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(Published Research in journals and scientific conferences)

College of Education for Pure Sciences

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جامعة البصرة
كلية التربية للعلوم الصرفة
قسم علوم الحاسوب

(Published Research in journals and scientific conferences)

الاستاذ الدكتور حامد علي عبد الاسدي

No.	Year	Title of the paper	Journal/ Conference (Title, No., Vol., …..)	Database indexed	Status
1	2016	Fuzzy model for evaluation of selected Diabetes Medical Sites	IJRDO-Journal of Computer Science Engineering, Vol. 2 Issue 1		Published
2	2016	Cuckoo Search Algorithm and Discrete Wavelet Transform for Iraqi Road Signs Recognition System,	The ICSES Journal on Evolutionary and Metaheuristic Algorithms (IJEMA)		Published
3	2016	Development of Tacit Knowledge Measurement Model for Academic Staff Activities	American Journal of Computer Science and Information Engineering, Vol.3 , No. 6, Nov. 8, 2016, Page: 37-44.		Published
4	2016	A Distributed Clustering Methodology for Connecting Dense Sensor Network Fields,	International Journal of Innovative Research in Electronics and Communications (IJIREC) Volume 3, Issue 4, PP 1-6.		Published
5	2016	Energy Efficient Hierarchical Clustering Mechanism for Wireless Sensor Network Fields	International Journal of Computer Applications, Vol. 153, Issue 8, PP 42-46.		Published
6	2017	Mobile Clustering Algorithm for Effective Clustering in Dense Wireless Sensor Networks	, European Journal of Advances in Engineering & Technology (EJAET), Vol. 4, Issue 1, PP. 1-6.		Published
7	2017	Integrated Energy Efficient Clustering Strategy for Wireless Sensor Networks,	The Journal of Middle East and North Africa Sciences, 3(4), pp. 8-		Published

			13.		
8	2017	Hybrid Clustering Methodology using Optical Communication in Wireless Sensor Networks	International Journal on Advanced Science, Engineering and Information Technology Vol. 7, No. 1.		Published
9	2017				Published
10	2017	A Novel Scan2Pass Architecture for Enhancing Security towards E-Commerce	Future Technologies Conference 2017, 29-30 November 2017 | Vancouver, BC, Canada		Published
11	2017	Thin Film Nanocomposite Membrane Impregnated with Clay Nanoparticles for Water Desalination,	Saudi j. civ. eng.; Vol-1, Iss-1 (Oct-Nov, 2017):24-29.		Published
12	2017	Reverse Osmosis Polyamide Thin Film Nanocomposite Membranes for Water Desalination: A Study,	International Journal of Advanced Research in Chemical Science (IJARCS) Volume 4, Issue 7, PP 1-7.		Published
13	2018	Design and Implementation of Challenge-Response Protocol for Enhanced E-Commerce Security,	Future Technologies Conference (FTC) 6-7 September.		Published
14	2018	Suggested Mechanisms for Understanding the Ideas in Authentication System,	International Journal of Advancements in Computing Technology9(3):10-24	Scopus	Published
15	2018	Toward for Strong Authentication Code in Cloud of Internet of Things based on DWT and Steganography,	Journal of Theoretical and Applied Information Technology, Vol. 96. No. 10,	Scopus	Published
16	2018	Optimization Noise Figure of Fiber Raman Amplifier based on Bat Algorithm in Optical Communication network,	International Journal of Engineering & Technology (UAE)	Scopus	Published
17	2018	Advanced Oxidation Processes (AOPs)	Asian Journal of Applied Science		Published

		for Wastewater Treatment and Reuse: A Brief Review	and Technology (AJAST), Volume 2, Issue 3, Pages 18-30.		
18	2019	A Novel and Enhanced Distributed Clustering Methodology for Large Scale Wireless Sensor Network Fields	, Journal of Computational and Theoretical Nanoscience, Volume 16, Number 2, February 2019, pp. 633-638(6).	Scopus	Published
19	2019	Stability Multi-Wavelength Fiber Laser Employing Semiconductor Optical Amplifier in Nonlinear Optical Loop Mirror with Different Gain Medium",	SPIE Future Sensing Technologies, 2019, Tokyo, Japan.	Scopus	Published
20	2019	Multiwavelength fiber laser employing semiconductor optical amplifier in nonlinear optical loop mirror with polarization controller and polarization maintaining fiber	THE 2ND INTERNATIONAL CONFERENCE ON APPLIED PHOTONICS AND ELECTRONICS (InCAPE 2019), conference.	Scopus, Conference	Published
21	2019	Characteristics of Multiwavelength Fiber Laser Employing Semiconductor Optical Amplifier in Nonlinear Optical Loop Mirror with Different Length Polarization Maintaining Fiber.	THE 2ND INTERNATIONAL CONFERENCE ON APPLIED PHOTONICS AND ELECTRONICS (InCAPE 2019), conference.	Scoops, Conference	Published
22	2019	Priority Incorporated Zone Based Distributed Clustering Algorithm For Heterogeneous Wireless Sensor Network.	Advances in Science, Technology and Engineering Systems Journal Vol. 4, No. 5, PP. 306-313.	Scopus, ASTES Publishers	Published
23	2019	Stability of Multiwavelength Fiber Laser Employing Semiconductor Optical Amplifier in Nonlinear Optical Loop Mirror with Polarization Maintaining Fiber.	SPIE Future Sensing Technologies, , Tokyo, Japan, Vol. 11197, 1119716, conference.	Scoops, Conference	Published
24	2019	An Efficient and Secure Scheme for	CSAE 2019: Proceedings of the 3rd	Scoops,	Published

		Dynamic Shared Data in Cloud	International Conference on Computer Science and Application Engineering, Article No.: 155 Pages 1–6https://doi.org/10.1145/3331453.3361648	Conference	
25	2020	A Network Analysis for Finding the Shortest Path in Hospital Information System with GIS and GPS.	Journal of Network Computing and Applications (2020) 5: 10-22. Clausius Scientific Press, Canada		Published
26	2020	Enhanced Clustering Algorithm for Efficient Clustering in Wireless Sensor Network,	International Journal of Computing and Digital Systems ISSN (2210-142X) Int. J. Com. Dig. Sys. 9, No.4 (July-2020)	Scopus	Published
27	2020	Nature Inspired Algorithms multi-objective histogram equalization for Grey image enhancement.	Advances in Computer, Signals and Systems 4: 36-46.	Scopus	Published
28	2020	Enhanced Hybrid and Highly Secure Cryptosystem for Mitigating Security Issues in Cloud Environments	, (Under review), Scopus.		Published
29	2020	A Critical Comparative Review of Nature-Inspired Optimization Algorithms(NIOAs)	International Journal of Simulation Systems, Science & Technology, Volume 21, Number 2, Page-1/2 2020.	Scopus, United Kingdom Simulation Society	Published
30	2020	Classification of Groundwater Quality using Artificial Neural Networks in Safwan and Al-Zubayr in Basra.	Advances in Computer, Signals and Systems (2020) 4: 25-35, Clausius Scientific Press, Canada		Published
31	2020	Password Authentication Scheme based on Smart Card and QR Code	Indonesian Journal of Electrical Engineering and Computer Science	Scopus	Published

32	2020	Multi-Factor Authentication for an Administrator's Devices in an IoT Environment,	2nd International Conference on Advances in Cybersecurity (ACeS 2020), CCIS 1347, pp. 27–47.	Scopus	Published

No.	Year	Title of the paper	Journal/ Conference (Title, No., Vol., …..)	Status
1	2016	Evaluating Iraqi universities websites based on fuzzy expert system using multiple quality criteria's	Universities ICT Research and Development conference, Basra, Iraq.	Published
2	2016	Diabetes Mellitus diagnosis system based on Supervised Learning Back Propagation Neural Networks	Universities ICT Research and Development conference, Basra, Iraq.	Published
3	2016	Controlling and Managing System for Electrical Devises Based on Timer via PC	Universities ICT Research and Development conference, Basra, Iraq.	Published
4	2016	Satellite Image Enhancement based on ERDAS and MATLAB techniques	Universities ICT Research and Development conference, Basra, Iraq.	Published
5	2017	Design Classification System for Satellite Imagery Data and Bands using hybrid techniques	Universities ICT Research and Development conference, Basra, Iraq.	Published
6	2017	General domain ontology in enterprise software development process	Universities ICT Research and Development conference, Basra, Iraq.	Published
7	2018	Optical Signal to noise ratio Characterization of Ring Cavity Brillouin Fiber Laser,	Al-utroha Journal of Engineering Science and Technology, Vol. 7, No. 3, pp, 11-28, 2018.	Published
8	2019	Calssification of groundwater quality using artificial neural networks in Safwan and Al-Zubayer in Basra,	Al-utroha Journal of Engineering Science and Technology, Vol. 7, No. 3, pp, 11-28.	Published

جامعة البصرة
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براءات الاختراع / جامعة البصرة/كلية التربية للعلوم الصرفة/قسم علوم الحاسوب

براءة الاختراع: ا.د. حامد علي عبد الاسدي

China/ 202010715354.X	**2020/07/23**	**ا.د. حامد الاسدي**	**A Lightweight Messaging Method for End-to-End Smart Device Communication in the Internet of Things Cloud**	**1**

Abstract:

The invention provides a lightweight messaging method for End-to-End intelligent device communication in the Internet of things cloud. in the IoT- cloud computing system, the messaging method includes two processes: registration and key negotiation, lightweight secure messaging, with secure key and biometric parameter exchange functions, biological sharing parameters and biological key generation functions, lightweight End-to-End smart device communication negotiation functions, and lightweight messaging functions.

An elliptic curve encryption algorithm is used to apply the secure exchange of security key and user biometric parameters to the communication process, so that the mutual authentication of the response can prevent the attack and ensure the communication security. the invention also integrates the shared key and the temporary session key into a random map, generates the sum of the message verification codes and hides them into the cover image to verify the source of the sender message transmission, and realizes the secure, low-complexity End-to-End intelligent device messaging function to maintain the authentication and integrity of the message.

