,

Uthaya Sankar. N (18ITR108)

IVth IT – 'A'

Department of Information Technology.

May be Permitted

14/07/21

June 21, 2021
To: Uthaya Sankar N

Congratulations **Uthaya Sankar**! We are happy to welcome you to Grootan Technologies and we are pleased to offer you the role of **Junior Engineer.**

With reference to the same, mentioned below are the details of your joining the company:

1. **Internship Start Date: August 02,2021**
2. **Stipend:10K Per Month (During Internship Period)**
3. **Location: Grootan Technologies Pvt Ltd, #364 & 365, Vaibogh,5th Link Street Nehru Nagar, Perungudi-600096**

Your role carries a total annual compensation and benefits of INR **5,00,004** (refer to the breakup of salary components). Below package will be applicable once you join the company full time.

Salary Break-Up	**Per Month**	**Per Annum**
Basic	16,667	200,004
House Rent Allowance	10,000	120,000
Conveyance Allowance	1000	12,000
Professional Dev Allowance	2,500	30,000
Performance Allowance	7,500	90,000
Attire Allowance	1,000	12,000
Business Communication	1,000	12,000
Medical Reimbursement	2,000	24,000
Gross Salary	**41,667**	**500,004**

Please keep the salary information confidential. As a token of acceptance, please sign a copy of this document and email to hr@grootan.com within three days of receiving this letter else this offer will be deemed to be cancelled.
Wishing you all the best and let's "Grow together" !

Thanks,

Lokesh Ravichandru
Co-Founder & CTO

Sasikumar T
Director of Project Delivery & HR

KRIDAS
THE SPORTS PLATFORM

Sportz Platform Pte. Ltd.
320 Thomson Road,
Singapore 307663

WWW.KRIDAS.COM | Email : hello@kridas.com | Call : +65 8118 6469

Date: 05-May-2022

Internship Certificate

This is to certify that Ms. Kalaiyarasi T student of Kongu Engineering College, Perundurai, Erode has successfully completed her internship in our organization, from 9-Aug-2021 till 30-Apr-2022 under the guidance of Mr. Saravanan. S (Project Manager, Kridas.com).

During the period of her internship program with us she had been exposed to different process. Her work was found satisfactory.

We wish her all the best in the future endeavors.

With Best Wishes,

Subhashini Venugopal

Human Resource Manager

KRIDAS
THE SPORTS PLATFORM

Sportz Platform Pte. Ltd.
320 Thomson Road,
Singapore 307663

WWW.KRIDAS.COM Email : hello@kridas.com Call : +65 8118 6469

Date: 05-May-2022

Internship Certificate

This is to certify that Ms. N. Kayalvizhi student of Kongu Engineering College, Perundurai, Erode has successfully completed her internship in our organization, from 9-Aug-2021 till 30-Apr-2022 under the guidance of Mr. Saravanan. S (Project Manager, Kridas.com).

During the period of her internship program with us she had been exposed to different process. Her work was found satisfactory.

We wish her all the best in the future endeavors.

With Best Wishes,

Subhashini Venugopal

Human Resource Manager

Date: 20th May 2022

To

Head of the Department,
Department of Information Technology,
Kongu Engineering College,
Perundurai-638060

Dear Sir/Madam,

Sub: Acceptance of Project Work

This is to certify that **Uthaya Sankar N (18ITR108)** B.Tech Information Technology final year student of Kongu Engineering College, Perundurai has completed the assigned module **Backend Development** under the project titled **"QLIKSLIDES"**assigned by our company under the guidance of **Mr. Achyuth, Principal Architect** towards the fulfillment of the award "Bachelor of Engineering" in Information Technology during the period **Aug 2021 to March 2022**.

We feel happy to state that the project has been done following IT Industry practices and to our complete satisfaction. We wish the student all the very best in his future endeavors.

Thanking You,

Sasikumar T

Director of Project Delivery & HR

Date: 20th May 2022

To

Head of the Department,
Department of Information Technology,
Kongu Engineering College,
Perundurai-638060

Dear Sir/Madam,

Sub: Acceptance of Project Work

This is to certify that **JANANI C K (18ITR03)** B.Tech Information Technology final year student of Kongu Engineering College, Perundurai has completed the assigned module **Frontend Development** under the project titled **"QLIKSLIDES"**assigned by our company under the guidance of **Mr. Achyuth, Principal Architect** towards the fulfillment of the award "Bachelor of Engineering" in Information Technology during the period **Aug 2021 to March 2022**.

We feel happy to state that the project has been done following IT Industry practices and to our complete satisfaction. We wish the student all the very best in his future endeavors.

Thanking You,

Sasikumar T

Director of Project Delivery & HR

MAERSK

Date: 21 May 2022

We are pleased to confirm that Vishva bharathi C (18ITR113) is working as Intern (Developer) in Service Improvement – Automation Team.

