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Levy Flight based Animal Migration Optimization Algorithm

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Abstract—Animal Migration Optimization algorithm is stimulated by intelligent conduct of animal while migrating from one place to other place in search of food and secure habitat. This algorithm simulate the behavior of animal that how they shift from existing location to fresh location and how a number of animal depart from the group and other connect with the group. There are mainly two phases namely migration and population update. This paper presents a new strategy for population update in animal migration optimization algorithm using levy flight search strategy. The newly proposed strategy named as Levy Flight Animal Migration Optimization (LAMO) algorithm. The performance of LAMO tested over 21 bench mark functions and results compared with basic AMO algorithm so as to prove its reliability, robustness and efficiency.

Keywords-Nature Inspired Algorithm; Swarm Intelligence; Optimization Techniques;Levy Flight Search

I. INTRODUCTION

Nature Inspired Algorithms are very popular in field optimization as they are able to crack the complex optimization problems easily with the strategies motivated by some natural phenomenon. Last two decades witnessed large number of nature inspired algorithms. These algorithms include algorithms that are inspired by biological process, physical actions and other natural activities. These algorithms show some unconventional approaches that are able to solve complex real world problems in field of engineering, science and management etc. These algorithms simulate swarming behavior of individuals. Swarm Intelligence refer the Natural system that are influenced by colonies of social insects like, fishes, bee, bird flocks, ant etc. The definition introduced by Bonabeau *et al.* for the swarm intelligence is "any attempt to design algorithms or distributed problem-solving devices inspired by the collective behavior of social insect colonies and other animal societies" [1]. These social creatures demonstrate some great ability while searching for food, security and mating in complex situations.

Recently number of researchers has developed new algorithms that simulate the intelligent behavior of animals. The Cuttlefish Algorithm [2] developed by A.S. Eesa in 2013 simulates the color changing behavior of Cuttlefish. E. Cuevas *et al.* [3] anticipated a swarm intelligence algorithm based on supportive conduct of swarm of social-spiders. The population of social spiders classified into two groups according to gender: male and female. This population engaged in developing the communal web, mating, prey capturing and communal connecting. During these activities they depict swarming behavior like self organization and cooperation. J.C. Bansal *et al.* [4] anticipated a new algorithm that mimics that intelligent performance of spider monkeys while penetrating for good food sources. It is stochastic in nature, as it introduced some random component in each step. The SMO strategy mimics the fission fusion structure of spider monkey. A. Askarzadeh [5] proposed a new metaheuristics namely bird mating optimizer (BMO) algorithm. The BMO emulates the intelligent conduct of bird species allegorically to breed broods with better-quality genes. S. Mirjalili *et al.* [6] noticed the intelligent leadership and hunting behavior of grey wolves and planned a novel population based algorithm namely Grey Wolf Optimizer. The lion optimization algorithm [7] mimics the lifestyle and hunting behavior of lions and elephant herding optimization [8] algorithm stimulated by the herding activities of elephant groups. Detailed study of recent developments in nature inspired algorithms discussed in [9][10].

Rest of the paper is arranged as follow: section II describe basic AMO algorithm. Section-III introduces new strategy in AMO algorithm namely levy flight search in AMO. Next section discusses and analyses the results of new strategy and compare with existing algorithms followed by conclusion.

II. ANIMAL MIGRATION OPTIMIZATION ALGORITHM

Animal Migration Optimization (AMO) algorithm is ne swarm intelligence algorithm developed by X. Li *et al.*[11]. It is nature inspired algorithm that mimics that intelligent behavior of animals groups, like birds, mammals, fish, reptiles, amphibians, insects etc. while migrating from one place to other place in search of quality food sources, secure place for habitat and secure place for mating.

The AMO algorithm divided into two major phases: first is animal migration and second is population update [11].

A. Animal Migration Process

This phase states that how individual change their position from current position based on three rules.

- An animal budge in the same direction as its neighbors
- Always stay near to its neighbors
- Do not collide with neighbors.

The AMO define local proximity of an individual with the help of topological ring. For the sake of straightforwardness, the basic AMO suggest the length of the locality as five for every individual. Here a static topology considered and

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contains a vector with set of indices. The animal with index i has animal with index *i+2, i+1, i, i-1* and *i-2* in its proximity. Similarly animal with index 1 has *NP-1*th, *NP*th, *1*st, *2*nd, *3*rd animal in its proximity. First we select a neighbor randomly and then update is position using (1).

$$X_{i,G+1} = X_{i,G} + \phi \times (X_{neighbourhood,G} - X_{i,G}) \quad (1)$$

Where

- $X_{neighbourhood,G}$ is the current position of the neighborhood
- ϕ is a uniform random number engendered with the help of Gaussian distribution.
- $X_{i,G}$ is the existing location of i^{th} individual, and
- $X_{i,G+1}$ is the new position of i^{th} individual.

B. Population update

The second phase of AMO is population update phase. This phase suggest that how animals update their position. This phase also imitates that how some animals go away from the group and some new animals connect with the group. This process simulated with the help of probability P_a. There may be different methods for probability calculation but it must be function of fitness. The fitness of a function indicates about its quality, fitness calculation must include function value. Here all fitness ranked according to their values with the help of (2). Animal with highest fitness has highest probability of selection for next iteration. The position updating process illustrated in Algorithm 1 [11].

Algorithm 1: Population Update

For *i*=1 to NP
  For *j*=1 to D
    If *rand* > P_a
    $X_{i,G+1} = X_{r1,G} + \phi \times (X_{best,G} - X_{i,G}) + \phi \times (X_{r2,G} - X_{i,G})$
    End If
  End For
End For

Where ϕ is a uniformly generated arbitrary number. $r_1, r_2 \in [1,2,....,NP]$ such that $r_1 \neq r_2 \neq i$. P_a decided by fitness of individual as follow:

$$P_a = \frac{FitnessRank_i}{NP} \quad (2)$$

Where *FitnessRank*$_i$ is rank of i^{th} solution in terms of fitness and *NP* is size of population. A greedy selection approach used to select next generation solution between $X_{i,G}$ and $X_{i,G+1}$. Solution with higher fitness promoted for next iteration.

III. Levy Flight Based Animal Migration Optimization Algorithm

The AMO algorithm drives by two major activities of animals: migration process and population update. Here a new population modification strategy introduced with the help of levy flight. In this section a new population update strategy is anticipated based on levy flight search. The levy flight search strategy used in several nature inspired algorithms like in artificial bee colony algorithm [12, 13] and in differential evolution algorithm [14, 15]. Here levy flight search strategy merged with AMO algorithm and new algorithm named as Levy Flight Animal Migration Optimization (LAMO) algorithm.

The Levy Flight is a random walk in which every step defined by some probability distribution. Here each step described in terms of step length. The levy distribution decides the length of these random steps as in (3)

$$L(s) \sim |s|^{-\beta} \quad (3)$$

Where s denotes the length of step and β is an index whose value lies in interval (0, 2]. In order to engender random step size we use Mantegna algorithm [16]. The step size may be positive or negative as it is symmetric levy distribution. The length of step decided by (4) in Mantega's algorithm.

$$s = \frac{u}{|v|^{\frac{1}{\beta}}} \quad (4)$$

Where, u and v are decided by normal distributions and decided by (5).

$$u \sim N(0, \sigma_u^2) \quad (5)$$

Where,

$$\sigma_u = \left\{ \frac{\Gamma(1+\beta)\sin(\pi\beta/2)}{\beta\Gamma[(1+\beta)/2]2^{(\beta-1)/2}} \right\}^{1/\beta}, \sigma_v = 1. \quad (6)$$

The step size assumed to follow levy distribution for all |s| that are greater than and equal to $|s_0|$, where s_0 denote the minimum length of step [15]. Here Γ (.) is the Gamma function and calculated using (7).

$$\Gamma(1+\beta) = \int_0^\infty t^\beta e^{-t} dt \quad (7)$$

The Γ (1 + β) = β! if β is an integer in extraordinary case.

The step size is decided by (8) in order to search the entire search space.

$$step\_size(t) = 0.0001 \times s(t) \times SLC \quad (8)$$

The above equation generates step size for each iteration. In (8) t represents the counter for iteration during local search. The value of $s(t)$ is estimated using (4) by levy distribution. The global search algorithm also uses a social learning component (*SLC*). In general the step size generated by levy flight is very large and that results into solution out of boundary. In order to make it feasible a multiplier (0.0001) used in (8) that reduce step size.

The AMO algorithm's success depends on population update equation. Here the LAMO algorithm updates population using algorithm 2. The new population update strategy makes use of step size component from (8) in place of uniformly generated random number. This step size generated by levy flight strategy fluctuate the swarm and help in exploring the search space.

Algorithm 2: New Population Update Strategy

For i=1 to NP

For j=1 to D

If $rand > P_a$

$$X_{i,g+1} = X_{i,g} + \phi \times (X_{best,g} - X_{i,g}) + step\_size \times (X_{r1,g} - X_{i,g})$$

End If

End For

End For

The newly introduced parameter *step_size* controls the population update process and enhance rate of convergence. The introduction of new parameter in basic AMO increase rate of convergence and avoid stagnation in local optima.

IV. Experimental Results

A. Considered Test Problems

The performance of LAMO algorithm tested over 21 benchmark problems (listed in table I) to prove the superiority with considered algorithms [17]. The considered problems are of different degree of complexity. Detail of problem like search range, function value and dimension are already known and given in table I.

All the algorithms are programmed in C programming language. Initial population size is taken as 50 and all problems are tested for 100 runs in order to nullify the effect of randomly introduced components. Final results are average of 100 run in order to decrease the effect of randomization. Experimental setup and parameter setting for AMO [2] taken as it is from its base papers.

B. Result Analysis

Table II displays experimental results for LAMO and it reports four major components for comparison, Rate of success (SR), Aggregate Number of Function Evaluations (AFE), Standard Deviation (SD) and Mean Error (ME). The considered algorithms are first compared by success rate then by AFE followed by SD and ME.