Fuzzy model for evaluation of selected Diabetes Medical Sites

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Abstract

The aim of this paper is to give model to evaluate Diabetes Medical Sites (DMSs) quality by fuzzy system to arrange these sites according to their quality depending on the values that get it during the application of the model on these sites. This model contain the most important element suggested for quality criteria like the Design Site, Update Site, Hyperlinks, Ability of User, Insufficient, Information, Use of visual effects, Data on the sources, time Input, Consistency content with goals of site. The particular goals of this work were to identify criteria for the evaluation of DMSs such as legitimacy; dependability, and usefulness and find out the weakness of those sites. The particular goals of this work were to identify criteria for the evaluation of DMSs, reconnoiter; usability of recognize criteria for the evaluation of DMSs with the identified criteria for the corroboration; of legitimacy; dependability, and usefulness; and find out the weakness of those sites. Additional, we give propositions; for improving the usability, content quality, dependability, performances and some other elements that must took care when evaluating sites and documentation information can use it in scientific research.

1-Introduction

Diabetes is a very common disease nowadays among the people of all age groups and has become a major health problem. Diabetes can be classified into four clinical types [1-3]:

- Type 1 diabetes due to β-cell obliteration, usually leading to absolute insulin insufficiency.
- Type 2 diabetes due to enlightened insulin; secretory defect on the contextual of insulin opposition.
- Other specific types of diabetes due to other causes, such as genetic defects in β-cell function.

(1)

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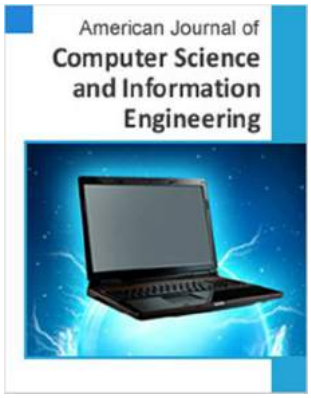

Keywords
Traffic Sign Recognition,
Cuckoo Search Algorithm (CSA),
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Cuckoo Search Algorithm and Discrete Wavelet Transform for Iraqi Road Signs Recognition System

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Abstract
In this article, a Cuckoo Search Algorithm (CSA) is presented as a class of evolutionary optimization technique with classifier Discrete Wavelet Transform (DWT) for generic object recognition. The invariant to rotation, translation or scaling DWT is used for extracting some features, and CSA performs the recognition task. Experimental results show that the proposed for all types of Iraqi traffic signs can give a system highly recognition rate and lower processing computation time of 98%, and 0.3 second, respectively.

1. Introduction

Traffic sign recognition has been a thought-provoking problem for many years. The development of intelligent vehicles is becoming progressively important now. The first work in this area can be traced back to the late 1960s and significant advances were made in the 1980s and 1990s [1]. Traffic sign recognition system could in principle is developed as part of an Intelligent Transport Systems (ITS) [2]. ITS focuses on integrating information technology into transport infrastructure and vehicles. The aim of intelligent transport systems is to increase transportation efficiency, road safety and to reduce the environmental impact with the use of advanced communication technologies. Many evolutionary algorithms have been developed for global optimum solution during last few years. The research in the field of Swarm Intelligence (SI) which deals with studying the behavior of the organisms like fish, ants, bees, cuckoo bird or something like water drops was done [3]. We apply Cuckoo Search Algorithm (CSA) in this article to classify the Iraqi traffic sign in the recognition stage using MATLAB program. This article is organized as follows: Section 1 gives an introduction and Section 2 gives an overview of the Iraqi traffic signs. Section 3, shows the stages of proposed system. Section 4 shows Traffic Sign Recognition. Section 5 shows concepts of the classifier Discrete Wavelet Transform (DWT). Section 6 describes Cuckoo Search Algorithm (CSA). Section 7 shows experimental results of our system for Iraqi traffic sign detection and recognition. Section 8 gives conclusions.

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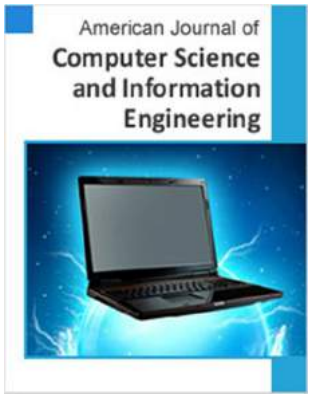

Keywords
Knowledge Management,
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Development of Tacit Knowledge Measurement Model for Academic Staff Activities

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Abdullah Mohammed Rashid, Zainuddin Bin Hassan, H. A. Al-Asadi. Development of Tacit Knowledge Measurement Model for Academic Staff Activities. *American Journal of Computer Science and Information Engineering.* Vol. 3, No. 6, 2016, pp. 37-44.

Abstract
Academic staffs represent the main knowledge resources in universities. The development of academic staff's tacit knowledge is necessary to improve the competitive advantage of various activities that are provided by universities such as teaching and research and administrative. The measurement of tacit knowledge levels is important to improve many business operations like better allocating of tacit knowledge sources based on working context and accurate development of tacit levels depend on working strategies. The measurement of tacit knowledge is difficult due to intangibility of tacit knowledge. The main aim of this paper is to develop a model to measure the academic staff's levels of tacit knowledge by using useful and practical variables. The research data were collected through qualitative approach using interview with five experts of knowledge management. The proposed model shows the academic staff's level of tacit knowledge which evaluated according three main activates; research, teaching, and administrative. The main results of this study are set of suitable variables to measure the academic staff's levels of tacit knowledge such as experiences years, qualification levels, innovations, number and quality of publication, and assessment by tests. The major benefits could be gained from tacit knowledge measurement by using the proposed model is better understanding of knowledge resources in the university.

1. Introduction

During the last two decades, knowledge management (KM) has become one of the most interesting topics for researchers and practitioners [35]. This is because KM is a systematic approach of administering knowledge to maximize the competitive advantages of organizations through effective value in knowledge chains [21]. Knowledge is defined as a combination of experience, values, and skills to evaluate and incorporate new experiences and information based on the working context of an organization [30]. It is considered as a critical organizational asset that enables organizations to achieve competitive advantage [31]. As knowledge has been recognized as an important asset to the organization, it needs to be managed effectively. Thus, KM emerges as a new management concept that has been well-established in many

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A Distributed Clustering Methodology for Connecting Dense Sensor Network Fields

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Abstract: *Clustering is a blooming topology control methodology, which can extend the lifetime and upturn scalability for wireless sensor networks. The admired principles for clustering procedure are to select cluster heads with additional residual energy and to interchange them occasionally. Sensors at substantial traffic locations swiftly exhaust their energy resources and expire much earlier, leaving behind energy hole and network barrier. Clustering goes behind some advantages like network scalability, localizing route setup, using communication bandwidth efficiently and takes the advantage of network lifetime. By the data aggregation procedure, needless communication between sensor nodes, cluster head and the base station is eluded. An evaluation of energy efficient optical low energy adaptive clustering hierarchy (O-LEACH) has been performed and the enactments have been compared with the prevailing low energy adaptive clustering hierarchy (LEACH) algorithm, between two detached wireless sensor network fields. O-LEACH procedure has been primarily implemented to join two distinct wireless sensor fields. An optical fiber is used to join two reserved wireless sensor fields. This distributed clustering methodology chiefly targets in exploiting the parameters like network lifetime, throughput and energy efficiency of the whole wireless sensor system.*

Keywords: *Distributed clustering algorithm, wireless sensor network, energy efficiency, clustering, network lifetime.*

1. INTRODUCTION

Wireless sensor network (WSN) is main and very motivating technology applied to diverse applications like observing the accessible conditions in specific areas. Each sensor node contains a wireless transceiver, a microcontroller and a battery. The foremost advantages of these networks are self-organization, fault tolerance characteristics, energy efficiency, avoiding wiring problems and being accessed through a centralized control. In order to drop the data transmission time and energy consumption, the sensor nodes are assembled into numerous clusters. The assemblage of sensor nodes is recognized as clustering. In cluster construction, every cluster has a leader which is identified as cluster head. A cluster head is one of the sensor nodes which have unconventional capabilities than other sensor nodes. The cluster head is nominated by the sensor nodes in the pertinent cluster and may also conceivable by the user to pre-assign the cluster heads. The cluster head is used to communicate the aggregated data to the sink or base station. The rest of this paper has been prearranged as follows. Low Energy Adaptive Clustering Hierarchy (LEACH) clustering methodology is discussed in section II. Section III gives the conceptual description and review of a well-distributed clustering algorithm, the optical low energy adaptive clustering hierarchy (O-LEACH). Simulation results have been briefed in section IV. Section V concludes the paper and gives few ideas for an improvement over the existing algorithm.

2. LITERATURE SURVEY OF EXISTING ALGORITHMS

Distributed clustering is extensively used in sensor node grouping since it provides improved data collection and reliability [1].LEACH is a clustering mechanism that distributes energy consumption all alongside its network, the network being alienated into clusters, CHs which are virtuously distributed in manner and the randomly selected CHs assemble the data from the nodes which are coming under its cluster [2]. LEACH forms clusters by using a distributed algorithm, where nodes make independent decisions without any centralized control [3]. The key disadvantage of this algorithm is that, when a random node nominated as cluster head dies during its operation, the

Energy Efficient Hierarchical Clustering Mechanism for Wireless Sensor Network Fields

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ABSTRACT
In wireless sensor networks it becomes infeasible to recharge or substitute the dead batteries of the sensor nodes. As soon as, some of the sensor nodes in a Wireless Sensor Network (WSN) run out of energy, they stop functioning initiating progressive deconstruction of the network. Hence, each and every protocol should be so designed in such a way that minimum energy should be expended during sensing, processing and communication. This work suggests the development of an enhanced hierarchical clustering method, the Energy Efficient Hierarchical Clustering Mechanism (EEHCM) for wireless sensor network fields. This is a well-distributed clustering mechanism and the cluster head selection is based on the residual energy, communication cost and the distance to the base station. The main distinguishing feature of the proposed algorithm is that the cluster head selection is accomplished in mere few steps and its hierarchical nature. Simulation results clearly display that the proposed EEHCM scheme depicts an excellent reduction in communication energy and backbone energy consumption. Also, the energy efficiency in EEHCM is enhanced to a great extent. It is noted that the first node death and the last node death are delayed, and hence the overall network lifetime is prolonged.

General Terms
Wireless sensor network, cluster head and energy efficiency.

Keywords
Base station, routing efficiency, clustering efficiency, network lifetime, distributed clustering.

1. INTRODUCTION
A wireless sensor node contains low power processor, a tiny memory, a radio frequency module, sensing devices and limited powered batteries. Much of the energy consumption takes place through wireless communication. An effectual way to lessen energy usage is to group the sensor nodes into numerous clusters and each individual cluster has a leader referred as cluster head [1]. The cluster head forwards the aggregated data to base station. In distributed clustering, the cluster head changes from one node to another node based on few parameters. Since, these wireless sensor nodes are power constrained devices, long distance transmissions should be generally kept minimum in order to enlarge the network lifetime. Thus, the direct communications between wireless sensor nodes and the base station (BS) are not extremely fortified. An effectual procedure to perk up efficiency, is by ordering the sensor network into numerous clusters, with each of the cluster electing one node as its leader or the cluster head.