Vishva bharathi worked in 'Message Count Monitoring Automation' for Service Support team from August 2021 to October 2021. She had automated the whole process and benefited the team.

After this project, she worked on 'Automation of Activation and Deactivation' in Main shipping Org for the Salesforce team from December 2021 to March 2022. The most time-consuming steps of that process is automated. Therefore, the process is improved and yielding benefit for the team.

K.S.R. COLLEGE OF ENGINEERING

(An Autonomous Institution, Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai, Accreditated by NAAC with 'A' Grade and ISO 9001:2008 Certified Institution)

R. SRINIVASAN B.B.M.,
Chairman cum Managing Trustee

Dr. P. SENTHIL KUMAR M.E., Ph.D.,(IITM)
Principal

Ref.: 026/KSRCE/IT/SSD-IT/2020-21.

Date: 12.06.2021

To
Dr. P. Suresh
Associate Professor,
Department of Information Technology,
Kongu Engineering College,
Perundurai – 638060,
Erode District, Tamilnadu, India.

Sir,

Sub.: Appreciate and convey thanks "Hands –On Training" for Students Skill Development (SSD) Series - Reg.

*****

This is to certify that Dr. P. Suresh, Associate Professor, Department of Information Technology, Kongu Engineering College, Perundurai – 638052, Erode District, Tamilnadu, India, acted as resource person for the Technical Talk for Students Skill Development (SSD) Series in the title **"Hands – On Training Programme on Python for Data Science",** held on 12th (Saturday), June 2021; in the Department of Information Technology, K.S.R. College of Engineering(Autonomous), Tiruchengode, Namakkal District, Tamilnadu, India. He shared his more informative ideas on Python for Data Science and his presentation was interactive. We appreciate and convey thanks for his valuable contributions.

Best Regards

K.S.R. COLLEGE OF ENGINEERING TIRUCHENGODE 637 215

PRINCIPAL

PRINCIPAL
K.S.R.COLLEGE OF ENGINEERING
K.S.R.Kalvi Nagar, Tiruchengode-637 215
Namakkal Dist., Tamilnadu

Copy to: 1) Resource person
2) Department –IT File copy

THE TWELFTH INTERNATIONAL CONFERENCE ON COMPUTING, COMMUNICATION AND NETWORKING TECHNOLOGIES

July 6 - 8, 2021, Indian Institute of Technology - Kharagpur, Kharagpur, West Bengal, India.

Certificate OF Appreciation

This is to commend

Suresh P

for his excellent contribution as Session Chair for INTERNATIONAL CONFERENCE ON COMPUTING. COMMUNICATION AND NETWORKING TECHNOLOGIES 2021, July 6 - 8, 2021, held at IIT Kharagpur, India.

Conference Chair / Co-Chair

VIVEKANANDHA INSTITUTE OF
INFORMATION AND MANAGEMENT STUDIES
SPONSORED BY : ANGAMMAL EDUCATIONAL TRUST.
Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.
Accredited by NAAC with 'A' Grade, Recognized under section 2(f) and 12(B) of UGC Act, 1956.
Elayampalayam - 637 205. Tiruchengode, Namakkal Dt., Tamil Nadu.
Phone : 04288 - 234030, FAX : 04288 - 234894, 04288 - 224130.
Website : www.viims.ac.in Email Id : mbaprincipal@gmail.com

VIVEKANANDHA
EDUCATIONAL INSTITUTIONS

14/08/2021

APPRECIATION LETTER

This is to certify that **Dr. R. Rajadevi,** Assistant Professor (SLG), Department of Information Technology, Kongu Engineering College, Erode has acted as a resource person for the Webinar on **"Machine Learning using Python"** on **13th August 2021.** We appreciate her effective lecture and interaction with participants.

DIRECTOR

DIRECTOR,
Vivekanandha Institute of Information
and Management Studies,
Elayampalayam P.O., Tiruchengode Tk
Namakkal Dt, Tamil Nadu - 637 205

PAAVAI ENGINEERING COLLEGE

(Autonomous Institution)
(Approved by AICTE and Affiliated to Anna University)
(Accredited by National Board of Accreditation, New Delhi & NAAC (UGC) with 'A' Grade)
Paavai Nagar, NH - 7, PACHAL, NAMAKKAL - 637 018.Tamil Nadu
04286-243038, 58,88 & 98 Fax: 04286-243068 Email: pecprincipal@paavai.edu.in website: http://pec.paavai.edu.in

Date: 31.08.2021

Certificate

This is to certify that Dr. M. Thangamani, Associate Professor, Department of Information Technology, Kongu Engineering College, Perundurai, Erode had handled a session on the topic " Insight into Deep Learning " on 31.08.2021 in CSI Sponsored Workshop organized by the Department of Computer Science and Engineering of Paavai Engineering College, Namakkal. The Session was useful to the Faculty.