Further a boxplot analysis has been carried out for all the measured algorithms [18] for the purpose of evaluation in terms of consolidated performance. The boxplot compare AFE for all the considered twenty one problems. The box plots for AMO and LAMO are shown in Figure 1. It is understandable from the figure 1 that LAMO is far better the basic AMO algorithm as inter-quartile range and median are moderately very low.

The new algorithm takes less number of function evaluations for almost all considered problems thus it is faster than basic AMO algorithm. The results of proposed algorithm are not by chance but due to change in population update strategy proved by a sequence of measurements. For each problem results are taken average of 100 run. The box plot also proves that LAMO is far better than AMO algorithm.

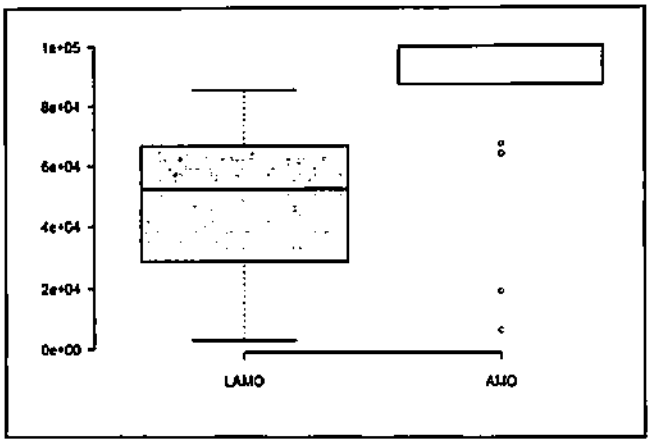

Figure 1. Boxplots graphs for average function evaluation

V. Conclusion

To improve the effectiveness of AMO algorithm a new variant of AMO named LAMO has been introduced. The LAMO incorporate levy flight search strategy in basic AMO. The newly introduced parameter helps AMO to explore search space. Table II shows the values of SD, ME, AFE and SR for LAMO which are far better than results reported by AMO. Thus this strategy gives better solution than AMO which avoids the less fitted solution in search space and gives the best among them. It improves the efficiency, accuracy and reliability by decreasing the mean error, standard deviation and average function evaluation values while increasing the success rate value.

TABLE I. Test Problems

Test Problem	Objective Function	SR	Optimum Value	D	AE

Sphere	$f_1(x)=\sum_{i=1}^{n} x_i^2$	[-5.12, 5.12]	f(0) = 0	30	1.0E-05
Michalewicz	$f_2(x)=-\sum_{i=1}^{D}\sin x_i(\sin(\frac{ix_i^2}{\pi})^{20})$	[0, π]	fmin = -9.66015	10	1.0E-05
Cosine Mixture	$f_3(x)=\sum_{i=1}^{D} x_i^2-0.1(\sum_{i=1}^{D}\cos(5\pi x_i))+0.1\times D$	[-1, 1]	f(0) = -D*0.1	30	1.0E-05
Salomon Problem	$f_4(x)=1-\cos(2\pi p)+0.1\times p, where, p=\sqrt{\sum_{i=1}^{D} x_i^2}$	[-100, 100]	$f(0)=0$	30	1.0E-01
Axis Parallel hyper-ellipsoid	$f_5(x)=\sum_{i=1}^{D} ix_i^2$	[-5.12, 5.12]	f(0) = 0	30	1.0E-05
Sum of different powers	$f_6(x)=\sum_{i=1}^{D}\lvert x_i\rvert^{i+1}$	[-1, 1]	$f(0)=0$	30	1.0E-05
Step Function	$f_7(x)=\sum_{i=1}^{D}(\lfloor x_i+0.5\rfloor)^2$	[-100, 100]	$f(-0.5\le x\le 0.5)=0$	30	1.0E-05
Neumaier 3 Problem (NF3)	$f_8(x)=\sum_{i=1}^{D}(x_i-1)^2-\sum_{i=2}^{D}x_i x_{i-1}$	[-100, 100]	f(0) = -210	10	1.0E-01
Levy montalvo -1	$f_9(x)=\frac{\pi}{D}(10\sin^2(\pi y_1)+\sum_{i=1}^{D-1}(y_i-1)^2(1+10\sin^2(\pi y_{i+1}))+(y_D-1)^2), Where\ y_i=1+\frac{1}{4}(x_i+1)$	[-10, 10]	$f(-1)=0$	30	1.0E-05
Levy montalvo -2	$f_{10}(x)=0.1(\sin^2(3\pi x_1)+\sum_{i=1}^{D-1}(x_i-1)^2(1+\sin^2(3\pi x_{i+1}))+(x_D-1)^2(1+\sin^2(2\pi x_D))$	[-5, 5]	$f(1)=0$	30	1.0E-05
Ellipsoidal	$f_{11}(x)=\sum_{i=1}^{D}(x_i-1)^2$	[-D, D]	f(1, 2,..,D) = 0	30	1.0E-05
Beale function	$f_{12}(x)=(1.5-x_1(1-x_2))^2+(2.25-x_1(1-x_2^2))^2+(2.625-x_1(1-x_2^3))^2$	[-4.5, 4.5]	$f(3, 0.5)=0$	2	1.0E-05
Colville function	$f_{13}(x)=100(x_2-x_1^2)^2+(1-x_1)^2+90(x_4-x_3^2)^2+(1-x_3)^2+10.1[(x_2-1)^2+(x_4-1)^2]+19.8(x_2-1)(x_4-1)$	[-10, 10]	$f(1)=0$	4	1.0E-05
Braninss Function	$f_{14}(x)=a(x_2-bx_1^2+cx_1-d)^2+e(1-f)\cos x_1+e$	$x_1\in[-5,10]$, $x_2\in[0,15]$	$f(-\pi, 12.275)=0.3979$	2	1.0E-05
Kowalik function	$f_{15}(x)=\sum_{i=1}^{11}(a_i-\frac{x_1(b_i^2+b_i x_2)}{b_i^2+b_i x_3+x_4})^2$	[-5, 5]	f(0.1928, 0.1908, 0.1231, 0.1357) = 3.07E-04	4	1.0E-05
2D Tripod function	$f_{16}(x)=p(x_2)(1+p(x_1))+\lvert(x_1+50p(x_2)(1-2p(x_1)))\rvert+\lvert(x_2+50(1-2p(x_2)))\rvert$	[-100, 100]	f(0, -50)=0	2	1.0E-04
Shifted Rosenbrock	$f_{17}(x)=\sum_{i=1}^{D-1}(100(z_i^2-z_{i+1})^2+(z_i-1)^2+f_{bias}, z=x-o+1, x=[x_1,x_2,...x_D], o=[o_1,o_2,.....o_D]$	[-100, 100]	f(o)=fbias=390	10	1.0E-01
Shifted Ackley	$f_{18}(x)=-20\exp(-0.2\sqrt{\frac{1}{D}\sum_{i=1}^{D}z_i^2})-\exp(\frac{1}{D}\sum_{i=1}^{D}\cos(2\pi z_i))+20+e+f_{bias}, z=(x-o), x=[x_1,x_2,...x_D], o=[o_1,o_2,..o_D]$	[-32,32]	$f(o)=f_{bias}=-140$	10	1.0E-05
Goldstein-Price	$f_{19}(x)=(1+(x_1+x_2+1)^2\times(19-14x_1+3x_1^2-14x_2+6x_1x_2+3x_2^2))\times(30+(2x_1-3x_2)^2\times(18-32x_1+12x_1^2+48x_2-36x_1x_2+27x_2^2))$	[-2, 2]	$f(0, -1)=3$	2	1.0E-14
Six-hump camel back	$f_{20}(x)=(4-2.1x_1^2+\frac{x_1^4}{3})x_1^2+x_1x_2+(4x_2^2-4)x_2^2$	[-5, 5]	f(-0.0898,0.7126) = -1.0316	2	1.0E-05
Dekkkers and Aarts	$f_{21}(x)=10^5x_1^2+x_2^2-(x_1^2+x_2^2)^2+10^{-5}(x_1^2+x_2^2)^4$	[-20, 20]	f(0,15)=f(0, -15)= -24777	2	5.0E-01

SR: Search Range, D: Dimension, AE: Acceptable Error

TABLE II. COMPARISON OF RESULTS FOR AMO, LFDE AND LAMO ALGORITHMS

Test Function	Algorithms	SD	ME	AFE	SR
$f_1(x)$	AMO	1.28E+01	8.75E+01	100000	0
	LAMO	1.33E-06	8.35E-06	59495	100

$f_2(x)$	AMO	3.30E-01	4.54E+00	100000	0
	LAMO	1.47E-02	1.49E-03	82090	98
$f_3(x)$	AMO	5.84E-01	6.44E+00	100000	0
	LAMO	9.56E-07	8.93E-06	57295	100
$f_4(x)$	AMO	1.40E+00	1.93E+01	100000	0
	LAMO	4.35E-02	9.24E-01	66663	100
$f_5(x)$	AMO	1.48E+02	9.32E+02	100000	0
	LAMO	8.37E-07	9.05E-06	85613	100
$f_6(x)$	AMO	2.89E-01	7.92E-01	100000	0
	LAMO	1.83E-06	7.60E-06	29401	100
$f_7(x)$	AMO	4.74E+03	3.35E+04	100000	0
	LAMO	0.00E+00	0.00E+00	54394	100
$f_8(x)$	AMO	7.65E+02	9.76E+02	100000	0
	LAMO	1.28E-02	8.16E-02	34511	100
$f_9(x)$	AMO	1.66E+00	1.28E+01	100000	0
	LAMO	9.35E-07	8.92E-06	71226	100
$f_{10}(x)$	AMO	1.41E+00	1.02E+01	100000	0
	LAMO	7.51E-07	9.01E-06	69056	100
$f_{11}(x)$	AMO	7.93E+01	5.16E+02	100000	0
	LAMO	1.02E-06	8.87E-06	84436	100
$f_{12}(x)$	AMO	2.65E-06	5.10E-06	6348	100
	LAMO	2.66E-06	4.34E-06	2991	100
$f_{13}(x)$	AMO	2.50E-02	2.26E-02	94312	34
	LAMO	2.33E-03	6.77E-03	14764	100
$f_{14}(x)$	AMO	1.20E-04	5.44E-05	64238	59
	LAMO	6.98E-06	6.01E-06	16436	87
$f_{15}(x)$	AMO	3.40E-03	8.27E-04	67557	79
	LAMO	2.00E-03	4.08E-04	28676	83
$f_{16}(x)$	AMO	1.94E-02	7.91E-03	87173	49
	LAMO	1.71E-01	3.01E-02	10318	97
$f_{17}(x)$	AMO	6.91E+02	9.91E+02	100000	0
	LAMO	7.90E-03	9.12E-02	61493	100
$f_{18}(x)$	AMO	2.29E-01	5.28E-01	100000	0
	LAMO	7.92E-07	8.96E-06	37614	100
$f_{19}(x)$	AMO	4.46E-15	5.28E-15	18974	100
	LAMO	3.98E-15	4.19E-15	7286	100
$f_{20}(x)$	AMO	1.46E-05	1.83E-05	64075	41
	LAMO	1.44E-05	1.68E-05	52400	49
$f_{21}(x)$	AMO	1.12E-06	1.21E-07	94761	53
	LAMO	2.92E-14	4.75E-14	29152	100