The accumulated data will then be transmitted to the base station directly or by multi-hop fashion by the cluster head (CH). In such an organization, only cluster heads are mandatory to transmit the data over longer distances. The remaining nodes will want to carry-out only short-distance transmission. Clustering methodology is basically classified into centralized, distributed and hybrid clustering methodologies. Hierarchical methodology could be employed for all these clustering mechanisms [2].

When energy efficiency is a key criterion during clustering, hierarchical methodology could be additionally effective. The cluster heads all over the wireless sensor network will be distributed into different levels or hierarchy or tier. First level cluster heads will hand-over the aggregated data to the second level cluster heads. The second level cluster heads will hand-over the data to third level cluster heads. The cluster head at the final level only will be forwarding every data to the base station. By following this hierarchical method, energy wastage can be avoided to a greater extent. This research work gives a deep description about Energy Efficient Hierarchical Clustering Mechanism (EEHCM) for effectual formation of clusters in wireless sensor network.

The paper has been prearranged as follows. An overview of wireless sensor network, their features and clustering in WSN has been entailed in Section 1. The existing hierarchical clustering methodologies have been discussed in section 2. The restrictions of the existing methodologies and the features of the proposed methodology has been discussed in Section 3 and finally the last Section 4 gives the conclusion.

2. EXISTING CLUSTERING METHODS
The major hierarchical clustering algorithms for wireless sensor network are Low Energy Adaptive Clustering Hierarchy (LEACH), Threshold sensitive Energy Efficient Network (TEEN) and Scaling Hierarchical Power Efficient Routing (SHPER). LEACH is a clustering mechanism that generally distributes the energy consumption all along its network, the network being separated into minor clusters and CHs which are virtuously distributed in manner and the indiscriminately elected CHs, collect the information from the sensor nodes which are coming under its cluster. The LEACH protocol includes four chief steps for each round: the advertisement phase, the cluster set-up phase, the schedule creation phase and the data transmission phase. During the advertisement phase, the appropriate CH nodes will be conveying a notification to the nodes coming under them to convert as a cluster member in its respective cluster. The sensor nodes will be accepting the offer based on the received signal strength (RSS). In cluster set-up phase, the sensor nodes will be responding to their selected cluster heads. In schedule creation phase, as the cluster head receives response from nodes it have to construct a TDMA time-slot and send it back to the cluster members to intimate them when they have to pass the data to it. In data transmission stage, the data

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Mobile Clustering Algorithm for Effective Clustering in Dense Wireless Sensor Networks

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ABSTRACT

A wireless sensor node is poised by a sensor, processor, confined memory, transceiver and a low-powered battery. To lessen the data communication period and energy intake, the sensor nodes are accumulated into a quantity of minute clutches denoted as clusters and the occurrence is mentioned as clustering. Essentially, clustering could be categorized into centralized, distributed and hybrid clustering methodologies. In centralized clustering method, the cluster head (CH) is immobile. The rest of the sensor nodes in the cluster deed as cluster member nodes. In case of distributed clustering mechanism, the CH is not static. The CH keeps on fluctuating form one sensor node to another sensor node within the cluster on the base of few fixed constraints. Hybrid clustering is the grouping of both centralized clustering and distributed clustering mechanisms. A dynamic clustering algorithm for mobile wireless sensor networks, the mobile clustering mechanism (MCM) has been examined and analysed appropriately. The anticipated method is hierarchical, dynamic and energy efficient algorithm. This system displays numerous clusters, with each clusters having a unique CH and two deputy CHs. The sensors start gathering the data only when the base station approaches in range with the cluster head. The performance of the projected algorithm has been assessed against the present LEACH-Mobile algorithm. This approach displays a large decrease in average communication energy and node death rate. The network lifetime has been extended by assimilating the fresh concepts to the proposed methodology, thereby finds valuable when both the nodes and the base station are moderately moveable.

Key words: Wireless sensor network, cluster head, energy efficiency, base station, routing efficiency, clustering efficiency, network lifetime, distributed clustering

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INTRODUCTION

Wireless sensor network is skilled for retrieving real-world data about the corporeal atmospheres. Few placements of wireless static sensor network are done by means of Berkley smart dust, micro-Adaptive multi-domain power aware wireless sensors and integrated sensor networks. In static wireless sensor network, scarce restrictions like mobility is not deliberated thereby mobility becomes the subsequent evolutionary principle to be prudently measured. The dynamic atmosphere of wireless sensor network familiarizes fashionable challenges like data management, correctness, coverage, safety and software pattern. One of the energetic inspections in wireless sensor nodes are the route preservation when the node moves. The traditional protocols for static sensor network are to be improved prudently when mobility is announced. To acquire the evaluation of these protocols, the mobility configurations and mobility metrics have to be individually deliberated. In this research work, an enhancement over the LEACH-M protocol has been projected, which is appropriate for mobile wireless sensor networks (MWSN). The proposed clustering algorithm, the mobile clustering mechanism (MCM) has been well-evaluated to provision mobility [1]. This is a hierarchical one, and the idea of cluster head panel has been engaged in the proposed algorithm to lessen re-clustering period and energy feasting. By engaging these methods to the proposed algorithm, the energy efficiency and network lifetime of the sensor nodes have been found to be significantly extended.

The marvel of grouping the sensor nodes into small-sized clusters is named clustering. Every cluster would have a leader, frequently discussed to as cluster-head. The cluster membership might be motionless or variable. Clustering has some strange benefits like supporting network scalability, localizing the route setup within the cluster, preservation of communication bandwidth, alleviating the network topology at the level of sensors, employment of enhanced

Integrated Energy Efficient Clustering Strategy for Wireless Sensor Networks

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Abstract: The foremost compensations of clustering are the communication of combined information to the base station, bids scalability for enormous quantity of nodes and lowers down energy depletion. Essentially, clustering could be categorized into centralized grouping, distributed grouping and hybrid grouping. In centralized grouping, the cluster head is immovable. The rest of the sensor nodes in the group deed as participant nodes. In distributed clustering, the cluster head is not stationary. The cluster head retains on fluctuating form node to node within the group on the foundation of some restrictions. Hybrid clustering is the mixture of both centralized clustering and distributed grouping contrivances. A distributed clustering procedure, the integrated energy efficient clustering (IEEC) mechanism has been anticipated. The anticipated procedure is a well dispersed and energy effectual grouping procedure which engages relay nodes, capricious communication power and solitary message communication per node for group set-up. The enactment of the projected procedure is associated with two prevailing distributed grouping procedures LEACH and HEED. The projected procedure portrays an upgrading in average communication energy and overall system energy intake. Eventually, the complete network lifetime is considerably extended in IEEC procedure

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Keywords: Wireless sensor networks (WSN), distributed grouping, adjustable communication power, relay node, energy efficiency, network lifetime.

1. Introduction:

Wireless Sensor system inter-networks with an Internet Protocol (IP) central system through a quantity of gateways. A gateway routes probes or commands to suitable nodes inside a sensor network. It correspondingly routes sensor information, at times combined and abridged to operators who have demanded it or are predictable to exploit the data. An information mine or storage provision is offered at the gateway, in adding to data classification at each sensor. The mine may support as an intermediate amid the users and sensors thus providing obstinate data storing. Furthermore, one or additional information storage strategies are involved for the IP network to record the sensor information from a quantity of superiority sensor networks. One of the chief compensations of WSN is their aptitude to function in unattended, severe environments in which current human-in-the-loop observing structures are indeterminate, incompetent and occasionally dreadful. Consequently, wireless sensors are probable to be positioned arbitrarily in the prearranged area of attention by a comparatively unrestrained method. Assuming the enormous area to be enclosed, the petite lifetime of the battery-operated wireless sensors and the likelihood of having dented sensor.

Nodes during disposition, enormous population of sensors are predictable in the majority of wireless sensor applications. A WSN contains numerous sensor nodes that are used to intellect the target information and collaborating them to the Base station (BS) sited abstractedly left from the sensing ground. The primary sorts of these systems are reduced amount movement, a slighter quantity of hardware competences, abridged memory and augmented populace compactness in the target zone, when associated to ad-hoc networks. Frequently, a wireless sensor node encompasses squat power processor, tiny memory, radio frequency constituent, copious kinds of identifying devices and inadequate powered batteries. Considerable energy depletion proceeds throughout the wireless transportations. The energy depletion when assigning one bit of data equivalents to numerous thousands of sequences of CPU instructions. Hence the energy effectiveness of a wireless communication procedure expressively distracts the energy competence and period of the scheme. Numerous investigators have projected plentiful measures for WSNs to progress energy ingesting and network period. The regarding procedures in WSNs can be characterized into three modules: routing processes, sleep/awake scheduling processes and clustering processes. Since these devices are power-constrained, long-distance transportations are

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Hybrid Clustering Methodology using Optical Communication in Wireless Sensor Networks

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***Abstract*—Grouping could be categorized into centralized grouping, distributed grouping and hybrid grouping. In centralized grouping, the cluster head is immovable. The rest of the sensor nodes in the cluster deed as member nodes. In distributed grouping, the cluster head is not immobile. The cluster head retains on fluctuating form node to node inside the cluster on the foundation of some restrictions. Hybrid grouping is the mixture of both centralized grouping and distributed grouping contrivances. A distributed grouping procedure, the hybrid grouping methodology (HCM) has been examined. The projected approach is a well-distributed and energy-efficient grouping procedure which employs three original methods: zone based transmission power, routing using distributed relay nodes and rapid cluster formation. The proposed procedure is associated with the two well-evaluated prevailing distributed grouping processes optical low energy adaptive clustering hierarchy and hybrid energy efficient distributed grouping. The proposed methodology displays an upgrading in remaining energy, throughput and energy effectiveness of the wireless sensor system. The grouping procedure could be successfully controlled, thus the number of cluster head choice and the number of packets delivered to the base station shall be carried out successfully. Eventually, the overall lifetime of the wireless sensor network is much enhanced. The distributed relay nodes engaged in the proposed procedure could effectually connect two distinct wireless sensor network fields with abridged packet loss and forms a superior alternate to optical fiber link.**