V.Ry 31/8/21

Convener
V .Ravindra Krishna Chandar
Department Of Computer Science and Engineering

KUMARAGURU college of technology
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IEEE
Advancing Technology for Humanity

IEEE
Madras Section

Presents

IEEE Technically Sponsored International Conference on

ADVANCEMENTS IN ELECTRICAL, ELECTRONICS, COMMUNICATION, COMPUTING AND AUTOMATION

ICAECA 2021

CERTIFICATE
OF APPRECIATION

This is to certify that

DR. P. SURESH

KONGU ENGINEERING COLLEGE,ERODE.

in honour of his/her outstanding contribution as Technical Reviewer for the manuscripts in 2021 International Conference on Advancements in Electrical Electronics Communication Computing and Automation (ICAECA2021) organized by Kumaraguru College of Technology, Coimbatore and technically co-sponsored by IEEE Madras Section conducted on 8 & 9 October 2021.

General Chair
Dr. P. Thirumoorthi
ICAECA'21

Principal
Dr. D. Saravanan
Kumaraguru College of Technology

A.V.P.
RESEARCH - INNOVATION - PROSPERITY COLLEGE OF ARTS AND SCIENCE
[Affiliated to Bharathiar University, Coimbatore]
No 4, Chettipalayam, T.M Poondi [P.O], Tirupur – 641 652, Tamil Nadu.

24.09.2021

ATTENDANCE CERTIFICATE

This is to certify that **Dr. M. Ramalingam,** Associate Professor, Department of IT, Kongu Engineering College, Perundurai has acted as the Resource Person for the one day webinar on the topic **"Recent Advancements in Networking"** organized by the Department of Computer Science, A.V.P. College of Arts & Science, Tirupur on 24.09.2021.

A.V.P. COLLEGE OF ARTS AND SCIENCE TIRUPUR - 641 652

24.9.21

PRINCIPAL

PRINCIPAL
A.V.P COLLEGE OF ARTS AND SCIENCE
4, CHETTIPALAYAM, T.M. POONDI (PO),
TIRUPUR - 641 652

+91 72006 77755 avpcollegetirupur@gmail.com avpcas.org

KONGU ARTS AND SCIENCE COLLEGE

ERODE - 638 107, TAMILNADU, INDIA.

Since 1994

Autonomous Institution	Affiliated to Bharathiar University	Approved by UGC & AICTE	Accredited by NAAC	DBT Star College Scheme	ISO 9001 : 2015 Certified Institution

Dr. N. RAMAN
Principal

27.09.2021

To

Mr.K.Logeswaran,
Assistant Professor,
Department of Information Technology,
Kongu Engineering College,
Perundurai, Erode.

Sir,

Sub: Department of Computer Applications – Workshop on Mobile Application Development held on 25.09.2021 and on 27.09.2021 – Thanks giving – Reg.

******

Greetings!

We like to express our heartfelt and sincere thanks to you for your gracious presence and presentation on the occasion of the **Workshop on Mobile Application Development** on 25.09.2021 conducted by the Department of Computer Applications.

Your interesting presentation and discerning ideas on the occasion will be helpful to the students to explore much more in the field of Mobile Application Development.

We hope that we may be able to get your continued co-operation, support and assistance in our future endeavors also.

With Warm Regards,

PRINCIPAL

KONGU
Assuring the Best

KONGU ARTS AND SCIENCE COLLEGE

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Autonomous Institution	Affiliated to Bharathiar University	Approved by UGC & AICTE	Accredited by NAAC	DBT Star College Scheme	ISO 9001 : 2015 Certified Institution

Dr. N. RAMAN
Principal

27.09.2021

To

Mr.A.P.Ponselvakumar,
Assistant Professor,
Department of Information Technology,
Kongu Engineering College,
Perundurai.

Sir,

Sub: Department of Computer Applications – Workshop on Mobile Application Development held on 25.09.2021 and on 27.09.2021 – Thanks giving – Reg.

******

Greetings!

We like to express our heartfelt and sincere thanks to you for your gracious presence and presentation on the occasion of the **Workshop on Mobile Application Development** on 25.09.2021 and on 27.09.2021 conducted by the Department of Computer Applications.

Your interesting presentation and discerning ideas on the occasion will be helpful to the students to explore much more in the field of Mobile Application Development.

We hope that we may be able to get your continued co-operation, support and assistance in our future endeavors also.

With Warm Regards,

PRINCIPAL

KONGU
Assuring the Best

Office : 0424 - 2242802, 2242999	e-mail : konguarts@kasc.ac.in	Website : www.kasc.ac.in

KONGU ARTS AND SCIENCE COLLEGE

ERODE - 638 107, TAMILNADU, INDIA.