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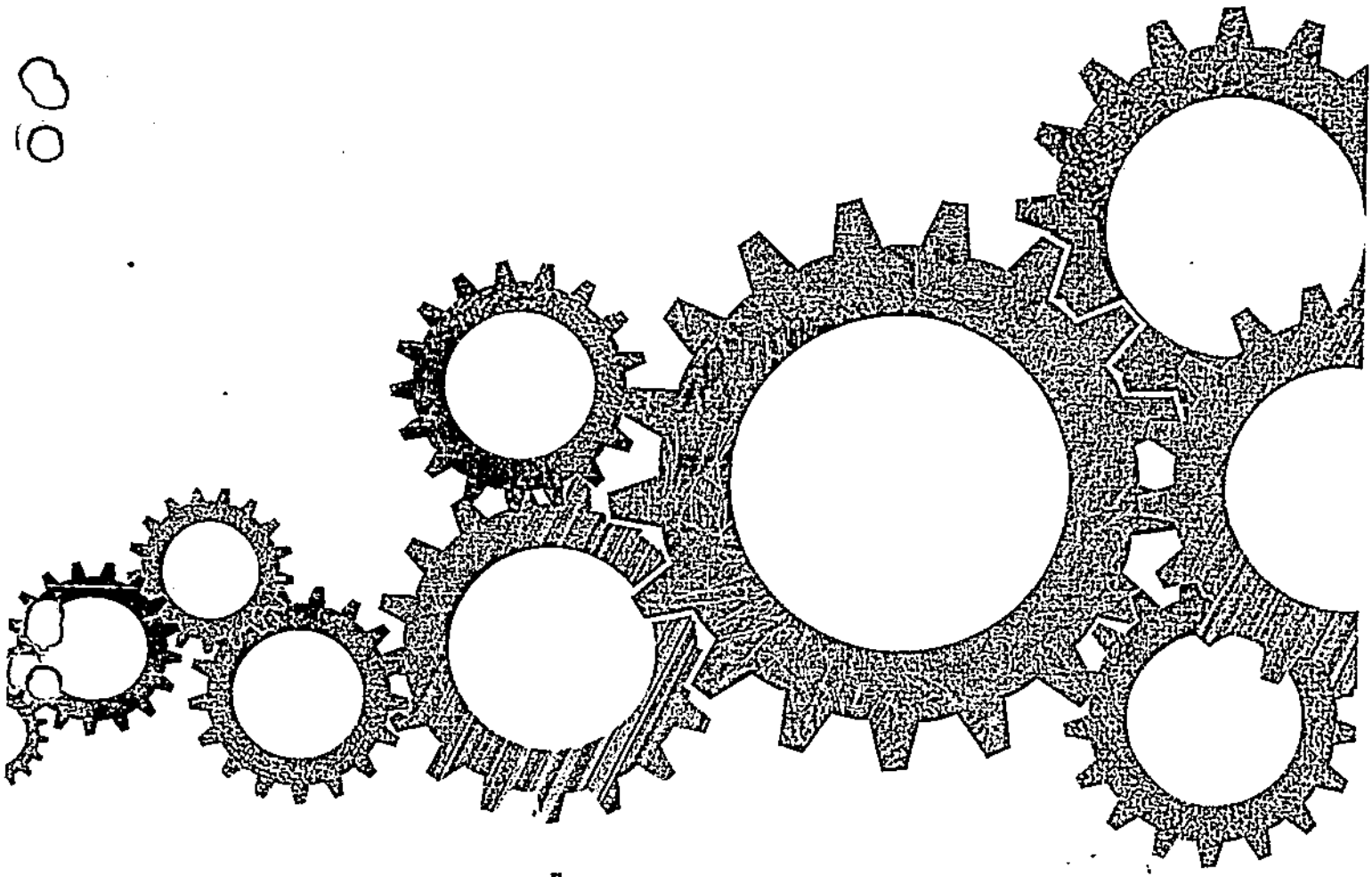

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Expectations Mapping[1] and Experience

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"Any customer can have a car painted any color that he wants so long as it is black."

- Henry Ford

Over a hundred years ago companies followed an undifferentiated approach. We have come a long way since the times of Henry ford. TVS- Scooty has been made available in India with over 100 shades, choices available today to customers are immense. Post World War II due to advent of technology, transportation, communication and availability of human and financial resources, mass production took place. These mass produced products were capable of providing products at reasonable prices. Mass production put emphasis on products rather than on markets or consumers.

Mass marketing is considered dead today and all marketers' attempts to fulfill customer expectations beyond their desire levels to provide positive individualized experience.

"The mind knows not what the tongue wants."

-Howard Moskowitz, Psychophysicist

Paradox of Choices[7]

We all love choices, but there is a point till choice is the hallmark of individual freedom and self-determination but it has the capacity to become detrimental to our psychological and emotional well-being.

Companies are spoiling customers today with umpteen choices; in fact there are over 100 models of cars, 150 toothpastes, & over 250 bathing soaps available for a customer to choose from in an emerging market like India.

More options leads to a decision paralysis because it requires time to evaluate and negate all the options available. Regrets are more if you have more options. More alternatives mean more good points are rejected out of various choices having good points in each one of them. Hence irrespective of the best choice being made, these rejections make the each choice less satisfying. More is less. Evaluating too many choices in life actually makes it less satisfying and makes us a little less unhappy.

More is confusing, fewer is insulting

We are spoilt for choices; McDonalds before they started trimming their menu had 145 items. But a new research from Bournemouth University shows that most menus list far more dishes than people want to choose from. Professor John Edward conducting this study said "We were trying to establish the ideal number of starters, mains and puddings on a menu." Finding of the study suggests an optimum number below those number consumers are likely to believe that they were cramped for choices, above that numbers it becomes futile exercise. More number of items on a menu is detrimental to inventory, operational efficiency, quality, brand image, training and time costs.

At fast food restaurants consumer just want reliable treats that are not heavy on their purse. Fast food joints usually have a short, simple menu that makes them serve customer quickly. It is easier and cheaper to deliver consistently good food if menu is short. Short menu requires a relatively small number of ingredients reduces waste and makes it possible to buy in bulk thereby reducing costs. People eat quickly, which means faster turnover.

[7] *The Paradox of Choice 'Why more is less' by Barry Schwartz (2003) by Harper Collins Publisher*

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Abstract

Safety measures are the main issue while communication over digital networks, but no one can assure delivery of the right contents as burglars may on the way keeping an eye on the communication. To guard the secret data from stealing, various techniques have been implemented to encrypt and decrypt the data. Cryptography and Steganography are the two most famous techniques regarding the same. The first one scrambles the original data and the second one hides the original data under some other media. Both have strong impact when used together instead of using individually. In this paper we are going to discuss the both, while our main focus is on exploring the different techniques of Text Steganography and compare them in terms of robustness and hiding capacity.