***Keywords*—Wireless sensor networks, distributed grouping, distributed relay node, communication power, energy efficiency and network lifetime.**

I. INTRODUCTION

One of the principal recompenses of WSN is their ability to function in unattended, unadorned environments in which current human-in-the-loop perceiving assemblies are unstipulated, inept and sporadically horrible. Subsequently, wireless sensors are possible to be sited randomly in the specified area of attention by a reasonably uninhibited method. Assuming the massive area to be surrounded, the petite lifetime of the battery-operated wireless sensors and the probability of having dented sensor nodes during disposition, vast population of sensors are foreseeable in the bulk of wireless sensor solicitations. A WSN encompasses plentiful sensor nodes that are used to brain the target data and cooperating them to the Base station (BS) positioned inattentively left from the sensing ground. The principal sorts of these systems are concentrated quantity of movement, a smaller quantity of hardware competencies, abridged memory and increased populace compactness in the objective zone, when connected to ad-hoc networks. In a wireless sensor network, abundant of the energy is expended during communication. On the other hand, information processing in WSN requires interesting tasks to be proficient to evade needless processing power. Energy efficiency can be accomplished at dissimilar levels beginning from the physical layer, Media Access Control (MAC) layer and routing protocols up to the application level as quantified by (Akyildiz et al 2002). To slender down the information transmission time and energy consumption, the sensor nodes are grouped into tiny clusters. This contrivance of grouping of sensor nodes into small-sized groups is known as grouping, with each group having an individual cluster head. The CH forwards the amassed information to the base station. The foremost problem faced by many grouping practices is that every nodes use identical amount of transmission power as operated out by (Pedro et al 2011; Younis et al 2003; Alain and John 2010; Banerjee and Khuller 2001; Chia and Yu 2012). In case of numerous grouping methodologies, the nodes that are closer to the CH and those remoter from the CH use the identical transmission power [1].

Also the CHs that are closer to the base station and those remoter from the base station use the identical transmission power. To overcome this delinquent, the wireless sensor field could be divided into dissimilar regions (zones). The nodes in the zone closer to the base station can expenditure

A Novel Scan2Pass Architecture for Enhancing Security towards E Commerce

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***Abstract*—Widely deployed web services facilitate and enrich several applications, such as e-commerce, social networks, and online banking. This study proposes an optical challenge-response user authentication system model based on the One Time Password (OTP) principle (Scan2Pass) that use multifactor authentication and leverage a camera equipped mobile phone of the legitimate user as a secure hardware token. The methodology which is designed and implemented to evaluate the proposed idea will be explored and explained throughout this paper. The chosen method presents a brief overview about the steps required to design an efficient and practical system. Also, the requirements will be discussed as well as our assumption to give a simple yet an adequate understanding about the security of our proposed system in general. Then, an overview about the basic architecture needed for the proposed system to explain the role of the shared secret and the challenge response protocol in order to complete authentication procedure and provide mutual authentication between the user and the server by adopting multi-factors such as time, OTP algorithm by describing the operation flows of users during each phase of this system.**

Keywords—Electronic commerce; authentication; one time password; performance and reliability

I. INTRODUCTION

Electronic commerce (e-commerce) uses electronic media for conducting commerce, which involves activities like setting up an electronic interface between service providers and target, namely, customer, streamlining the workflow in the organization to process the requests from the customer and ultimately deliver that was promised. The International Business Machines Corporation (IBM) has defined e-commerce to be "the transformation of key business processes through the use of Internet technologies" [1]. E-commerce is associated with the buying and selling of information, products and services via computer networks today and in the future via any one of the myriad of networks that make up the Information Superhighway. As e-commerce growth, it becomes more significant. Many countries must not only address and appreciate its potential for the growth of trade and industry but also as a means of survival in the new world of e-commerce-based trade and business. E-commerce is a global phenomenon providing markets and opportunities world-wide with a significantly reduced barrier to access as compared to global marketing in the 21th century [2]-[5]. This paper discusses on the background of study, the problem of the current system, research questions, objective to maintain this issues that leads to draw the conclusion and brief summary of approach that implemented in this research.

II. RESEARCH DESIGN

This section introduces the research design to develop this research. As shown from Fig. 1 below, there are four main steps to complete this research. The first step is to work on the research gap from extensive reading on the literature. Study the literature about existing authentication method to find the research gap or weakness in the existing researches. Then, analyze the requirements for a new authentication system required to apply technology and solve the existing problems. The third step is to move in design stage [6], [7]. The process of defining the architecture, components, modules, interfaces and data for a system is to satisfy specified requirements. Then, begin to develop the new authentication system, called Scan2pass. Finally, after implementation Scan2Pas starts to evaluate the proposed LSB technique using PSNR measurement and compare the results with the previous existing system to show the performance of the new system. Fig. 1 shows the overall research design.

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Thin Film Nanocomposite Membrane Impregnated with Clay Nanoparticles for Water Desalination

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Abstract: Fabrication high performance reverse osmosis (RO) membrane at low cost is necessary in desalination industry. In this paper, we report the use of clay nanoparticles (NPs) to improve RO thin film composite (TFC) membrane. Different concentrations of NPs were embedded into polyamide (PA) active layer of TFC membrane through interfacial polymerization (IP). Results indicated that the membrane impregnated with clay NPs exhibited higher water flux and fouling resistant than the pristine one, and maintained good salt rejection.

Keywords: Thin film nanocomposite (TFN); Reverse Osmosis (RO); polyamide (PA); nanoparticles (NPs)

INTRODUCTION

Nowadays, massive interest in the use of membrane technology for water desalination has emerged [1]. Thin-film composite (TFC) membrane, which is fabricated by interfacial polymerization (IP) between m-Phenylenediamine (MPD) and trimesoyl chloride (TMC) on polysulfone (PSU) support, is considered as the most widely used desalination membrane [2]. However great efforts have been exerted to enhance TFC membrane properties, fabricating a membrane with high performance and low cost is a big challenge [3]. On 2007, Hoek and his coworkers [4] developed a new approach to enhance TFC membrane performance by embedding Zeolite NPs into polyamide (PA) active layer through interfacial polymerization (IP). Result indicated that the membrane impregnated with zeolite NPs showed higher water flux as compared to unmodified membrane. This is because zeolite NPs are hydrophilic, and their presence in membrane PA layer increased water adsorption, thus, improved water flux. Since then, researches have been conducted to enhance membrane performance by incorporating NPs into membrane matrix [5-13].

Clay NPs have been used in water treatment because they are eco-friendly and cheap [14]. Monticelli and his coworkers [15] successfully improved ultrafiltration membrane performance by dispersion of clay NPs into membrane structure. In addition, an enhancement in the composite film mechanical properties was noticed. Another study by Khranovssky [16] showed that the addition of clay NPs in casting solution of UF membrane improved membrane surface wettability. The objective of this paper is to study the effect of clay NPs incorporation into PA thin film layer of membrane. The hydrophilic nature and cheap price of clay were utilized with the purpose of fabricating high performance RO-TFN membrane.

MATERIALS

Commercial polysulfone (PSU, 0.03) sheet were purchased from MicroVantage™ WGPS Series. M-Phenylenediamine (MPD) and trimesoyl chloride (TMC) were obtained from Sigma Aldrich. Clay nanoparticles (NPs-70 nm) were purchased from Sigma Aldrich.

Polysulfone Layer Preparation

Commercial PSU sheet was used as a support layer. The fabrication process is graphically illustrated in scheme 1. First, *m*- MPD solution, which prepared by dissolving 15 wt.% MPD in DI water, was poured on PSU sheet for 3 minutes. Excess solution on MPD-PSU sheet was removed by squeegee roller**.** Next, TMC solution, which was prepared by dissolving 0.13 wt % TMC in hexane, was poured on MPD-PSU sheets for 3 minute. The reaction between MPD and TMC resulted in the formation of PA thin film layer. Then, the membrane was washed with DI water and kept in room temperature for at least 12 hours before test. Clays NPs were dispersed in TMC solution at different concentrations.

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Reverse Osmosis Polyamide Thin Film Nanocomposite Membranes for Water Desalination: A Study

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Abstract: *Reverse osmosis (RO) desalination is one of the well-known technologies for water purification. Since its development, many studies have been devoted to improve this technique. Nanostructured reverse osmosis membrane is expected to play an important role in water desalination. The main objective of this study is to highlight the most important achievements in reverse osmosis membrane technology.*

Keywords: *Thin Film Nanocomposite (TFN); Reverse Osmosis (RO); Desalination; Nanoparticles (NPs).*

1. INTRODUCTION

Lack of clean water resources is a grand issue in modern society [1,2]. Water desalination represents a real solution to produce clean water for human consumption and industrial sectors [3]. Because of its high efficiency, reverse osmosis (RO) is considered as the most important desalination technology [4,5]. Thin film nanocomposite membrane has become a frequently selected RO membrane [6].This membrane is prepared by interfacial polymerization (IP) process and incorporation of nanoparticles into polyamide (PA) active layer with the aim of improving membrane characteristics including the hydrophilicity and surface charge. The term TFN membrane was first introduced by Hoek and his coworkers in 2007 [7]. In their work, they used zeolite NaA nanoparticles as filler in PA active layer during interfacial polymerization between m-phenylenediamine (MPD) and trimesoyl Chloride (TMC). Remarkable enhancement in water flux was achieved by embedding zeolite NaA nanoparticle without sacrificing membrane separation efficiency. This improvement was ascribed to hydrophilic property of zeolite nanoparticles which facilitate water solubilization and diffusion through the membrane.

Table 1 summarized the performance of RO TFN membrane that studyed in research publications. Next section is presented the recent scientific and technological advances in the development of nanocomposite membranes for water treatment**.**

2. PERMEABILITY AND SELECTIVITY

Embedding hydrophilic nanoparticles into the polyamide layer of the composite membrane lead to significant enhancement in the membrane performance including water flux and salt rejection. As it mentioned earlier, zeolite NaA is the first nanomaterial that has been used to improve membrane water flux due to its superior hydrophilicity, high negative surface charge, and internal pores which facilitate water adsorption across the membrane [7].

Lind and his coworkers [9] investigated the effect of nanoparticles size on membrane performance using different size of zeolite nanoparticles. Smaller nanoparticles produced higher water flux due to its large pores, on the other hand larger nanoparticles produce better surface properties. This study suggested that nanoparticles size is an important factor needs to be considered while fabricating PA nanocomposite membrane.

In addition to zeolite, different nanomaterials have been used to modify membrane performance; all mentioned in table 1.