Since 1994

Autonomous Institution	Affiliated to Bharathiar University	Approved by UGC & AICTE	Accredited by NAAC	DBT Star College Scheme	ISO 9001 : 2015 Certified Institution

Dr. N. RAMAN
Principal

27.09.2021

To

Dr.K.R.Prasannakumar,
Assistant Professor,
Department of Information Technology,
Kongu Engineering College,
Perundurai, Erode.

Sir,

Sub: Department of Computer Applications – Workshop on Mobile Application Development held on 25.09.2021 and on 27.09.2021 – Thanks giving – Reg.

******

Greetings!

We like to express our heartfelt and sincere thanks to you for your gracious presence and presentation on the occasion of the **Workshop on Mobile Application Development** on 27.09.2021 conducted by the Department of Computer Applications.

Your interesting presentation and discerning ideas on the occasion will be helpful to the students to explore much more in the field of Mobile Application Development.

We hope that we may be able to get your continued co-operation, support and assistance in our future endeavors also.

With Warm Regards,

PRINCIPAL

KONGU
Assuring the Best

Office : 0424 - 2242802, 2242999	e-mail : konguarts@kasc.ac.in	Website : www.kasc.ac.in

Ref. No.: BUPGERC/ MCA/DC/04/21 Date: 04.10.2021

From

Dr.K.K.Savitha,
Assistant Professor,
Department of Computer Applications,
Bharathiar University PG Extension and Research Centre,
Erode.

To

The Controller of Examinations
Bharathiar University
Coimbatore -641046.

Respected Sir,

Sub: Ph.D., Programme - Synopsis Doctoral Committee Meeting – Reg.

It is proposed to conduct the Synopsis doctoral committee meeting for the following research scholar on 08.10.2021 at 02.00 P.M. in online mode (Google Meet Link: https://meet.google.com/mhr-xctq-bxk)

Name and Reg. No. of Research Scholar	Supervisor and Convenor	Internal Panel Member	V.C.'s Nominee	Venue
Mr.D.Gopinath Reg. No: C2/CSC17ENOVPO2/17	Dr. K.K.Savitha	Dr. E.Chandra	Dr.S.Varadhaganapathy	Computer Lab, Bharathiar University PG Extension and Research Centre-Erode.

Thanking You

Yours Sincerely,

K.K. 4/10/21

(Dr. K.K.SAVITHA)

Dr. K.K.SAVITHA, M.C.A.,M.Phil.,Ph.D.,
Assistant Professor
Department of Computer Applications
Bharathiar University PG
Extension Centre, Erode.

Copy to:

1. The Registrar, Bharathiar University, Coimbatore -641046.
2. The Director, Bharathiar University PG Extension and Research Centre, Erode – 638052.
3. Dr. E.Chandra, Professor& Head, Department of Computer Science, Bharathiar University, Coimbatore – 641 046.
4. Dr.S.Varadhaganapathy, Professor, Department of Information Technology, Kongu Engineering College (Autonomous), Perundurai, Erode.
5. Mr.D.Gopinath, Assistant Professor, Department of Computer Science, Kongu Arts and Science College (Autonomous), Nanjanapuram, Erode.
6. File

AIT
Adithya Institute of Technology

Adithya Institute of Technology

Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai
AN INDUSTRY INTEGRATED INSTITUTION
Accredited by NAAC

1.11.2021

Letter of Appreciation

We would like to thank Dr. R. Devi Priya, Associate Professor, Department of Information Technology, Kongu Engineering College, Perundurai for delivering a webinar on "Machine Learning and its Application" scheduled on 30-10-2021 between 2:00 PM to 3:30 PM conducted by the Department of Computer Science and Engineering & Information Technology. The session was very informative with a very good feedback from the participants.

01/11/2021

Dr.S.M.Nandhagopal., M.E., Ph.D.,
Head of the Department
Dept. of Computer Science and Engineering
Adithya Institute of Technology
Sathy Main Road, Kurumbapalayam,
Coimbatore - 641 107.

FACULTY TRAINING CENTRE

Government College of Technology, Coimbatore – 641 013

Tamil Nadu State Government Sponsored

Five Day Online Faculty Development Programme

On

"Emerging Trends in Internet of Things (IoT)"

22-11-2021 to 26-11-2021

CERTIFICATE OF APPRECIATION

This is to certify that **Mr. A. Jeevanantham / Assistant Professor / Information Technology / Kongu Engineering College, Erode** has delivered a guest lecture on the topic of "**IoT Open Source Data Visualization Tools"** on **24-11-2021** (FN) organized by the Faculty Training Centre, Government College of Technology, Coimbatore in association with Department of Electronics and Communication Engineering, Periyar Centenary Polytechnic College, Vallam, Thanjavur through *online mode*.