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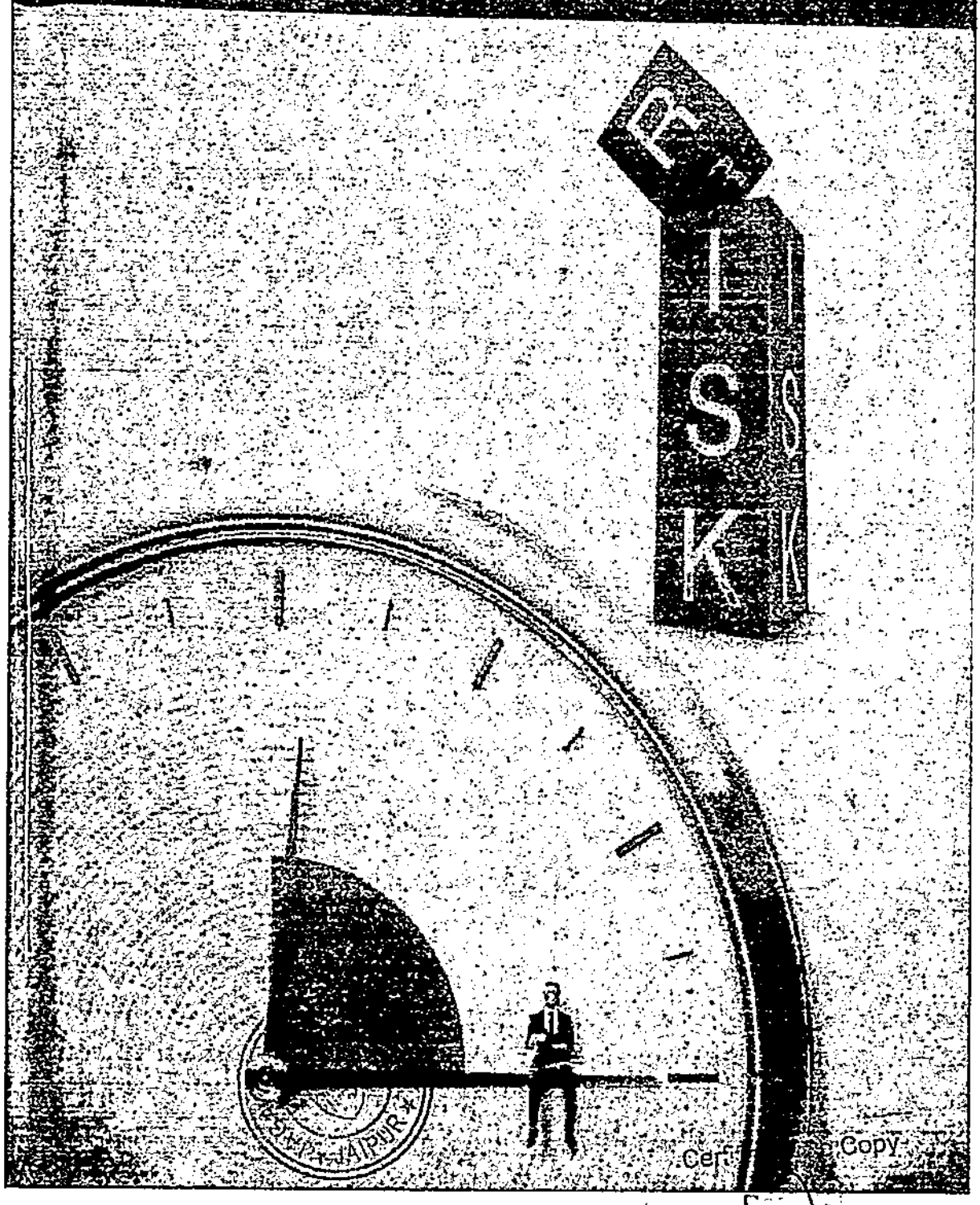
14

FINANCIAL ENGINEERING AND RISK MANAGEMENT

POLICIES AND PROGRAMMES

Dr. SHILPI KHANDELWAL



3

Financial Engineering and Risk Management: Policies and Programmes

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FINANCIAL ENGINEERING AND RISK MANAGEMENT
POLICIES AND PROGRAMMES

Financial engineering (in the sense of risk management) is concerned with protecting economic activity against the adverse effects of financial risk factors such as movements in exchange rates, interest rates, and commodity prices. It has emerged in the past decades as a model-based discipline that provides rules for decisions to be taken on the basis of incoming observations. As such, financial engineering can be considered a neighbouring field of control engineering. It will be one of the aims of this paper to highlight similarities both in purpose and in method between the two fields. Risk management refers to the practice of identifying potential risks in advance, analysing them and taking precautionary steps to mitigate/eliminate them. Thus, risk management is simply the practice of systematically identifying and understanding risks and the controls that are in place to manage them. This book explains and examines various aspects of risk management practices and strategies in areas concerning banking, foreign exchange, insurance and credit derivatives.

Contents: Introduction; Application of Financial Engineering; Income Statement; Risk Management; Currency Risk Management; Risk Management Accounting Issues; Financial Risk Management; Globalization and Risk Sharing in Financial Management; Credit and Debit Risk Management; Banking Trends and Deposit Insurance Risk.

About the Author

Dr. Shilpi Khandelwal is a renowned name in academics who has written a number of books in the field of Management. She is working as Associate Professor, Faculty of Management, Jagannath University, Jaipur. Several students completed their Project works under her guidance. She has contributed many research papers in the sphere of management which are published in Journals of National and International repute. Dr. Shilpi Khandelwal has presented many papers in National and International seminars and conferences. Her objectives include to work more and more in the field of academics and to motivate readers to read more and more.

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Optimal Capacitor Placement in Distribution System Using Genetic Algorithm

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***Abstract*— The placement of shunt capacitor banks at optimal locations in the distribution network and their sizing can effectively reduce the losses in the utility network. It also helps in the maximum active power flow through the existing distribution lines which. This also increases the power transfer capacity of feeders and improves the voltage profile of the feeders which leads to reduced investment of transmission network. This paper presents a method for optimal placement and sizing of the capacitors in radial distribution feeder using Genetic algorithm (GA) with an objective of loss reduction and voltage profile improvement. The results have been validated using MATLAB programming. An IEEE 33-bus distribution test feeder is employed for testing the proposed algorithm. The optimal sizing of the capacitors has been suggested in terms of the kVAr.**

Keywords*— *Capacitor placement, distribution system, genetic algorithm, reactive power, voltage profile.

I. INTRODUCTION

Recently the loss minimization in distribution network of power system has attained greater significance due to integration of renewable energy sources, nonlinear loads, and automation of the power system network. The system automation requires the most efficient operating scenario for economic considerations with minimum loss in the network. A significant part of the total generated power as much as 13% is wasted in the form of losses in the distribution network [1]. Shunt capacitors are extensively utilized in the distribution network for reactive power compensation to minimize the losses. These capacitors also help to maintain voltage profile within permissible limits and system capacity release [2]. The extent of benefits depends on the location, size and type of the capacitors. The problem is to choose the optimum capacitor allocation and the capacitor control in order to maximize the benefits and minimize the cost of the capacitors.

The researchers are continuously working to solve the problem of optimal capacitor placement in the distribution network. The optimal capacitor placement is a complicated combinatorial optimization problem. Many optimization techniques and algorithms have been proposed so far for optimal placement of the capacitor. The possibly first technique for the optimal capacitor placement was 2/3 rule which had been utilized for capacitor placement assuming a uniformly distributed load on the distribution feeder [3]. Huang *et al.* [4], proposed the Tabu Search (TS) based algorithm for optimal capacitor placement in a radial distribution system. Delfanti *et al.* [5], presented a technique for optimal capacitor placement with minimum investment satisfying suitable reactive constraints [5]. In [6], authors presented a practical technique to solve the capacitor placement based on Graph search algorithm. Optimal capacitor placement in radial distribution feeder using hybrid method utilizing combinatorial approaches such as genetic algorithm (GA), simulated annealing and heuristic approach is proposed by the authors [7]. The GA based approach for power quality improvement along with the optimal capacitor placement and sizing of fixed shunt capacitor banks in radial distribution networks in the presence of voltage and current harmonics is presented in [8]. A micro-genetic algorithm in conjunction with fuzzy logic for solving the optimal capacitor placement problem has been proposed by the authors [9]. Fuzzy based approach for optimal placement of fixed capacitor and their sizing in radial distribution network in the presence of voltage and current harmonics has been reported in [10]. Optimal capacitor placement in distribution systems using a hybrid technique utilizing fuzzy and GA is proposed in [11]-[12]. Optimal capacitor placement and sizing of the shunt capacitor in distribution system distorted to some extent using an algorithm utilizing particle swarm optimization have been reported in [13]-[14]. Heuristic constructive algorithms for the optimal capacitor placement in distribution system are presented in [15]-[16]. Feeder reconfiguration and optimal placement of the capacitors for loss reduction of distribution systems using ant colony search algorithm is presented in [17]. Capacitor modeling to obtain maximum savings using differential evolution and multi agent particle swarm optimization is presented in [18]. Plant growth simulation for optimal capacitor placement is reported in [19]. Simple branch exchange method of single loop for reconfiguration of network and optimal capacitor placement for energy loss reduction is presented by the authors in [20]. Mahela *et al.* [21], proposed different methods for the use of existing high voltage shunt capacitor banks installed at grid sub-stations (GSS) on 33 KV and 11 kV buses with reduced capacity in the remote areas of Rajasthan state of India. In [22], authors presented an efficient algorithm for optimization of unbalanced and balanced radial distribution networks by a network reconfiguration and capacitor placement. In [23], a new efficient technique to find optimal size and location of shunt capacitors has been reported. The main objective of the proposed approach was minimizing cost due to energy loss and reactive power compensation of distribution system.

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$$V_i^{(k+1)} = \frac{1}{Y_{ii}}\left(\frac{P_i - jQ_i}{V_i^{*(k)}} - \sum_{\substack{n=1 \\ n\neq i}}^{m} Y_{in}V_n\right) \qquad (6)$$

Where,

$V_i^{(k)}$: Voltage on i^{th} bus at the k^{th} iteration

P_i, Q_i: Active and reactive power of bus i

$Y_{im} = y_{im}$ for $i \neq y$

and $Y_{ii} = y_{i,m-1} + y_{i,m+1} + y_{io}$ for i = m

The loss of power loss in the line segment between buses i and i+1, at power frequency can be computed by:

$$P_{loss(i,i+1)} = R_{i,i+1}\left\|V_{i+1} - V_i\right\|\left|y_{i,i+1}\right|^2 \qquad (7)$$

Where

$Y_{i,i+1} = \dfrac{1}{(R_{i,i+1} + x_{i,i+1})}$: Admittance of the line section between buses i and i+1.

$R_{i,i+1}$: Resistance of the line segment connecting bus i and i+1.

$X_{i,i+1}$: Reactance of the line segment connecting bus i and i+1.

The total power loss is calculated by the relation:

$$P_{loss} = \sum_{i=0} P_{loss(i,i+1)} \qquad (8)$$

III. DESCRIPTION OF TEST SYSTEM

The proposed study has been carried out using the IEEE 13 bus test system. The test system has been simulated using the MATLAB codes. The test system has 4 feeders and 32 buses [27]. The main feeder is consists of the buses 0 to 17. The secondary three feeders have the buses 18 to 21, 22 to 24 and 25 to 32 respectively. The utility grid is connected to the test system at bus 0. The proposed test system is shown in Fig. 1. The bus 0 is generator bus and is taken as slack bus. All other buses from 1 to 32 are load (PQ) buses.