Design and Implementation of Challenge Response Protocol for Enhanced e-Commerce Security

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Abstract

The environment of the proposed Scan2Pass is described in detail. Confidentiality is provided at the application level in the system to protect user credential in both entities (the user and the server) for preventing brute force and dictionary attacks. A security mechanism is also provided to maintain confidentiality at the transport level. The HTTP Strict Transport Security in the system ensures that all connections between entities will be upgraded to HTTPS only. This way guarantees that all

data and sensitive information transmitting between both sides are protected. The implementation of Scan2Pass presents a possible deployment of the system and describes the components of the prototype. Implementation and testing confirm that the proposed Scan2Pass is fast and easy to use and learn. In particular, users without much experience with smartphones can easily use the proposed system after seeing it done only once. Therefore, the proposed system model is convenient for users because of the absence of the burden of carrying a separate hardware token or extra charges from the short message service. The design and implementation of a challenge–response protocol for enhanced e-commerce security are also elaborated.

Keywords

Electronic commerce Security Attacker Short message service Performance Reliability

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Suggested Mechanisms for Understanding the Ideas in Authentication System

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Abstract

An introduction to the necessary background information required for understanding the ideas of authentication system has been elaborated in this paper. It begins with a description of basic concept of authentication process together with the essential factors required for use in authentication systems. This is followed by a description of the token types with an explanation of the threats and challenges founded in the authentication. Also included in this paper, an explanation of the fundamental cryptographic concepts that are used in this research study. A brief description of the suitable technology for use in the authentication system. Finally, the paper provides a review of literature that focuses on protection of the user against sensitive data theft (e.g. user credentials). However, some of the systems require modifications to the server, while some require additional hardware, to provide more protection to the system, besides making them difficult for adoption by the general public. This paper concludes with a comparison between the previous works regarding, password managers and some of their intrinsic characteristics which could be perceived as weaknesses and flaw. From this comparison, it can be concluded that there are limitations and shortcomings in all the existing approaches.

Keywords: *Electronic commerce, Authentication system, Security, Attacker, Short message service and Reliability.*

1. Introduction

For decades, authentication systems depend on a single factor which is ID and a secret password. However, users' passwords are prone to be stolen and compromised under different threats and vulnerabilities. In addition, the length and randomness of user-chosen passwords remain poor over time for easy memorization. But, because of hacking technologies have become more diversified and advanced, security and authentication have become unable to rely on ID and password-based authentication alone. As a result, single-factor authentication using an ID and password has been found to be vulnerable to many cyber-attacks such as malware attack, replay attack, offline brute force attack,

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TOWARD FOR STRONG AUTHENTICATION CODE IN CLOUD OF INTERNET OF THINGS BASED ON DWT AND STEGANOGRAPHY

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ABSTRACT

Now days, with the remarkable fast development of micro processing devices and communicating technologies, networks, computers, mobile devices and Internet have become very unavoidable, as a result led to the emergence and prevalence of the Internet of Things (IoT). The mobility devices in IoT have entered in all areas of life ranging from a smart home down to a smart city. Due to big storage systems are extremely needed for securing data in flexible processing. Especially, the two or more entities wish to exchange data in IoT. In this paper, we propose secure and scalable scheme to keep data against attacks during a communication channel in IoT environment when IoT's components want to exchange their data. This scheme work based on crypto hash function, and Discrete Wavelet Transform (DWT) that apply on sender's/receiver's message. Our proposed scheme distinguishes a good of security, scalability, and reliability in entities' data via IoT. Additionally, our work includes numerous security features like one time message code for each user's login request, user's message integrity, user's message anonymity, and session key agreement. Empirical results have explained the potential and profits of the proposed scheme as well as significant gains in performance.

Keywords: *IoT, MAC, Key Management, Battle Attack.*

1- INTRODUCTION

In information technology world today, the improvement of multicore processors leads to a significant increase in the amount of computational power on a single device.. In parallel and distributed system, the advancement of networking technologies has funded with the fast enlargement of web skills and service providers. Now, ''Big Data'' is a term for huge and budding sets of data. ''How fast it is budding'' and ''how difficult it is'' are the key anxieties. Project companies see that the data in their place is an excellent foundation of insights [1]. Due to a relatively current event of an upsurge in data exchanged among nodes in devices (computer, laptop, mobile, etc.) in the Internet of Things (IoT), exchanging data between two or more devices in IoT are also often needed for secured Big Data [2]. IoT refers a modern era of computing whereby every conceivable object is prepared with a smart device permitting data collection and communication via the Internet. The main challenges of IoT represented in the security in terms of the group and use of individuals' special data. Continuously, the security of exchanging data in the IoT's environment and how to keep this data from adversaries is very important demand.

Obviously, the message that generated from a legal user is known as User Authentication and is supported by Message Authentication code (MAC) for ensuring from the integrity and authenticity of received message. MAC functions require possessing several security tools such as SHA-1.

For more security, a MAC function should be having ability to withstand famous malicious attacks like forgery and insider attacks. As a result, even if an adversary can be achieved an oracle which holds the

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Research paper

Optimization noise figure of fiber Raman amplifier based on bat algorithm in optical communication network

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Abstract

Designing Raman amplifier with high On-Off again and low noise figure is required in in optical communication networks, due to wide and tunable amplification and low nonlinearity. This paper proposes a new configuration design to the single mode fiber Raman amplifier using a multi-objective bat algorithm. The main aim of the proposed method is to preserve the values of noise figure and ripple of the amplifier as low as possible while keeping the values of laser wavelength and the amplifier powers are high. The simulation results show that increasing the number of iterations is required, which would result in a flat gain spectrum with a considerable enhancement in the noise figure and minimal gain ripple that reaches to less than 0.18 DB.

Keywords: *Forward Pumping Scheme; Fiber Raman Amplifiers; On-off Gain; Bat Algorithm; Optical Communication Network.*

1. Introduction

The nonlinear effects in optical fiber is a major issue in a Dense Wavelength Division Multiplexing (DWDM) system of optical telecommunication networks related to vibrational excitation modes of silica. Rayleigh, Raman and Brillouin are the three stimulated scattering processes in optical networks. Among the first nonlinear effects studied in optical fibers is the stimulated Raman scattering (SRS) was studied in [1]. From the stimulated inelastic scattering the energy transfer to the linear medium, so the optical fiber serves as a nonlinear gain-amplifying medium.

Spontaneous Rayleigh and Rayleigh wing (very large spectral width) scattering are an elastic process from the local density fluctuations and the fluctuations in the orientation of the molecules of the medium, respectively. The spontaneous Brillouin and Raman scattering are produce a spectral shift of about 10 and 13000 GHz in silica optical fiber with time relaxation of 10-9 and 10-12 Sec, respectively [2, 3].

Due to SRS and SBS restricts the performance of nonlinear devices and limitation of the light power and the bandwidth, such as parametric optical frequency converters and amplifiers. In recent years, there has been many studies in optical communication network order to obtain devices to amplify the light using SRS in silicon [4, 5] and signal processing systems [6-9].

There are many types of optical amplification devices, such as semiconductor optical amplifiers (SOAs), erbium-doped fiber amplifiers (EDFAs) and Fiber Raman amplifier (FRAs) [10]. The spectral shape of Raman gain amplifier depends on the wavelength separation between pump and signal and guides light at both the signal and pump wavelengths by using fibers with low losses [11]. To get high signal to noise ratio, high Noise figure and minimal ripple of Raman gain and flatness in the optical communication network design by optimization the proper pump configuration and other parameters of the amplifier.

2. Theoretical modeling of fiber Raman amplifiers

The signal power $p_s(z)$ with the attenuation constant $\alpha_S$at wavelength λ_s, and the pump power $P_P(z)$ with the attenuation constant $\alpha_P$at wavelength λ_P , propagation differential equations in in Raman amplified medium are expressed as [12]

$$\frac{d}{dz} P_S(z) = \left[\frac{g_R}{A_{eff} K_R} P_P(z) - \alpha_s\right] P_s(z) \quad (1)$$

$$\frac{d}{dz} P_P(z) = \left[-\frac{\lambda_S}{\lambda_P}\frac{g_R}{A_{eff} K_R} P_S(z) - \alpha_P\right] P_P(z) \quad (2)$$

Where g_R is the Raman gain coefficient, K_R is the polarization factor and $A_{eff}$is the effective area.

The design parameters for the optimized the Raman amplifier to evaluate the performance of it is found by [13-17]:

$$P_S(z) = P_S(0)\, e^{\left(\frac{g_R P_P(0)(1-e^{-\alpha_P z})}{\alpha_P A_{eff} K_R} - \alpha_S z\right)} \quad (3)$$

$$P_P(z) = P_P(0)\, e^{(-\alpha_P z)} \quad (4)$$

$$G_{On-Off} = \frac{P_S(L)|_{\text{with pump power}-On}}{P_S(L)|_{\text{with pump power}-Off}} \quad (5)$$

$$NF = \left[\frac{1}{G_{On-Off}}\left(\frac{2 P_{ASE}}{h\, v\, \Delta v} + 1\right)\right] \quad (6)$$

Where P_{ASE} , Δv, v, G_{On-Off} and NF are the forward amplified spontaneous emission (ASE) noise output power, the bandwith for frequency signal v, the ON-OFF Raman gain and the effective noise figure.

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Advanced Oxidation Processes (AOPs) for Wastewater Treatment and Reuse: A Brief Review

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ABSTRACT

Although coagulation / flocculation, sedimentation, filtration, and disinfection are promising for waste water treatment, some of the chemical pollutants cannot be eliminated using such methods, hence the need to use advanced methods. Currently, advanced oxidation processes (AOPs) are among the most frequently used approaches to remove pollutants that have low biodegradability or high chemical stability. These methods is depend on the generation of hydroxyl free radical (HO*) as a strong oxidant for the destruction of compounds which cannot be oxidized using conventional oxidants. In this brief-review, we highlighted the AOPs that have shown premises in pollutant removal from wastewater.

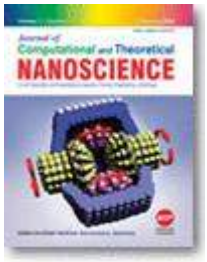
INTRODUCTION

The need to pursue sustainable practices has led to a continuously increasing global concern for the development of alternative water reuse technologies, mainly focused on industry and agriculture [1,2]. Chemical pollution from solvents, dyes, heavy metals, etc., poses a major threat to water quality [3,4]. Traditionally, the focus by environmentalists was on pollutions detection and their negative impacts on ecosystems. With the advancements being experienced in science, the understanding of the chemistry of pollutants has improved and this has led to more cutting edge technologies being implemented for the treatment of erstwhile difficult to treat pollutants [5,6].