Faculty Development Training Centre ★ GCT, Cbe - 13 ★

07/12/2021

Professor / FTC

PROFESSOR
Faculty Development Training Centre
Government College of Technology
Coimbatore - 641 013.

MUTHAYAMMAL ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi, Accredited by NAAC & Affiliated to Anna University)

Rasipuram - 637 408. Namakkal Dt., Tamil Nadu.

Estd. 2000

Date:26.11.2021

Greetings from Muthayammal Engineering College, Rasipuram. The Department of Computer Science and Engineering and Technology Learning Centre in Association with Institution of Engineers (India)- IE(I). has organized two days workshop on 24.11.2021 and 25.11.2021 . Ms. R. Aarthi, Assistant Professor/ IT, Kongu Engineering College, Perundurai ,Erode has handled the topic "Zero Coding: Data Analysis for IoT using Node-Red ".The sessions was very useful to the participants. Thank you for making the session successful and we appreciate your continued support.

26/11/21

Dr.G.KAVITHA,Ph.D.,
Professor
Department of Computer Science and Engineering
MUTHAYAMMAL ENGINEERING COLLEGE
(AUTONOMOUS)
RASIPURAM-637 408, NAMAKKAL Dist.
TAMILNADU.

Tel : 04287 - 220837, 226837 Email : info@mec.edu.in www.mec.edu.in

MUTHAYAMMAL ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi, Accredited by NAAC & Affiliated to Anna University)

Rasipuram - 637 408. Namakkal Dt., Tamil Nadu.

Estd. 2000

Date:26.11.2021

Greetings from Muthayammal Engineering College, Rasipuram. The Department of Computer Science and Engineering and Technology Learning Centre in Association with Institution of Engineers (India)- IE(I). has organized two days workshop on 24.11.2021 and 25.11.2021 .Dr.M.Thangamani, Associate Professor/ IT, Kongu Engineering College, Perundurai ,Erode has handled the topic "Zero Coding: Data Analysis for IoT using Node-Red ".The sessions was very useful to the participants. Thank you for making the session successful and we appreciate your continued support.

26/11/21

Dr.G.KAVITHA,Ph.D.,
Professor
Department of Computer Science and Engineering
MUTHAYAMMAL ENGINEERING COLLEGE
(AUTONOMOUS)
RASIPURAM-637 408, NAMAKKAL Dist.
TAMILNADU.

Tel : 04287 - 220837, 226837 Email : info@mec.edu.in www.mec.edu.in

A.V.C. COLLEGE OF ENGINEERING

MAYILADUTHURAI, MANNAMPANDAL - 609 305

NAGAPATTINAM (DT), TAMILNADU

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Accredited by NBA, New Delhi

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ISO 9001 REGISTERED

DNV Certification B.V., The Netherlands

Dr.S.Selvamuthukumaran
Director
Department of Computer Applications

03.12.2021

Attendance Certificate

This certificate of Attendance is issued to **Dr. M. Thangamani**, Associate Professor, Department of Information Technology, Kongu Engineering College for attending the Third Doctoral committee meeting of my candidate Ms. C. Mallika (Register No.172375911) held on 03.12.2021, Friday at department of Computer Application , A.V.C College of Engineering, Mayiladudthurai.

A.V.C. COLLEGE OF ENGINEERING
ANNA UNIVERSITY
RESEARCH CENTRE
Code: 4380116
DEPT. OF COMPUTER APPLICATIONS

Director
Director
Department of Computer Applications
A.V. C. College of Engineering
Mannampandal, Mayiladuthurai
Nagapattinam District - 609 305

SRI KRISHNA COLLEGE OF ENGINEERING AND TECHNOLOGY

(An Autonomous Institution, Accredited by NAAC and NBA, Affiliated to Anna University, Chennai)

Kuniamuthur, Coimbatore, Tamil Nadu

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

AICTE - ISTE SPONSORED ONE WEEK ONLINE INDUCTION/ REFRESHER PROGRAM ON

"Big Data Analytics for Smart Grid"

14.12.2021 to 20.12.2021

Organizing Committee

Chief Patron
Smt. S. Malarvizhi
Chair Person and Managing Trustee

Patron
Dr. J. Janet
Principal

Convener
Dr. K.C. Ramya
Professor & Head
EEE

Coordinator
Dr. S. Sivaranjani
Professor, EEE

Organizing Secretaries
Dr. M. Senthilkumar
Associate Professor, EEE
Dr. G. Radhakrishnan
Associate Professor, EEE

Organizing Members
Dr. B. Karthikeyan
Associate Professor, EEE
Ms. D. Gunapriya
Assistant Professor, EEE
Mr. S. Boobalan
Assistant Professor, EEE
Ms. D. Maladhi
Assistant Professor, EEE

02.12.2021

To

Prof.A.Jeevanantham,
Assistant Professor,
Department of Information Technology,
Kongu Engineering College, Erode.