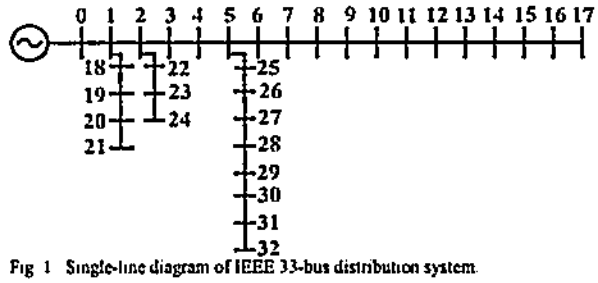

Fig 1 Single-line diagram of IEEE 33-bus distribution system

Network line data of the system are given in Table 1. These data are detailed in terms of the resistance and inductance of the feeders expressed in ohms. The capacitive reactance of the feeders is neglected because the distribution feeders are relatively short in length. The active and reactive power loads on different buses of the test system are given in Table 2. The lower and upper limits of voltage on generator bus and load buses in per unit system are provided in the Table 3.

TABLE I. NETWORK LINE DATA OF THE TEST SYSTEM

Line	From	To	R (ohms)	X (ohms)
1	0	1	0.0922	0.0470
2	1	2	0.4930	0.2511
3	2	3	0.3360	0.1864
4	3	4	0.3811	0.1941
5	4	5	0.8190	0.7070
6	5	6	0.1872	0.6188
7	6	7	0.7114	0.2351
8	7	8	1.0300	0.7400
9	8	9	1.0440	0.7400
10	9	10	0.1966	0.0650
11	10	11	0.3744	0.1238
12	11	12	1.4680	0.1550
13	12	13	0.5416	0.7129
14	13	14	0.5910	0.5260
15	14	15	0.7463	0.5450
16	15	16	1.2890	1.7210
17	16	17	0.7320	0.5740
18	1	18	0.1640	0.1565
19	18	19	1.5042	1.3554
20	19	20	0.4095	0.4784
21	20	21	0.7089	0.9373
22	2	22	0.4512	0.3083
23	22	23	0.8980	0.7091
24	23	24	0.8960	0.7011
25	5	25	0.2030	0.1034
26	25	26	0.2842	0.1447
27	26	27	1.0590	0.9337
28	27	28	0.8042	0.7006
29	28	29	0.5075	0.2585
30	29	30	0.9744	0.9630
31	30	31	0.3105	0.3619
32	31	32	0.3410	0.5320

TABLE II. ACTIVE AND REACTIVE POWER AT LOAD BUSES

Bus No.	P (kW)	Q (kvar)	Bus No.	P (kW)	Q (kvar)
1	100.0	60.0	17	90.0	40.0
2	90.0	40.0	18	90.0	40.0
3	120.0	80.0	19	90.0	40.0
4	60.0	30.0	20	90.0	40.0
5	60.0	20.0	21	90.0	40.0
6	200.0	100.0	22	90.0	50.0
7	200.0	100.0	23	420.0	200.0
8	60.0	20.0	24	420.0	200.0
9	60.0	20.0	25	60.0	25.0
10	45.0	30.0	26	60.0	25.0
11	60.0	35.0	27	60.0	20.0
12	60.0	35.0	28	120.0	70.0
13	120.0	80.0	29	200.0	600.0
14	60.0	10.0	30	150.0	70.0
15	60.0	20.0	31	210.0	100.0
16	60.0	20.0	32	60.0	40.0

TABLE III. BUS VOLTAGE CONSTRAINTS

	Generator Bus Voltage (p.u.)	PQ Bus Voltage (p.u.)
Lower Limit	1.0	0.9
Upper Limit	1.1	1.1

compensation using genetic algorithm are provided in Table 4. The active power losses decreases by 66.51% and reactive power losses decreases by 60.81% of original values.

TABLE IV. RESULTS RELATED TO LOSSES OF ACTIVE AND REACTIVE POWERS

	Loss of active power	Loss of reactive power
Before Optimization	282.5877	187.9595
After optimization by GA	175.1905	106.5347

The size of shunt capacitors is taken as discrete values of the capacity 50 kVAr which is generally used in the 11 kV distribution systems. The calculated values of reactive power compensation are converted in to nearest capacity as integral multiple of minimum available capacity. The bus voltages before and after compensation as well as capacity of capacitor units at candidate buses are provided in the Table 5. All voltages after optimal capacitor placement are found to be within permissible limits as specified.

TABLE V. RESULTS OF BUS VOLTAGES AND REACTIVE COMPENSATION

Bus No.	Bus Voltages without Reactive compensation	Bus voltages after optimal reactive compensation using GA	Reactive compensation at different Buses using GA (in Kvar)
0	1.0000	1.0000	-
1	0.9960	0.9968	0
2	0.9770	0.9820	0
3	0.9668	0.9748	1*50
4	0.9568	0.9678	1*50
5	0.9318	0.9530	0
6	0.9271	0.9508	0
7	0.9205	0.9453	2*50
8	0.9119	0.9391	0
9	0.9040	0.9335	0
10	0.9028	0.9325	1*50
11	0.9008	0.9308	0
12	0.8924	0.9254	0
13	0.8894	0.9240	1*50
14	0.8874	0.9230	1*50
15	0.8856	0.9219	0
16	0.8828	0.9211	2*50
17	0.8820	0.9203	0
18	0.9953	0.9962	1*50
19	0.9906	0.9914	0
20	0.9896	0.9905	0
21	0.9888	0.9897	0
22	0.9722	0.9775	0
23	0.9632	0.9693	0
24	0.9588	0.9656	2*50
25	0.9292	0.9515	0
26	0.9257	0.9495	0
27	0.9101	0.9435	1*50
28	0.8989	0.9392	0
29	0.8941	0.9370	5*50
30	0.8884	0.9360	1*50
31	0.8871	0.9363	2*50
32	0.8867	0.9374	5*50

VII. CONCLUSIONS

This paper proposes a solution for placement of shunt capacitor banks in the power distribution network which can be easily implemented in the practical power system networks. The proposed method is based on the genetic algorithm. The algorithm is implemented on 33-bus IEEE distribution test system. The optimal location and sizes of shunt capacitors is obtained for minimum loss in the network and optimal voltage profile. The results have been validated in the MATLAB. The developed algorithm can also be applied on real network of large electricity utility network.

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REJUVENATING, REVIVING AND RESTORING THE BURIED, IGNORED AND NEGLECTED 'URBAN WATER STREAMS'

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ABSTRACT

Urban Water Streams provide a wide array of benefits to communities, such as nutrient and pollution removal, groundwater recharge, and flood mitigation. Largely unnamed and mostly absent from maps, these critical small streams suffer from a lack of visibility. Being unnamed, however, doesn't lessen their importance. In fact, due to their small size and dominance within the stream network, they offer the greatest opportunity for groundwater exchange between the water and land, serving as critical connections with the terrestrial environment. Scientific research has consistently demonstrated that healthy headwater systems provide crucial downstream community benefits including clean water, flood control, and water supply, yet we routinely destroy these streams as part of the land development process.

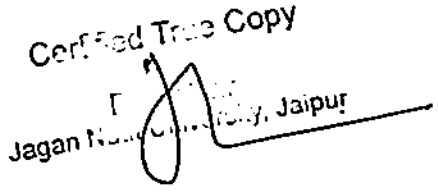
Unplanned land development, from suburban subdivisions to urban city centers, threatens small, headwater streams and their associated ecosystems. Suburban development often channelizes or buries small streams. Destruction of small headwater streams has already impacted many communities resulting in less reliable sources of clean water and potential for increased flooding. Cities and their residents are now reviving these once buried ecosystems and restoring them to vital community assets. The new approach of 'day lighting' streams promises to improve stream health and improve community livability as well.

Key words: Day lighting, Urbanization, Urban Water Streams, Urban Water Management

1 INTRODUCTION

The state of water resources in the country is perilous, but India's water crisis has been in the making for a long time.

The per capita availability of fresh water has declined sharply from 3,000 cubic metres to 1,123 cubic metres over the past 50 years. The global average is 6,000 cubic metres.



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D-9-6 Research On Morphology And Adaptability Of New-type Rural Community In Transition Period——A Case Study Of Handan Area In Hebei,China
Jiayi Zhao, Shifen Li and Wei Sun
Dalian University of Technology, China

D-9-7 Re-Neili: Art, Green and New Communities Revive the Old Community
Wan-Wen Huang and Kuan-Hua Chen
Yuan Ze University, Taiwan

D-10 Livable Community 3 — Sept. 22 (Thu) 8:30-10:15

D-10-1 open spaces, Two dimensional breathing outlets of a residential neighborhood.
Manjari Rai
Jagannath University, India

D-10-3 Preliminary study on the evaluation of vitality in existing settlements
Li Dong, Yue Fan and Eryuan Zhang
Dalian University of Technology, China

D-10-4 Characteristics influencing leisurely physical activity in community outdoor space: Results from a Harbin representative survey
Cuina Zhang and Lingling Li
Harbin Institute of Technology, China

D-10-5 Practice and Perspective of Existing Housing Environment Regeneration Design in the North of China
Ying Gao, Yue Fan, Ning Zhang and Qiong Zhang
Dalian University of Technology, China

D-10-6 Exploration on regeneration mode of sub-healthy space in middle-aged community at post-urban age: Example of Huizhongli community regeneration design in Beijing
Minghui Xue[1], Fei Lian[1] and Jia Li[2]
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D-10-7 The Role of the Community Learning and Development Center in the Diverse Community
Sayaka Fujii
University of Tsukuba, Japan

D-11 Participation and Education — Sept. 22 (Thu) 10:30-12:15

D-11-1 Evaluation of Pedestrian's Profile, Activity, and Environment in the City of Bandar Lampung, Indonesia
Fritz Akhmad Nuzir[1], Haris Murwadi[1,2] and Bart Dewancker[2]
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D-11-2 Developing the Aesthetic Ecology Concept in Participatory Planning of Rural Areas in Bumiaji-Batu City, Indonesia
Dina Poerwoningsih, Imam Santoso and Erna Winansih
University of Merdeka, Indonesia