Advanced oxidation processes (AOPs) are increasingly being considered as a highly competitive water treatment technology for removing low biodegradability or high chemical stability pollutants [7,8]. While these processes come in handy to treat pollutants with high chemical stability, it is a well-known fact that chemical oxidation for complete mineralization is expensive. In order to reduce the costs incurred, the process is combined with biological treatment [9,10,11,12,13]. While the latter is an interesting approach to waste water treatment, the following discussion is restricted to advanced oxidation processes only.

1. Wastewater treatment technology selection

The task of selecting the best treatment option for remedying specific industrial water is usually a complex one. The main factors that one considers in making a decision regarding the wastewater technology to apply include the quality of original water, conventional treatment options, removal of parent contaminants, treatment flexibility, economic studies, the facility decontamination capacity, final waste water treatment system efficiency, potential use of treated water and life cycle assessments for the determination of the compatibility of wastewater treatment technology [9]. In general, the capabilities and possibilities of the conventional treatment methods available are widely known. However, in order to determine the efficiency of new technologies such as AOPs, bench-scale and



A Novel and Enhanced Distributed Clustering Methodology for Large Scale Wireless Sensor Network Fields

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Abstract | References | Citations | Supplementary Data

Wireless sensor network (WSN) is a grid of sensors possessing processor unit and trivial memory unit implanted on them. Trustworthy packet forwarding from nodes to sink seems to be the most substantial purpose of this sensor network. The customary routing algorithms could not be employed at this juncture since the sensor battery power is limited. To provide energy proficiency, sensors are normally grouped as non-overlapping groups. This research work provides a transitory summary on clustering procedures in sensor networks. An energy-efficient distributed clustering approach for impenetrable sensor networks, the Weight based clustering Low Energy Adaptive Clustering Hierarchy (WC-LEACH) is proposed and the outcomes are assessed in contradiction with the prevailing Low Energy Adaptive Clustering Hierarchy (LEACH) and Hybrid Energy Efficient Distributed Clustering (HEED) methodologies. Simulation results obviously display an exceptional enhancement in packet delivery ratio, reduced packet loss, reduced energy consumption, increased throughput and increased lifetime for WSNs.

Keywords: DISTRIBUTED CLUSTERING PROCEDURE; ENERGY EFFECTIVENESS; NETWORK LIFETIME; WEIGHT BASED CLUSTERING; WIRELESS SENSOR NETWORK

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Stability of multiwavelength fiber laser employing semiconductor optical amplifier in nonlinear optical loop mirror with polarization maintaining fiber

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Abstract

This paper demonstrated a multiwavelength fibre laser incorporating semiconductor optical amplifier in nonlinear optical loop mirror with polarisation maintaining fibre. The configuration comprised 3-dB optical coupler, semiconductor optical amplifier, and a 2-meter length of polarisation maintaining fibre. The range of semiconductor optical amplifier varied from 160mA to 180mA to determine and evaluate their performance in terms of peak power and stability. Based on the results, the power fluctuation for different wavelengths at 1555nm, 1558nm and 1561nm was less than 5dB. In addition, the output peak power increased as the semiconductor optical amplifier current increased. The highest output peak power was - 2.093dBm at 180mA with lasing wavelength of 1558nm. The stability test showed that the multiwavelength fibre laser system was stable at room temperature within 60 minutes. Furthermore, the polarisation maintaining fibre that acts as gain medium has a broader bandwidth operating in the C-band to L-band at room temperature.

Multiwavelength fiber laser employing semiconductor optical amplifier in nonlinear optical loop mirror with polarization controller and polarization maintaining fiber

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Multiwavelength Fiber Laser Employing Semiconductor Optical Amplifier in Nonlinear Optical Loop Mirror with Polarization Controller and Polarization Maintaining Fiber

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Abstract. This paper demonstrates multiwavelength fiber laser employing semiconductor optical amplifier in nonlinear optical loop mirror with polarization controller and polarization maintaining fiber. The configuration consists of a 3-dB coupler, polarization controller and several lengths of polarization maintaining fiber. The results showed a single polarization controller with 5 meters of polarization maintaining fiber length generated 36 of lasing lines at 160mA of semiconductor optical amplifier current. In addition, for the average peak power and average optical signal to noise ratio, the 2 meters of polarization maintaining fiber length with single polarization controller in the nonlinear optical loop mirror shows higher values, 0.55mW at 210mA and 31.98dB at 210mA, respectively. Both gain media have a wider bandwidth operating in the C-band and L-band at room temperature.

INTRODUCTION

Researchers in telecommunications and sensors multiplexing have interests in the application of the multiwavelength fiber laser (MWFL) in the fiber optic test, measurement of Wavelength Division Multiplexer (WDM) components and optical test instruments [1,2]. MWFL is able to form; a new and simple fiber laser application. Thus, improving the performance and cost efficiency of the fiber laser system.

Previous studies show the successful applications of using comb filters such as Fabry-Perot filter, Lyot filter, cascaded Bragg Gratings, Mach Zender interferometer, array waveguide grating, and Sagnac loop mirror [3,4] to significantly increase the fiber laser performance.

Various mechanisms are utilized including stimulated Brillouin scattering (SBS), stimulated Raman scattering (SRS) and erbium-doped fiber amplifiers (EDFA) to generate stable lasing lines. Therefore, SOA was proposed in this study as a suitable gain medium as it can easily generate stable multiwavelength in room temperature due to inhomogeneous broadening compared to the EDFA that has poor lasing lines stability at room temperature due to the strong homogenous gain broadening and cross-gain saturation [5,7,10]. Therefore, SOA is preferable for it possesses many interesting features; direct electrical pump, small size, flexibility with for a variety of wavelengths, and easy integration with other semiconductor devices [8,9,11].

Recently, the nonlinear optical loop mirror (NOLM) of fiber laser has become popular for its ultra-high sensitive ambient environment temperature changes [10] which lead to a truly path-matched interference mode. Furthermore, an integration of SOA and NOLM with the fiber laser configuration has been intensively investigated for several years

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Characteristics of multiwavelength fiber laser employing semiconductor optical amplifier in nonlinear optical loop mirror with different length polarization maintaining fiber

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Characteristics of Multiwavelength Fiber Laser Employing Semiconductor Optical Amplifier in Nonlinear Optical Loop Mirror with Different Length Polarization Maintaining Fiber

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Abstract. In this paper, we propose and demonstrate generated characteristics of a multiwavelength fiber laser based on semiconductor optical amplifier in a nonlinear optical loop mirror with different length of polarization maintaining fiber. The configuration comprises 3-dB optical coupler, semiconductor optical amplifier and, 2 meters and 10 meters of polarization maintaining fiber. Characteristics of multiwavelength fiber laser are studied through the use of polarization maintaining fiber at different lengths. The experimental results revealed the number of lasing lines increases with the increment of the polarization maintaining fiber length. The polarization maintaining fiber with 10 meters of length has the ability to generate a higher number of lasing lines up to 47 signals with semiconductor optical amplifier injected current at 180mA, respectively. However, in terms of average peak power and average optical signal to noise ratio, the 2 meter of polarization maintaining fiber length has the capability to produce a higher value which is 0.45mW at 250mA of semiconductor optical amplifier driven current and 28.86dB at 170mA of semiconductor optical amplifier driven current, respectively. Furthermore, it is observable that this configuration capable to generate a wider bandwidth which is operating in the conventional (C) band to long (L) band at the room temperature.

INTRODUCTION

The multiwavelength fiber laser (MWFL) has received a lot of attention from the other researcher for telecommunications and sensors multiplexing as MWFL can become a great potential in the fiber optic test, measurement of wavelength division multiplexer (WDM) components and optical test instruments [1,2]. By using MWFL [3,4], a new and simple configuration can be formed. Thus, these opportunities increase the performance of the laser system's technologies as it offers a solution to cost savings.

Demand of high speed data transmission's technologies are the main objective in this MWFL research. Prior project have shown many researcher are successful using a different technique by using comb filters such as Fabry-Perot filter, Lyot filter, cascaded Bragg Gratings, Mach Zender interferometer, array waveguide grating, and Sagnac loop mirror [2,5] to significantly increase the transmission capacity. However these techniques require in-depth

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Priority Incorporated Zone Based Distributed Clustering Algorithm for Heterogeneous Wireless Sensor Network

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ABSTRACT

Wireless sensor networks (WSNs) are considered to be the currently flourishing scientific domain, thereby found to be applicable in numerous industrial and domestic applications. As per the mathematical results in Pulse-coupled oscillator (PCO), it has been predicted that, numerous iterations are needed for convergence, leading to increased power consumption. Biologically inspired solutions are greatly applicable for recovering coverage issues and efficient routing processes. In Hybrid energy efficient distributed clustering (HEED), to find a node with lowest communication cost, large number of iterations is needed, thereby leading to larger time duration for finding such node, and this is considered as the prevalent drawback, resulting in significant power consumption. In Optical low energy adaptive clustering hierarchy (O-LEACH), the cluster head selection is based on randomness, resulting in easy cluster failure. Hence, for cases, where power minimization and higher network lifetime is to be achieved to a larger extent, the existing strategies shall not be applicable, due to few restrictions. In this paper, a priority incorporated zone based distributed clustering algorithm, the Better Integrated and Optimized Low Energy Adaptive Clustering Hierarchy (BIO-LEACH) has been proposed for heterogeneous WSN. The methodology of this distributed clustering algorithm possesses three distinct features. First, the given clustering area will be divided in to different clusters and each cluster will be assigned with priority. The cluster which is highly sensitive and which needs frequent data recording will be given highest priority. The clusters in which the priority is assigned, takes multiple sensing and communication even in one cycle. But, the clusters where priority is not assigned, only one sensing and data transmission will be allowed for one cycle. Second, the clusters possessing priorities will have one cluster head (CH) and two supporting cluster head (SCH), but the clusters that do not have priorities will have only one cluster head. Third, the clusters possessing priorities will be possessing cluster nodes more than that of the clusters without priorities, so as to avoid cluster failure. Simulation results have been done to evaluate the performance of the proposed algorithm in terms of number of cluster head selection, amount of energy consumed and number packets received.