Dear Sir/Madam,

Warm Greetings from Sri Krishna College of Engineering and Technology, Coimbatore!

We are organizing an **AICTE ISTE sponsored one week online Induction/Refresher program** on **'Big Data Analytics of Smart Grid'** during **14.12.2021 to 20.12.2021**.

In this regard, we are elated to invite you as a Resource Person to handle a Session on "**Big Data Analytics for Smart Grid-Case Studies**" on **20.12.2021** between **11.15 am to 12.45 pm**. We look forward to your expertise and believe that the knowledge sharing in this domain would add to an excellent technical feast to the aspiring participants.

Looking forward towards the association.

With Thanks and Regards

Dr. K.C. Ramya
Professor & Head,
Department of EEE,
SKCET/ Coimbatore
ramyakc@skcet.ac.in

AIT
Adithya Institute of Technology

Adithya Institute of Technology

Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai
AN INDUSTRY INTEGRATED INSTITUTION
Accredited by NAAC

23.12.2021

Letter of Appreciation

We would like to thank **Mr.N.Adhithyaa**, Assistant Professor, Department of Information Technology, Kongu Engineering College, Perundurai for delivering an informative talk on "**Machine learning on IoT applications**" on 21-12-21 AN conducted by the Department of Computer Science and Engineering & Information Technology. The session was very informative with a very good feedback from the participants.

23/12/2021
Dr.S.M.Nandhagopal., M.E., Ph.D.,

Head of the Department
Dept. of Computer Science and Engineering
Adithya Institute of Technology
Sathy Main Road, Kurumbapalayam,
Coimbatore - 641 107.

SRI KRISHNA COLLEGE OF ENGINEERING AND TECHNOLOGY

(An Autonomous Institution, Accredited by NAAC and NBA, Affiliated to Anna University, Chennai)

Kuniamuthur, Coimbatore, Tamil Nadu

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

AICTE - ISTE SPONSORED SIX DAYS ONLINE INDUCTION/ REFRESHER PROGRAMME

ON

"Big Data Analytics for Smart Grid"

14.12.2021 to 20.12.2021

Organizing Committee

Chief Patron
Smt. S. Malarvizhi
Chair Person and Managing Trustee

Patron
Dr. J. Janet
Principal

Convener
Dr. K.C. Ramya
Professor & Head
EEE

Coordinator
Dr. S. Sivaranjani
Professor, EEE

Organizing Secretaries
Dr. M. Senthilkumar
Associate Professor, EEE
Dr. G. Radhakrishnan
Associate Professor, EEE

Organizing Members
Dr. B. Karthikeyan
Associate Professor, EEE
Ms. D. Gunapriya
Assistant Professor, EEE
Mr. S. Boobalan
Assistant Professor, EEE
Ms. D. Maladhi
Assistant Professor, EEE

26.12.2021

To

Prof.A.Jeevanantham,
Assistant Professor,
Department of Information Technology,
Kongu Engineering College, Erode.

Dear Sir,

Warm Greetings from Sri Krishna College of Engineering and Technology, Coimbatore!

We appreciate the friendly manner in which you accepted our invitation and thank you whole heartedly for serving as a resource person in our **AICTE-ISTE Sponsored Six days online Induction/Refresher Programme on "Big Data Analytics for Smart Grid"** held during **14.12.2021 to 20.12.2021** at Sri Krishna College of Engineering and Technology, Coimbatore.

The lecture session you delivered entitled "**Big Data Analytics for Smart Grid-Case Studies**" on **20.12.2021 - FN** was very factual and informative for the entire participants and we have received applausive comments on your interactive and lively presentation.

We sincerely appreciate your contribution towards the successful conduct of Programme.

We look forward to your future association with us.

With Thanks and Regards

Dr. K.C. Ramya
Professor & Head,
Department of EEE,
SKCET/ Coimbatore
ramyakc@skcet.ac.in

AIT
Adithya Institute of Technology

Adithya Institute of Technology
Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai
AN INDUSTRY INTEGRATED INSTITUTION
Accredited by NAAC

23.12.2021

Letter of Appreciation

We would like to thank **Dr. R. Devi Priya**, Associate Professor, Department of Information Technology, Kongu Engineering College, Perundurai for delivering an informative talk on "**Machine learning on IoT applications**" on 20-12-2021 and 21-12-21 FN conducted by the Department of Computer Science and Engineering & Information Technology. The session was very informative with a very good feedback from the participants.

Dr.S.M.Nandhagopal., M.E., Ph.D.,

Head of the Department
Dept. of Computer Science and Engineering
Adithya Institute of Technology
Sathy Main Road, Kurumbapalayam,
Coimbatore - 641 107.