D-11-3 Education about Disaster Reduction by Sharing Flood Experiences
Mari Tanaka
Gunma University, Japan

D-11-4 Community's Housing Types and Residents Risk Perceptions Case study of Northern Thailand Earthquakes in 2014
Titaya Sararit
Chiangmai University, Thailand

D-11-5 A study on the Cooperation between Local Community and Combined Elementary and Junior High School From the View Point Of Utilization of Local Resources - In a case of Kyoto Ohara Gakuin-
Risa Mori and Chie Murosaki
Nara Women's University, Japan

D-11-6 Bottom-up Participatory Design Process for Practical City Development Action : The Case of Khon Kaen Province Affordable Local Smart City Project
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D-11-7 Discovery Learning Model with a Scientific Approach in Understanding The Concept of Energy Efficiency for Students of Vocational High School in Indonesia
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Abstract: Artificial Bee Colony Algorithm (ABC) is very popular algorithm inspired by intelligent food foraging behavior of honey bee in class of nature inspired algorithms. This p... View more

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Abstract:

Artificial Bee Colony Algorithm (ABC) is very popular algorithm inspired by intelligent food foraging behavior of honey bee in class of nature inspired algorithms. This paper put forward a new algorithm named as Weight driven Position Update Artificial Bee Colony (WdABC) algorithm which update position of employed bee according to variation in weight factor so as to improve the balance between exploration and exploitation. The WdABC algorithm improves the performance of ABC algorithm. The Performance of WdABC algorithm tested on standard problems and some real world problems. Results of WdABC compared with basic ABC and its recent variants to prove its superiority in terms of accuracy, reliability and robustness.

Published In: 2016 2nd International Conference on Advances in Computing, Communication, & Automation (ICACCA) (Fall)

Date of Conference: 30 Sept.-1 Oct. 2016 INSPEC Accession Number: 16484594

Date Added to IEEE *Xplore*: 21 November 2016 DOI: 10.1109/ICACCAF.2016.7748953

Publisher: IEEE

▸ ISBN Information:
Conference Location: Bareilly, India

Contents

In day to day life we faces some complex problems that requires to find the best solution among large number of feasible solutions and at the lowest possible cost, thus for this purpose it is essential to introduce some robust optimization techniques. The most of the classical optimization techniques can solve simple optimization problems but fails to handle non-convex, multi-model, non-differential and discrete nature problems. The problems with large search space can be easily solved by stochastic population based algorithms like Artificial Bee Colony (ABC) algorithm.

Lbest Gbest Artificial Bee Colony algorithm

Hansh Sharma , Sonal Sharma , Sandeep Kumar All Authors

Abstract: Artificial Bee Colony (ABC) algorithm is the most popular add-on to class of swarm intelligence based meta-heuristic which is evolved to resolve the complex real world op... View more

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Abstract:

Artificial Bee Colony (ABC) algorithm is the most popular add-on to class of swarm intelligence based meta-heuristic which is evolved to resolve the complex real world optimization problems. Most of the swarm intelligence based algorithms face the problem of stagnation, and premature convergence and ABC is not an exception. To reduce the chance of these problems as well as to control equilibrium between intensification and diversification capabilities of ABC, a unique variant of ABC is intended. In this intended variant, the employed bee stage, as well as onlooker bee stage of ABC algorithm is modified by taking inspiration from a local best candidate as well as the global best candidate. The intended ABC variant is named as Lbest Gbest ABC (LGABC) algorithm. The accuracy and efficiency of LGABC have examined over 12 benchmark functions and evaluated with the basic ABC, best so far ABC, Gbest ABC and Modified ABC and found that it may be an efficient contender in the field of swarm intelligence based algorithms.

Published In: 2016 International Conference on Advances in Computing, Communications and Informatics (ICACCI)

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Date of Conference: 21-24 Sept. 2016

INSPEC Accession Number: 16429816

Date Added to IEEE *Xplore*: 03 November 2016

DOI: 10.1109/ICACCI.2016.7732158

Publisher: IEEE

ISBN Information:

Conference Location: Jaipur, India

Contents

Nature inspired techniques are inspired intelligent and collective behavior of an animal, insects, birds and much more living beings. Nowaday nature inspired techniques are used to solve very complex real word optimization problems. Collaborative trial and error techniques are used to search optimum candidate by in these population-based optimization algorithms started by a cluster of candidates. Swarm intelligence based algorithms imitate the capability of social creatures to solve difficult tasks by utilizing social learning. Some social creature shows collective and self-organizing behavior while searching for food, security and safe place for mating. Development of a powerful and efficient swarm-based algorithm to simulate the behavior of reinforcing existing knowledge from one another in social territories without any coordinating entity. This cooperative behavior inspired researchers to develop algorithms that can resolve nonlinear, nonconvex or discrete optimization problems that are not solvable by classical methods. Current research [4], [10], [12], [15] demonstrate that swarm intelligence techniques inspired by nature are really useful while solving complex real-world optimization problems. Behavior of species is imitated in these algorithms and few of them are ant colony optimization (ACO) [4], particle swarm optimization (PSO) [10], bacterial foraging optimization (BFO) [11].

RESEARCH-ARTICLE

Text Steganography Based on Feature Coding Method

Authors: Sunita Chaudhary, Meenu Dave, Amit Sanghi Authors Info & Affiliations

AICTC '16: Proceedings of the International Conference on Advances in Information Communication Technology & Computing • August 2016 • Article No.: 7 • Pages 1–4 • https://doi.org/10.1145/2979779.2979786

Published: 12 August 2016

ABSTRACT

Stegnography is a sheltered communication in which information such as text, image, audio and video is kept under shelter of another message. The message providing the shelter can also be any sort of hidden writing exists. In this paper, we present and evaluate an approach for text steganography which is hiding text underneath text. The approach is based on feature encoding shape encoding method.

1. M. Shirali-Shahreza, "Text steganography by changing words spelling," In 10th International Conference on Advanced Communication Technology, Korea, 2008.

2. M.Shirali-Shahreza, and M. Shirali-Shahreza, "Text Steganography in SMS," In International Conference on Convergence Information Technology, 2007.

3. F. Khan, "Enhanced Text Steganography in SMS," In 2nd International Conference on Computer, Control and Communication, 2009.

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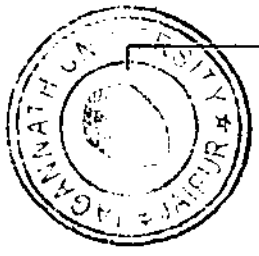

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Jagan Nath University, Jaipur

Software quality prediction using random particle swarm optimization (PSO)

Publisher: IEEE

Asif Ali , Kavita Choudhary , Ashwini Sharma All Authors

Abstract: In this paper we have considered java based modules as a dataset for software quality prediction. The properties used are class, object, inheritance and dynamic behavior.... View more

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Abstract:
In this paper we have considered java based modules as a dataset for software quality prediction. The properties used are class, object, inheritance and dynamic behavior. The data modularity considered for this work is 1-10 and 11-20. First the data is arranged in the group and then it is tested based on chi-square test. Then we have calculated F-measure (FM), Power (PO) and Odd Ratio (OR) and find the parametric quality of software metrics. Then we have applied random particle swarm optimization for testing the optimized value and the obtained results found are improved.

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DOI: 10.1109/ICCPCT.2016.7530244

Publisher: IEEE

▸ ISBN Information: Conference Location: Nagercoil, India

Contents

I. Introduction

To finding the item distinction is the best test in today's circumstance. There are a couple examination presentations in this course. Despite the measure of effort spent in the design and use of blemish desire models, programming insufficiency conjecture research area still positions mind blowing troubles [1]. Tragically, none of the methodologies which are made in couple of years former satisfies the significance in the item business as a result of a couple reasons including the nonappearance of programming gadgets to robotize this desire set up, the unwillingness to accumulate the inadequacy data, and the other sensible issues [11]. The standard way which is used from the most punctual utilizing in order to star point is to gage programming quality programming estimations and weakness data accumulated from past structure releases or near endeavors to add to a quality-desire or quality-request model [12]. By then originators use this model to anticipate the issue slant of programming fragments being produced. Past investigation [13] has exhibited that item quality models in perspective of programming estimations can yield desires with supportive precision [14]. Such models can be utilized to foresee the additional blemishes that either be the class of a segment or a quality segment for a part. The past is typically recommended as social event models [2] while the last is generally suggested as yearning models [3]. The point of convergence of this paper is on the past, i.e., demand models. Frequently, anticipating the measure of blemishes is extreme. It is the whole all the all the additionally perplexing consequent to, as De Vaux and Hand [4] Stated, 60-95% of the exertion of information examination is making use for the cleaning. The extent of examination such as data structures and information mining the effect of poor information has been seen as an issue which should be tended to by database originators and information clients alike. Redman [5] for occasion imparted that poor information quality is an issue which results for all bits of the economy: affiliations, governments, and the astute world and their clients", and Wand and Wang [6] cautioned of the colossal effect of poor information quality on the adequacy of an association. Data Clustering and Classification are inspected in [7]–[10]. By then we apply the testing on article organized property considering chi square test.