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Stability of multiwavelength fiber laser employing semiconductor optical amplifier in nonlinear optical loop mirror with polarization maintaining fiber

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Stability of Multiwavelength Fiber Laser Employing Semiconductor Optical Amplifier in Nonlinear Optical Loop Mirror with Polarization Maintaining Fiber

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Abstract

This paper demonstrated a multiwavelength fibre laser incorporating semiconductor optical amplifier in nonlinear optical loop mirror with polarisation maintaining fibre. The configuration comprised 3-dB optical coupler, semiconductor optical amplifier, and a 2-meter length of polarisation maintaining fibre. The range of semiconductor optical amplifier varied from 160mA to 180mA to determine and evaluate their performance in terms of peak power and stability. Based on the results, the power fluctuation for different wavelengths at 1555nm, 1558nm and 1561nm was less than 5dB. In addition, the output peak power increased as the semiconductor optical amplifier current increased. The highest output peak power was -2.093dBm at 180mA with lasing wavelength of 1558nm. The stability test showed that the multiwavelength fibre laser system was stable at room temperature within 60 minutes. Furthermore, the polarisation maintaining fibre that acts as gain medium has a broader bandwidth operating in the C-band to L-band at room temperature.

Keywords: multiwavelength fibre laser, semiconductor optical amplifier, polarisation maintaining fibre, nonlinear optical loop mirror

I Introduction

Multiwavelength fibre laser (MWFL) with several applications such as optical communication system and sensors multiplexing has been attracting researchers [1,2]. MWFL offers cost-effective solutions as a new and straightforward fibre laser configuration can be formed [3,4]. Prior studies have shown that many researchers successfully use various techniques using Lyot filter, Fabry-Perot filter, cascaded Bragg Gratings and Sagnac loop mirror [2,5] to significantly increase the transmission capacity. However, specific issues regarding signal quality in terms of stability and peak power in the fibre optic communication system still need thorough research. Therefore, this study proposed a semiconductor optical amplifier (SOA) incorporating a nonlinear optical loop mirror (NOLM) configuration to be experimentally investigated. The SOA exhibits many advantages including its small size, availability for a variety of wavelengths, and easy integration with other semiconductor devices [9,10,12]. Equally important, the device can generate multiwavelength in room temperature quickly due to inhomogeneous broadening compared to erbium-doped fibre amplifiers (EDFAs).

Conversely, for the EDFA, there is some limitation in generating stable multiwavelength at room temperature due to the healthy homogenous gain broadening and cross-gain saturation although it yields high output power [6-9, 11]. Hence, SOA was selected as a suitable optical

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An Efficient and Secure Scheme for Dynamic Shared Data in Cloud

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ABSTRACT

People have proposed many data integrity techniques to secure data storage in cloud. The majority of these schemes assume that only the owner of the data can modify their storage in cloud. In recent years, researchers have allowed different cloud users to use integrity assurance for modifying data. As a result, schemes with stronger reality than before have been proposed. Nevertheless, these attempts are impractical due to the large computing costs for cloud users. Clients must also perform numerous computations to ensure the integrity of data storage. A robust and efficient scheme is put forward in this study to maintain data integrity in cases that involve public auditing. In this way, multiuser modification can be used to check the public integrity for cloud data and reduce the auditing cost.

The proposed scheme uses public key cryptography equipped with a proxy re-encryption and a cryptographic hash function. We allow a third-party auditor (TPA) to conduct preprocessing of data for the sake of cloud users prior to uploading these data to the cloud service providers (CSPs) and then verify the integrity of data. We also allow the TPA to perform re-encryption of data for sharing data without losing privacy. The scheme is characterised by significant security features, such as management of key, privacy, low-cost computation, exchange of key, freeing clients from burdens, failure of CSPs in creating right verifier response in absence of data and one-time key requirement. Numerical analysis and extensive experimental results verify that the proposed scheme is efficient and scalable.

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A Network Analysis for Finding the Shortest Path in Hospital Information System with GIS and GPS

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Keywords: SDSS, GIS mobile applications, improved Dijkstra algorithm, A* algorithm.

Abstract: The Spatial decision support system (SDSS) has turned to be an important aspect of our daily lives for its role in developing decision techniques based on Geographic Information System (GIS). This paper will be presenting a proposed intelligent SDSS mobile application for better health services and faster aid through integrating two types of technology: an improved Dijkstra algorithm that insures faster response and the geographic information system technology. This is done by studying and comparing the A* algorithm and Dijkstra algorithm to arrive at the best Dijkstra algorithm improvement method. The application goal is to serve as a health aid application that will give instruction to avoid the covid-19 virus and provide the required information and help the infected to find the right donors or apply for receiving request by using an online database system for adding and viewing lists of donators and receivers in Basra governorate. The other aim of the application is to seek out the closest hospital, shortest path to the current health centre, time, and distance.

1. Introduction

These days transportation is becoming more and more of an issue due to the rapid increase in population and the demand of transportation, and along with this issue, comes the serious problem of emergency fast transportations. Hence, it is only a rationale to find a way to efficient travel from one place to another in an easy way at the shortest time, cheapest cost and, least effort. Obtaining a system that can give fast decisions in real time is now more important than ever. Making the decision about the nearest hospital and the shortest path to it is to be through a system by using an algorithm in graph theory known as Dijkstra's algorithm for the purpose of offering routine services to all those who are in need of it and guide them to the most correct choice of route [1-2].

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Enhanced Clustering Algorithm for Efficient Clustering in Wireless Sensor Network

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Abstract: Wireless sensor network (WSN) is a network formed as resultant interconnection of multitude of sensor nodes. The main challenging question here is to lessen energy ingesting during sensing, processing and communication. In this paper, a well evaluated distributed clustering strategy, the Hybrid Integrated Clustering Algorithm (HICA) has been proposed for interconnecting two sensor fields. The proposed clustering algorithm is a hybrid and integrated clustering procedure which employs grid nodes, range-based transmission power, one-step clustering mechanism and cluster head panel. The performance evaluation of the suggested procedure is compared against O-LEACH and HEED. Simulation results clearly show an excellent upgrading in network lifetime, improved residual energy, reduced energy consumption, improved throughput and evenness in cluster head selection, thereby applicable for connecting two detached wireless sensor network fields.

Keywords: WSN, Distributed Clustering, Grid Nodes, Range-Based Transmission Power, Throughput And Network Lifetime.

1. INTRODUCTION

Wireless sensor network entails a collection of sensors that are deployed in buildings, forests and numerous infrastructures. Sensors gather data regarding the neighboring environs, updates the base station (BS) thereby responding to intermittent monitoring demands. For this purpose, the sensors are assembled into dissimilar cluster, with each cluster containing one leader commonly referred as cluster head (CH) and this mechanism is termed as clustering. Clustering is classified into centralized and distributed clustering. In centralized approach, the CH has a fixed architecture. In distributed clustering, the CH is not static and this shifts on the basis of few parameters. Distributed clustering strategy could be employed for some valid reasons like preventing network failure, improved information gathering and minimizing redundant information transmittal. In this paper, a well-evaluated distributed clustering strategy, the Hybrid Integrated Clustering Algorithm (HICA) has been proposed for interconnecting two sensor fields.

The proposed clustering algorithm has some specific uniqueness like employment of grid nodes, range-based transmission power, one-step cluster formation and cluster head panel. This section gives a brief overview of the novel concepts employed in the proposed HICA algorithm. Grid nodes are dedicated backup sensors which are used only for forwarding the data from CHs to the BS. Grid nodes are positioned halfway among two separated sensor fields. The sensor field is organized into several zones starting from the cluster head. The energy utilization will be ranging from minimum to maximum from first zone to last zone. In the existing clustering procedures O-LEACH and HEED, the power utilization of every node is equivalent to the power used by the nodes in the last zone of the proposed algorithm. In both LEACH and HEED, many messages are needed for cluster formation. But the proposed algorithm employs one-step cluster formation procedure. In the proposed HICA algorithm a novel perception of cluster head panel is employed. Each cluster consists of one CH and dual delegate CHs. This arrangement of one CH and dual delegate CHs is called as cluster head panel.

The foremost target in formulating this proposed structure is to decrease energy during communication and increasing the overall network lifetime, when two separate sensor network fields have to be connected together by using grid nodes. The proposed HICA algorithm is assessed against two well-formulated clustering schemes Optical Low Energy Adaptive Clustering Hierarchy (O-LEACH) [1] and Hybrid Energy Efficient Distributed

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Nature Inspired Algorithms multi-objective histogram equalization for Grey image enhancement

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Keywords: Medical Images, Histogram Equalization, Enhancement Techniques, Nature Inspired Algorithms.

Abstract: Nature is a very rich source of inspiration. Many algorithms have inspired from nature and source of algorithms inspiration development are diverse with different quality. Nature–inspired optimization techniques play an essential role in the field of image processing. It reduces the noise and blurring of images with improves the image enhancement, image segmentation, image pattern recognition. The Image enhancement is a process to make image ready for further uses in certain applications. The image quality is individually related with its contrast by rising the contrast, further disfigurements can be produced. In this paper covers current equalization enhancement technique some nature inspired algorithm for medical images. In addition, proposed an image enhancement method built by using two natures inspired algorithms Particle Swarm Optimization (PSO) and Bat Optimization Algorithms (BOA) combined to produce better enhancement. Here an objective criterion for measuring image enhancement is used which considers the Discrete Entropy (DE), the Structural Similarity Index Matrix (SSIM) and Executing Time (ET). The results showed the Bat Algorithm has produced a batter enhanced images when comparing with Particle Swarm Optimization images and the existing histogram-based equalization methods. The final results showed proposed image enhancement method can not only improve the contrast of the image, but also preserve the details of the image, which has a good visual effect.