PAAVAI ENGINEERING COLLEGE

(Autonomous Institution)

(Approved by AICTE and Affiliated to Anna University)

(Accredited by National Board of Accreditation, New Delhi & NAAC (UGC) with 'A' Grade)

Paavai Nagar, NH - 7, PACHAL, NAMAKKAL - 637 018 Tamil Nadu

04286-243006, 50,00 & 90 Fax. 04286-243008 Email: paavaiprincipal@paavai.edu.in website: http://pec.paavai.edu.in

Date: 30.12.2021

Certificate

This is to certify that Dr. M. Thangamani, Associate Professor, Department of Information Technology, Kongu Engineering College, Perundurai, Erode had handled a session on the topic " Artificial Intelligence into Deep Learning " on 30.12.2021 in CSI Sponsored Workshop organized by the Department of Computer Science and Engineering of Paavai Engineering College, Pachal. The Session was useful to the Students.

Convener

V. Ravindra Krishna Chander

NALVINAI Energy Systems

TBI, Kongu Engineering College,
Perundurai, Erode Dist., Tamil Nadu -638060
nalvinaies@gmail.com

Date: 31-03-2022

To

Dr T. Abirami,
Associate Professor,
Department of Information Technology,
Kongu Engineering College.

We would like to thank you for having accepted our invitation to give a valuable lecture on the topic of "**Basics of Python Programming and its Embedded application**", on 19-12-2021 and 26-12-2021.

It was an enlightening session. We thank you for your service and look forward to your valuable support for the growth our company.

Vaithilingam K

Managing Director

NALVINAI Energy Systems

TBI, Kongu Engineering College,
Perundurai, Erode Dist., Tamil Nadu -638060
nalvinaies@gmail.com

Date: 31-03-2022

To

Dr T. Abirami,
Associate Professor,
Department of Information Technology,
Kongu Engineering College.

We would like to thank you for having accepted our invitation to give a valuable lecture on the topic of "**Expert System and its application on Power Systems**", on 08-01-2022 and 09-01-2022.

It was an enlightening session. We thank you for your service and look forward to your valuable support for the growth our company.

Vaithilingam K

Managing Director

PAAVAI ENGINEERING COLLEGE

(Autonomous Institution)
(Approved by AICTE and Affiliated to Anna University)
(Accredited by National Board of Accreditation, New Delhi & NAAC (UGC) with 'A' Grade)
Paavai Nagar, NH - 7, PACHAL, NAMAKKAL - 637 018 Tamil Nadu
04286-243008, 09, 88 & 99 Fax: 04286-243068 Email: peoprincipal@paavai.edu.in website: http://pec.paavai.edu.in

Date: 10.01.2022

Certificate

This is to certify that Dr. M. Thangamani, Associate Professor, Department of Information Technology, Kongu Engineering College, Perundurai, Erode had handled a session on the topic " Machine learning approach for Research " on 10.01.2022 in CSI Sponsored Workshop organized by the Department of Information Technology of Paavai Engineering College, Pachal. The Session was useful to the Faculty.

Convener

V. Ravindra Krishna Chandar

Fw: Request to permit Dr.S.Varadhaganapathy, Professor-IT department for Board of studies meeting -reg

Principal Kongu Engineering College <principal@kongu.ac.in>

Tue 4/26/2022 6:02 PM

To: HOD Information Technology <hod_it@kongu.ac.in>;Dr. Balasubramanie <registrar@kongu.ac.in>

Dr. V. Balusamy BE (Hons), MTech, PhD
Principal
Kongu Engineering College
Perundurai 638 060.
Ph: 04294220583
Mobile: 9942820583
email : principal@kongu.ac.in

From: RASC Head Ranking & Accreditation Steering Committee <head.rasc@kpriet.ac.in>
Sent: Friday, April 22, 2022 10:01 PM
To: Principal Kongu Engineering College <principal@kongu.ac.in>
Cc: Dr.S.Varadhaganapathy <svg@kongu.ac.in>; PRINCIPAL KPRIET <principal@kpriet.ac.in>
Subject: Request to permit Dr.S.Varadhaganapathy, Professor-IT department for Board of studies meeting -reg

Dear Sir,

Warm Greetings from KPRIET!

We are starting B.Tech (IT), B.E CSE(AI & ML), B.E(Computer science and Business systems) and B.E (Mechatronics) this year.

The board of studies meeting to fix the entire curriculum for B.Tech (IT), B.E CSE(AI & ML), B.E(Computer science and Business systems) and finalize the first two semesters syllabus for all the programmes is planned on 23.04.2022 through online mode.

In this connection, I request you to kindly depute Dr.S.Varadhaganapathy, Professor, IT department as a special invitee-academics for our board of studies meeting.

Thank you.