Authors
Figures
References
Citations
Keywords
Metrics

2016 International Conference on Circuit, Power and Computing Technologies [ICCPCT]

Mathematical Implications of Software Quality Prediction using different Software Metrics and Particle Swarm Optimization (PSO)

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***Abstract*—This paper provides mathematical implications of software quality prediction using different software metrics and the optimized values are obtained by particle swarm optimization (PSO). Then the main focus of this research work is to find the final optimum score based on the previous software metrics used. Then we apply PSO for checking the optimized value based on the results obtained by the F-measure(FM), Odd ratio(OR) and Power(PO). We have applied random particle so that fixed blasness is removed through this algorithm. The algorithm used in our approach is shown below. The results are convincing and uniform in different iteration.**

***Keywords* – Software quality, FM, PO, OR, PSO**

I. INTRODUCTION

To discovering the product particularity is the greatest challenge in today's situation. There are a few examination introductions in this course. Notwithstanding the measure of exertion spent in the configuration and utilization of flaw expectation models, programming deficiency forecast research region still stances incredible difficulties. Lamentably, none of the strategies which are made in couple of years prior fulfills the relevance in the product business because of a few reasons including the absence of programming devices to robotize this expectation prepare, the unwillingness to gather the deficiency information, and the other down to earth issues [11-14]. The customary way which is utilized from the earliest using so as to star point is to gauge programming quality programming measurements and shortcoming information gathered from past framework discharges or comparative undertakings to develop a quality-expectation or quality-order model. At that point designers utilize this model to foresee the issue inclination of programming segments being developed. Past exploration [1] has demonstrated that product quality models in view of programming measurements can yield expectations with helpful exactness. Such models can be used to anticipate the response variable that can either be the class of a portion or a quality component for a fragment. The past is normally suggested as gathering models [2] while the latter is for the most part implied as desire models [3]. The focal point of this paper is on the past, i.e., request models. Often, predicting the amount of imperfections is excessive. It is the entire all the all the more confounding subsequent to, as De Vaux and Hand [4] Stated, 60-95% of the effort of data examination is making use for the cleaning. The scope of examination like information structures and data mining the impact of poor data has been seen as an issue which ought to be tended to by database originators and data customers alike. Redman [5] for instance communicated that poor data quality is an issue which consequences for all pieces of the economy: associations, governments, and the insightful world and their customers", and Wand and Wang [6] forewarned of the great impact of poor data quality on the ampleness of an affiliation. Information Clustering and Classification are examined in [7][8][9][10]. At that point we apply the testing on article arranged property taking into account chi square test.

II. LITERATURE SURVEY

In [15] authors have depicted an exploratory examination strategy that addresses two difficulties and that is constructed with bunching and the assistance of a product building master. It is an unsupervised technique since named preparing information is not needed to foresee the deficiency inclination of programming modules. In [16] authors examined about several programming grouping calculations Most of these calculations have been connected to specific programming frameworks with significant achievement. On the other hand, the topic of how to choose a product bunching calculation that is most appropriate for a particular programming framework stays unanswered. In 17] authors presented UpMoJo, a novel correlation technique for programming deteriorations that can be connected to both settled and level disintegrations. The advantages of using this system are exhibited in both explanatory and exploratory design. We likewise contrast UpMoJo with the END structure, the main other existing system for settled decay examination. In [18] authors have utilized subtractive grouping based fluffy surmising framework approach which is

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2016 International Conference on Micro-Electronics and Telecommunication Engineering (ICMETE)

Intelligent Classification of Lung & Oral Cancer through Diverse Data Mining Algorithms

Year: 2016, Volume: 1, Pages: 133-138
DOI Bookmark: 10.1109/ICMETE.2016.24 (https://doi.ieeecomputersociety.org/10.1109/ICMETE.2016.24)

Authors

Tanupriya Choudhury (https://www.computer.org/csdl/search/default?type=author&givenName=Tanupriya&surname=Choudhury)
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Bhaskar Mandal (https://www.computer.org/csdl/search/default?type=author&givenName=Bhaskar&surname=Mandal)

Abstract

Nowadays, the environment of healthcare is quiet richin information, but knowledge wise the data is very poor. There isan availability of ample amount of data within the systems ofhealthcare. Nevertheless, there is a absence of genuine tools ofinvestigation in order to determine hidden associations in data. The main motive of this investigation is towards the speciallydesigned GUI based interface in order to input the patient'srecord. Thus anticipate whether or not the patient is sufferingfrom the lung and oral cancer by the use of the rule basedclassifier. The forecast is done from the process of mining therecent informative data of the patient and data repository or thereference value for every attributes. The reference values aretaken from specialist doctors, and internet repository. In thisresearch a comparison of Multilayer perceptron and simplelogistic algorithm have been carried out so as to analyse anddetect the lung and oral cancer in an intelligent way.

2016 8th International Conference on Information Technology in Medicine and Education (ITME)

- A Review on Image Processing Methods in Detecting Lung Cancer Using CT Images (/csdl/proceedings-article/ictacc/2017/4797a018/12OmNwCsdBX)
  2017 International Conference on Technical Advancements in Computers and Communications (ICTACC)
- Network-based identification of smoking-associated gene signature for lung cancer (/csdl/proceedings-article/bibm/2010/05706613/12OmNx3HIaZ)
  2010 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)
- Lung Cancer Diagnosis via Interfacing Bio-nano-molecular System: hTERT, Chitosan, and Carbon Nanotubes (/csdl/proceedings-article/cbms/2014/4435a559/12OmNxFJXMr)
  2014 IEEE 27th International Symposium on Computer-Based Medical Systems (CBMS)
- Prognosis System for Lung Cancer Based on Rough Set Theory (/csdl/proceedings-article/icic/2010/05514004/12OmNxG1yXJ)
  2010 Third International Conference on Information and Computing
- Detection of Lung Cancer Using Content Based Medical Image Retrieval (/csdl/proceedings-article/acct/2015/8488a048/12OmNxGSmmE)
  2015 Fifth International Conference on Advanced Computing & Communication Technologies (ACCT)
- Segmentation and Analysis of CT Chest Images for Early Lung Cancer Detection (/csdl/proceedings-article/gscit/2016/2659a120/12OmNzWOBdB)
  2016 Global Summit on Computer & Information Technology (GSCIT)
- Deep Learning for Categorization of Lung Cancer CT Images (/csdl/proceedings-article/chase/2017/4722a272/12OmNzWOBfv)
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MATEC Web of Conferences 57, 01003 (2016) DOI: 10.1051/matecconf/20165701003
ICAET-2016

Split and Merge Based Quantitative Approach to Select Filter Combination for Image Segmentation

Amit Goyal[1] and Mohit Srivastava[2]

[1]*Research Scholar, Department of ECE, Jagan Nath University, Jaipur, Rajasthan, India*
[2]*Professor, Department of ECE, Chandigarh Engineering College, Landran, Punjab, India*

Abstract. With the advent of image analysis and computation in different domains, image segmentation has emerged as the most crucial step to achieve a compact segment-based description of image scene by decomposing it into meaningful segments of similar attributes. The pre-and-post filtering operation reduces the effect of noise from the segmented image. The Cameraman image is pre-filtered using Laplacian, Median and Min filter. The Split and Merge method for Region based image segmentation which guarantees to connected regions are now applied on the filtered image. The Median, Laplacian and Sobel filter is then used to post-filter the segmented image. The PSNR and MSE values are calculated to quantitative evaluation of segmented images. The quantitative evaluation of post-filtered segmented image shows that median filter produces most effective result with lowest MSE of 84.89 dB and highest PSNR of 5.72 dB.

1 Introduction

To analyze or interpret an image automatically, pre-processing is done which involves segmenting the image into different objects of interest e.g. separation of foreground from the background [6]. Image segmentation has firmed its ground in many practical applications that involve a visual interpretation, namely in medical imaging, object detection (face detection, pedestrian detection, brake light detection etc. More accurate the segmentation, more successful is the recognition of objects in the image.

Basically, segmentation is the process of subdividing an image into its constituent regions or objects. Segmentation algorithms are based on either similarity or discontinuity of intensity/gray level values. A number of image segmentation algorithms with increased complexity have been developed over the years. All these algorithms work on the use of any of the three main criteria: the homogeneity within a segment, separation from adjacent segments and shape homogeneity. Typically, the segmentation algorithms can be grouped into three major categories on the basis of their segment formation properties, namely Threshold Based Segmentation [11, 22], Boundary based Segmentation [9, 16] and Region Based Segmentation [10].

1.1 Features of various segmentation techniques

Threshold based segmentation produces regions of uniformity within the given image based on some threshold criteria on the attributes of pixels [11].These algorithms are computationally less expensive but causes noise, blurred edges or outlier [8] in the image. Contrary to this, the boundary based techniques rely on edges found in an image and tries to locate points of discontinuities in images. This segmentation method is very sensitive to noise and hence post-processing is required. However, region based segmentation algorithms partition the entire image into sub regions depending on some homogeneity criteria [3, 14].

1.2 Region Split and Merge Technique

The region split and merge technique falls under region based segmentation and is combination of top-down and bottom-up approach [4]. In this image is first split into homogeneous regions on the basis of homogeneity criteria. The regions formed after first split will be individually checked for the homogeneity and any two adjacent homogeneous regions will be merged into one region. The merging of homogeneous connected regions is a combination of two phases: first is to find the pair of adjacent homogeneous regions and second is to choose a certain merging criterion [2, 4, 10]. The algorithm halts when no further merging is possible. This technique produces large number of region boundaries, other than the horizontal and vertical ones [13]. But the algorithm of this approach leads to increase in computational speed [10] with lesser complexities and hence improves segmentation quality [4]. It also guarantees connected regions [9] i.e. there are no gaps due to missing edge pixels. Due to the inherent advantages of region based segmentation technique, the performance of image segmentation is elaborated in this paper using split and merges technique.

2 Methodology Adopted

To apply pre and post filter techniques in order to segment the image using split and merge technique and evaluate the performance of algorithm, the system architecture being followed is explained with the help of flowchart as given in fig. 1.

[1] Corresponding author: amitgoyal0810@gmail.com

Object oriented based technique for software quality prediction through clustering and chi-square test

Publisher: IEEE

Asif Ali . Kavita Choudhary . Ashwini Sharma All Authors

Abstract: In this paper we present an efficient approach for software quality prediction. We accept object oriented modularity as the dataset. The data used for the experimentation... View more

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Abstract:
In this paper we present an efficient approach for software quality prediction. We accept object oriented modularity as the dataset. The data used for the experimentation have class, object, inheritance and dynamic behavior. After that we categorized our framework for selecting the modularity from six different choices. The six different choices are 1-10, 11-20, 21-30, 31-40, 41-50 and > 50. Procedure for chi-square test is selected by the user. Were the deviations (differences between observed and expected) the result of chance, or were they due to other factors. How much deviation can occur before you, the investigator, must conclude that something other than chance is at work, causing the observed to differ from the expected? The chi-square test is always testing what scientists call the null hypothesis, which states that there is no significant difference between the expected and observed result. Then based on four different object oriented parameters that is class, object, inheritance and dynamic behavior we find chi square probability distribution that is p. Then we process the data that is P value for software quality estimation. For software quality estimation we apply F-measure (FM), Power (PO) and OddRatio (OR).