1. Introduction

Your paper will be part of the journals therefore we ask that authors follow the guidelines explained Image enhancement technology is a multidisciplinary research topic involving subject areas such as advanced mathematics, computer science, and signal processing technology. Image enhancement has been divided into two categories, a first one is used on the gray level of the image which is called space domain, while the second one is an indirect enhanced algorithm based on the frequency domain [1]. There are many enhancement methods in the industry, such as histogram equalization,

Enhanced Hybrid and Highly Secure Cryptosystem for Mitigating Security Issues in Cloud Environments

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Enhanced Hybrid and Highly Secure Cryptosystem for Mitigating Security Issues in Cloud Environments

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Abstract:

Recent advancements in cloud computing domain has changed the way of data storage infrastructure and corresponding sharing of resources. Therefore, cloud computing is observed to be greatly secure, private, offering data integrity, guarding of property rights and rectification of other issues that are concerned with data storage in cloud. Inspite of all these advantages, cloud computing is mainly exposed to severe security issues that made many researchers to put forward new algorithms for cloud environments. In this paper, a hybrid algorithm called as Enhanced Hybrid Privacy and Secure (EHPS) algorithm has been proposed, implemented, well-evaluated and compared with its peer. By understanding the positive features of hybrid algorithms, the proposed algorithm integrates the features of Advanced Encryption Standard (AES), Data Encryption Standard (DES), Cipher Block Chaining (CBC) and Triple DES algorithms. Simulation analysis clearly reveals that the proposed hybrid algorithm depicts reduced encryption time and decryption time when compared with AES algorithm. Moreover, reduction of encryption time and decryption time of the proposed algorithm in comparison with hybrid cryptosystem, makes the proposed algorithm as a positive choice when cloud environment has to be implemented with reduced encryption/decryption times and enhanced security.

Keywords: *Cloud computing, Data security, Privacy, Encryption time, Decryption time, Hybrid cryptosystem.*

1. INTRODUCTION

Recent develpments in information and communication domain in a rapid manner has recently attracted many researchers to contribute more in this particular domain. Research works were mainly concenterated on security issues, secure data storage, and various algorithms were focussed mainly on attaining data privacy and data protection [1]. A complete security mechanism and mechanism for attaining secure data exchange between environments is still a serious concern. Cloud computing is one of the leading data storage and data exchange mechanism that is currently under consideration by numerous ongoing researchers. Almost all the organizations make use of cloud computing either directly or indirectly, thereby, this domain is mainly concenterated by researchers to propose

A Critical Comparative Review of Nature-Inspired Optimization Algorithms (NIOAs)

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***Abstract* - Nature is a very rich source of inspiration. Many algorithms have been inspired by nature. The source of inspiration for algorithm development are diverse and, as a result, the algorithms are equally very different. We present in this paper a critical review of current Nature-Inspired Optimization Algorithms (NIOAs) to include: Evolutionary Algorithms (EAs), Swarm Intelligence Algorithms (SIA), Physical and Chemistry Algorithms (PCA), Bio-Inspired Algorithms (BIA) and others. The aim is to explore the performance of the optimization process using a range of different analytical methods and motivate further research.**

Keywords - nature inspired algorithms, swarm intelligence, gravitational search algorithm (gra), chemical reaction optimization (cro), bio-inspired algorithms.

I. INTRODUCTION

Nature is a very rich source of inspiration. New algorithms are nature-inspired, so they have been improved by inspiration from nature [1]. Different levels of classification depending on a number of details and sub sources to be used or implemented. For simplicity, this article will concern or focus on the highest level sources such as biology-inspired which called swarm-intelligence based on swarm intelligence examples of it such as ant colony optimization, particle swarm optimization, cuckoo search, bat algorithm, and firefly algorithm, etc. Many algorithms have been developed by using inspiration from physical and chemical systems such as Central force optimization, Anarchic society optimization, Electro-magnetism optimization. Artificial cooperative search, Social emotional optimization. The source of inspiration for algorithm development are diverse, and as a result the algorithms are equally very different [2].

Algorithms have been summarized in brief in this article. Algorithms may be a comprehensive source of information for further research. It has to be noted that the classifications may not be unique and that some algorithms are more efficient and commonly used than other, further research needs to be carried out. Currently, there may be some un clarity in the article of metaheuristic algorithms. From one side, articles have concentrated on important novel thoughts to solve hard problems. From the other side, some articles artificially create new algorithms for the purpose of being published with little development and no novelty. More research must be encouraged to conduct truly novel and considerable studies that are in fact useful to solve difficult problems. For that reason, the aim of this article is to inspire more research to get better insight into efficient algorithms and solve large-scale real-world problems. This article presents a broad classification of the NIOAs.

II. NATURE-INSPIRED ALGORITHMS (NIOAS)

Nature plays an important role in different human activities as well as being a diverse source of inspiration. Algorithms are developed by drawing inspiration from nature. Therefore, algorithms based on nature are called Nature Inspired Algorithms (NIOAs). The purpose of designing NIOAs is to find out optimal solution of the difficulty. Two key factors define an algorithm:

- Optimal solution
- Time at which a solution is reached.

The achievement of a result (which is fairly good approximate ion of an ideal) in real time is often more desirable than achieving the best result in a long period of time. The nature-inspired metaheuristics meet the goal. In the past two decades, many nature- inspired algorithms have been proposed and applied to solve optimization problems, e.g., Genetic Algorithm (GA), Particle Swarm Optimization (PSO) ant Colony Optimization (ACO), Differential Evolution (DE), etc. Swarm Intelligence is well known algorithm among Nature Inspired Algorithms.

Some of these algorithms use the field of physics, chemistry and biology while some other use music for their functioning. It is observed that, equilibrium is maintained in all the three states i.e. physical, chemical and biological by any method. And we may or may not be familiar with those methods. Further, algorithms are classified in their

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Classification of Groundwater Quality using Artificial Neural Networks in Safwan and Al-Zubayr in Basra

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Abstract: Groundwater in the southern region of Iraq is a completed resource for irrigation and industry. In this study, the groundwater quality of more than 60 wells in the Safwan area and Al-Zubayr district in Basra was calculated using artificial neural networks with feedback. The variables used in the proposed classification and verification model are the physical and chemical variables of groundwater. The taxonomy model demonstrated good performance and accurate taxonomic capacity to facilitate the development and implementation of more effective and sustainable groundwater management strategies in the study area.

1. Introduction

Groundwater is one of the basic requirements for human survival on Earth. As the world's population increases, it is necessary to provide safe and free water from all contaminants. groundwater is one of the major sources of drinking in many urban and rural areas of the world and is an important source of water in the agricultural and industrial sectors. The groundwater level is an indicator of groundwater availability, flow, and physical and chemical properties. The term groundwater management is used to refer to a formal methodology capable of improving groundwater decisions[1]. groundwater management seeks to minimize the impact of salt water intrusion, hazardous waste, pesticide use, or other threats to the quality of groundwater. groundwater systems are characterized by complex, nonlinear, multidimensional and random features that are controlled by natural or anthropogenic factors, complicating dynamic predictions. Depending on Tigris and Euphrates rivers, Iraq is relatively rich in its water resources compared to neighboring countries until the 1970s. Syria and Turkey began to build dams on Tigris and Euphrates during the 1970s, resulting in a significant decline in the flow of Euphrates as well as deterioration in the quality of its water. This fact has highlighted further concern about future water quotas and their troubling implications for national security and strategies. Water resources in Iraq can be divided into (precipitation, surface water, groundwater)[2].

Be advised that papers in a technically unsuitable form will be returned for retyping. After returned the manuscript must be appropriately modified. The rainfall is either in the form of rain or snow in the cold and high areas and because of the nature of the desert and semi-desert climate, which covers about 80% of the area of Iraq can be explained the distribution of the total annual

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Password Authentication Scheme based on Smart Card and QR Code

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ABSTRACT

As a hopeful computing paradigm, cloud services are obtainable to end users based on pay-as-you-go service. Security is represented one of the vital issues for the extended adoption of cloud computing, with the object of accessing several cloud service providers, applications, and services by using anonymity features to authenticate the user. We present a good authentication scheme based on QR code and smart card. Furthermore, our proposed scheme has several crucial merits such as key management, mutual authentication, one-time password, user anonymity, freely chosen password, secure password changes, and revocation by using QR code. The security of proposed scheme depends on crypto-hash function, QR-code validation, and smart card. Moreover, we view that our proposed scheme can resist numerous malicious attacks and are more appropriate for practical applications than other previous works. The proposed scheme has proved as a strong mutual authentication based on Burrows–Abadi–Needham (BAN) logic and security analysis. Furthermore, our proposed scheme has good results compared with related work.

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1. INTRODUCTION

Parallel and distributed systems have essentially changed the manner entities and enterprises share, procedure and store information today. Furthermore, security issues play a principal role in parallel and distributed systems, as better obtainability and access to information, in turn, involve that there is a greater need to keep them. To solve these issues, there are many security skills, tools and systems have been presented [1-10]during the years from 1985-2020. For instance, several access control methods such as trust management systems that have been offered over these time period.

In recent times, cloud computing [2] considers the on-demand service model for information technology provides, often depended on parallel and distributed computing technologies. With the fast growth of cloud computing models, service providers gradually put their services in clouds for users and customers. Cloud computing has preserved a lot of well-merited attention lately due to the fluctuant advantages its service-oriented manner has existing, such as pay-as-you-go, on-demand services. In the cloud environment, customers can access the resources and services without knowing the location of data, computing devices, and platforms. With the acceptance of cloud computing services, authorization, authentication and security concerns of cloud computing have become major research topics. Authentication is the core of the security field, whether in the cloud or any network. Managing identities and authentication are the main challenges of corporate networks and cloud computing. Additionally, these challenges became

Multi-factor Authentication for an Administrator's Devices in an IoT Environment

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Abstract. In the information technology era, authentication systems have been developed that use multi-factor authentication to ensure the authorisation of users and administrators. There are many schemes based on factors such as smart cards, biometrics, and token devices. Although these schemes are generally strong, they suffer from several drawbacks such as malicious attacks, factors that may be lost/stolen, and a need for extra hardware/software. In this paper, we propose a strong authentication scheme for an IoT environment to authenticate the owners of devices. Our work supports a negotiation service using an anonymous QR image as a second factor to check the authority of an administrator. The proposed scheme has good security features such as mutual authentication, a secure index file, anonymity of the user's identity and password, a secure session key, and perfect forward secrecy. Additionally, our work can resist well-known attacks such as the man in the middle, insider, and spoofing attacks, among others. In the real world, we apply our scheme using a mobile phone (Samsung Galaxy S5 model SM-900H) and server (Intel Xeon E3 – 1220LV2 3.5GHZ 4GB RAM). Based on its accuracy and performance standards, we obtain good results in the login and authentication phases. Moreover, the computational cost of our work is comparable to that of related works.

Keywords: QR image · MITM · IoT · Strong authentication · Mobile phone

1 Introduction

The Internet of Things (IoT) offers an ideal model for future communication networks and can facilitate the use of the internet for all things related to civil society, based on rapid technological development. The components of this network are physical objects, sensors, triggers, RFID tags, and mobile devices that have the ability to sense and control the environment remotely and to collect the necessary data associated with the user's environment, for example in smart companies and smart homes [1, 2]. The collected data

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