With Regards
Dr.J.Indra
Head - Ranking and Accreditation Steering Committee
KPR Institute of Engineering and Technology

Avinashi Road, Arasur, Coimbatore - 641 407

09894885987

KONGU ARTS AND SCIENCE COLLEGE

ERODE - 638 107, TAMILNADU, INDIA.

Since 1994

Autonomous Institution	Affiliated to Bharathiar University	Approved by UGC & AICTE	Accredited by NAAC	DBT Star College Scheme	ISO 9001 : 2015 Certified Institution	Institution's Innovation Council

Dr. N. RAMAN
Principal

11.05.2022

To

Mr.M.Gunasekar
Assistant Professor,
Department of Information Technology,
Kongu Engineering College,
Erode.

Sir,

Sub: Department of Computer Applications – Guest Lecture Programme on Database Concepts and Applications – Thanks giving - Reg.

Greetings!

We like to express our heartfelt and sincere thanks to you for your gracious presentation on the occasion of the Guest Lecture Programme on Database Concepts and Applications conducted by the Department of Computer Applications on 11.05.2022.

Your interesting presentation will ever be cherished in the memories of our students and will be helpful in shaping their career goals.

We hope that we may be able to get your continued co-operation, support and assistance in our future endeavors also.

With Warm Regards,

PRINCIPAL

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN

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Sathinaickanpalayam - 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.
Phone : 04288-234241, FAX : 04288 - 234241. E-mail : principal@vcew.ac.in

VIVEKANANDHA
EDUCATIONAL INSTITUTIONS

Date: 18.05.2022

To

Mr.K.Logeswaran,
Assistant Professor,
Department of Artificial Intelligence,
Kongu Engineering College,
Erode.

Dear Sir,

We are very much thankful to you for sharing your precious time with us on the jubilant occasion of one day workshop entitled as **"Hands on training with Android Studio"** on 18.05.2022.

The Technical Lecture and the way you interacted with our students were very much impressive and your words motivated our students to develop their attitude. We are expecting your valuable interactions in future.

Thanking you

HOD/IT
Head of the Department,
Dept. of Information Technology
Vivekanandha College of Engineering
for Women (Autonomous)
Tiruchengode.

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Phone : 04288-234241, FAX : 04288 - 234241. E-mail : principal@vcew.ac.in

VIVEKANANDHA
EDUCATIONAL INSTITUTIONS

Date: 18.05.2022

To

Mr.A.P.Ponselvakumar,
Assistant Professor,
Department of Information Technology,
Kongu Engineering College,
Erode.

Dear Sir,

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The Technical Lecture and the way you interacted with our students were very much impressive and your words motivated our students to develop their attitude. We are expecting your valuable interactions in future.

Thanking you

HOD/IT
Head of the Department,
Dept. of Information Technology,
Vivekanandha College of Engineering
for Women (Autonomous)
Tiruchengode.

AIT
Adithya Institute of Technology

Adithya Institute of Technology
Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai
AN INDUSTRY INTEGRATED INSTITUTION
Accredited by NAAC

Head of the department,

Date: 19/5/2022

Computer Science and Engineering,

Adithya Institution of Technology,

Kurumbapalayam,

Coimbatore.

Respected Madam/Sir,

On behalf of Computer Science and Engineering Department, We are writing to you. We intend to Organize One day National level Seminar on (21/05/2022), and we'd like to invite you to join us. We'd also like you to give a one day seminar speech about Research Methodologies in Compiler Design and its application. We eagerly await your response and look forward to sharing the day with you and hearing your insightful speech.

Thanking You,

Adithya Institute of Technology
CSE-107

19/5/2022

Head of the Department-CSE

Dr.S.M.Nandhagopal.,Ph.d.,

ADITHYA INSTITUTE OF TECHNOLOGY
Sathy Main Road, Kurumbapalayam
Coimbatore - 641 107

SNS COLLEGE OF ENGINEERING

AN AUTONOMOUS INSTITUTION

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
SNS Kalvi Nagar, Sathy Main Road, Kurumbapalayam Post, Coimbatore - 641 107
Phone : 75503 16708, 75503 16709, Fax : 0422 - 2668604
E-mail : principalsnsce@gmail.com, Website : www.snsce.ac.in

21.05.2022

Letter of Appreciation

We would like to thank **Mr. N. Adhithyaa**, Assistant Professor, Department of Artificial Intelligence, Kongu Engineering College, Perundurai for delivering an informative talk on "**Recent trends in Artificial Intelligence**" on 21.05.2022 conducted by the Department of Information Technology. The session was very informative with a very good feedback from the participants.

21/5/22

Dr. P. SUMATHI, M.E.,Ph.D.,
Assistant Professor (SG) & Head
Department of Information Technology
SNS College of Engineering
Coimbatore-641107.