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Conference Location: Davangere, India

Contents

To discovering the product particularity is the greatest challenge in today's situation. There are a few examination introductions in this course. Notwithstanding the measure of exertion spent in the configuration and utilization of flaw expectation models, programming deficiency forecast research region still stances incredible difficulties. Lamentably, none of the strategies which are made in couple of years prior fulfills the relevance in the product business because of a few reasons including the absence of programming devices to robotize this expectation prepare, the unwillingness to gather the deficiency information, and the other down to earth issues [11]–[14]. The customary way which is utilized from the earliest using so as to star point is to gauge programming quality programming measurements and shortcoming information gathered from past framework discharges or comparative undertakings to develop a quality-expectation or quality-order model. At that point designers utilize this model to foresee the issue inclination of programming segments being developed. Past exploration [1] has demonstrated that product quality models in view of programming measurements can yield expectations with helpful exactness. Such models can be utilized to foresee the reaction variable that can either be the class of a segment or a quality element for a segment. The previous is typically alluded to as grouping models [2] while the last is generally alluded to as expectation models [3]. The center of this paper is on the previous, i.e., order models. Frequently, foreseeing the quantity of flaws is a bit much.

Authors: Ankita Sharma, Hema Banati Authors Info & Affiliations

ICC '16: Proceedings of the International Conference on Internet of things and Cloud Computing • March 2016 • Article No.: 6 • Pages 1–7 • https://doi.org/10.1145/2896387.2896391

Published: 22 March 2016

ABSTRACT

Cloud has gained a wide acceptance across the globe. Despite wide acceptance and adoption of cloud computing, certain apprehensions and diffidence, related to safety and security of data still exists. The service provider needs to convince and demonstrate to the client, the confidentiality of data on the cloud. This can be broadly translated to issues related to the process of identifying, developing, maintaining and optimizing trust with clients regarding the services provided. Continuous demonstration, maintenance and optimization of trust of the agreed upon services affects the relationship with a client. The paper proposes a framework of integration of trust at the IAAS level in the cloud. It proposes a novel method of generation of trust index factor, considering the performance and the agility of the feedback received using fuzzy logic.

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ICC

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Authors: Sonia Duggal, M. K. Sharma Authors Info & Affiliations

ICTCS '16: Proceedings of the Second International Conference on Information and Communication Technology for Competitive Strategies • March 2016 • Article No.: 22 • Pages 1–5 • https://doi.org/10.1145/2905055.2905080

Published: 04 March 2016

ABSTRACT

Cloud computing framework makes us convenient to offer e-learning services in the remotest areas of India. By using cloud based E-Learning model, we can reap multiple benefits in schools, colleges or universities in India.

This paper proposes a Conceptual Model to offer e-learning services using cloud computing platform.

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ICTCS

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Proposed Frame Work of e-Learning Services Through Cloud

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Authors: Anupriya Jain, M. K. Sharma Authors Info & Affiliations

ICTCS '16: Proceedings of the Second International Conference on Information and Communication Technology for Competitive Strategies • March 2016 • Article No.: 19 • Pages 1–7 • https://doi.org/10.1145/2905055.2905077

Published: 04 March 2016

ABSTRACT

Fast and Appropriate Social Network Analysis (SNA) tools, techniques, are required to collect and classify opinion scores on social network sites, as a grouping on wrong opinion may create problems for a society or country. Social Network Analysis (SNA) is popular means for researcher as the number of users and groups increasing day by day on that social sites, and a large group may influence other. In this paper, we recommend hybrid model of opinion recommendation systems, for single user and for collective community respectively, formed on social liking and influence network theory. By collecting the data of user social networks and preferences like, we

The significance of paper to analyze the suitability of ANN and Fuzzy sets method in a hybrid manner for social sites classifications, First, we intend to use Artificial Neural Network(ANN)

fuzzy approach as a way to overcome the uncertainity that is always present in social media analysis.

We give a brief overview of the main ideas and recent results of social networks analysis, and we point to relationships between the two social network analysis and classification approaches. This research suggests a hybrid classification model build on fuzzy and artificial neural network (HFANN). Information Gain and three popular social sites are used to collect information depicting features that are then used to train and test the proposed methods. This neoteric approach combines the advantages of ANN and Fuzzy sets in classification accuracy with utilizing social data and knowledge base available in the hate lexicons

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Predictions and Recommendations for the Higher Education Institutions from Facebook Social Networks

April 2016

Mamta Madan · Meenu Dave · Meenu Chopra

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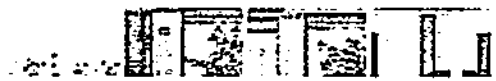
Abstract and figures

We are living in the age of Higher Education (HE) 2.0, where the fastest growing social networking sites (SNS) is Facebook. It's been widely accepted as a platform for communications and collaborations. The students and Higher Education Professionals (HEP) which includes faculty members, administrators, management, etc. use to share their valuable resources. It's been notified that students are far more ahead in using communication technologies as compared to the Higher Education Institutions (HEIs) Professionals. In our research work, we analyse the social network graphs which are Facebook pages or groups having members like HEP, students, etc., related to Higher Education in India. We discovered that in some networks, members are less, but online posts and messages are huge in number. Student's active participations or interactions in the social networks can be done by Social Network Analysis (SNA) approaches. In our study, we explore the techniques for the SNA to detect the models or patterns in the Online Social Media Networks (OSMNs). These are produced by the interactions and the content exchanged among the users, students and professionals of HE in the social graph. In our previous research work, we used Network Analysis Software Applications (NASA) tools able to discover important architectures and finding the core, peripheric and outlined members in the network. By these NASA applications, we can visualize, generate and summarize the buzz topics or the words by the active members of the network, which gives us a glimpse of the topic under discussion. We explained the mining algorithms provided by the NASA tools like (Gephi, NodeXL, LikeAnalyzer and Wolfram Alpha). This helped us in assessing their prowe ... Read more



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Job Shop Scheduling Algorithms- A Shift from Traditional Techniques to Non-Traditional Techniques

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Abstract- The success of planning and operations phase essentially lies in efficient scheduling, and searching for the best scheduling algorithm in accordance with the problem in hand, is still a difficult task. Numerous job shop scheduling algorithms have been proposed and implemented, and each has its pros and cons. This review paper discusses the development of traditional and nontraditional Job Shop Scheduling Problem and also advancements in the development of methods to be used in solving the problem. It also classifies the JSSP, on the basis of the complexity of the solution. The survey provides an insight on the research carried out in this field.

Keywords: Job Shop Scheduling Problem; Non-Traditional Techniques; Scheduling; Traditional Techniques.

I. INTRODUCTION

A procedural plan or layout, meant for achieving a goal/objective and which aids in measuring the work process, is termed as schedule. If the plan is associated with a list of proposed operations/events and their respective sequence. Scheduling is an elementary concern in the operation of any manufacturing systems and planning process. It is responsible for taking care of the assignment of resources for several tasks in given period of time, and its objective is to optimize other missions. Depending on the problem being solved, resources improvement in productivity, along with enhanced adaptability. Keeping up with such demands, there is a strong need for scheduling methods which encompass the specified demands in their design and which could be effectively implemented with the modern manufacturing systems.

Section II of this research paper provides some essential facts and objective of scheduling, whereas section III deals with Job Shop Scheduling Problem. Section IV is dedicated to literature survey and section V discusses the traditional and non-traditional techniques for solving the aforesaid problem.

II. SCHEDULING

A. Scheduling: Essential Facts

Allocation of operations on machines (commonly known as scheduling) by the automated system (in an optimized form and within a defined period) is highly required in several industries, especially the manufacturing units.

Schedules [4] are broadly classified into two branches, the feasible schedules and the unfeasible schedules. The feasible schedules are those which are compatible with all of the predefined constraints (based on time and technique used) and unfeasible schedules are those that disobey some or all deadlines and the mentioned constraints.

Other aspect of scheduling [5] is the static and dynamic state. If

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Analysis of Big Data for Data-intensive Applications

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***Abstract*—In the recent decade big data has attracted attention from decision and policy makers in enterprises and governments, market analysts, and data scientists. The growth of information in the current decade has exceeded the Moore's law, and the vast amount of data is increasing the pain towards managing and analyzing. However, this high amount of data has a great potential and extremely useful information is hidden in it. Data-intensive scientific discovery helps to identify big data problems. The big data problems are found in various areas and sectors such as economic activities to provide effective public administration, national security, and scientific research. Several progressions in various fields were made possible because of big data and there is no doubt that the future challenges in business enhancements will converge to explore big data. Few difficulties that arise in big data are data visualisation, data storage, data analysis, and data capture. The aim of our paper is to give a clear idea about big data and its data-intensive applications. We have also covered several schemes to handle quantum computing, bio-inspired computing, cloud computing, and granular computing.**

Keywords*—*Hadoop; Big Data problems; Apache Mahout; Skytree server.

I. INTRODUCTION

The current research frontiers are more focussed towards big data. Big data is listed in both "Top 10 Strategic Technology Trends For 2013" and "Top 10 Critical Tech Trends for the Next Five Years." This proves that fields like public administration, scientific research, and business will be revolutionised by big data. In [1], the authors categorised the conception of big data using volume, velocity, and variety. Later people started giving new 'V's based on their distinct requirements. So, big data has started being characterised from 3Vs to 4Vs. The fourth 'V' was given different values according to the requirements such as value, virtual, or variability. The traditional data processing platforms or the classical data processing approaches struggle to mine huge diverse data sets. Due to big data's large volume, large variety, and high velocity, new processing techniques are required to enable the decision making technique.

Data from telescopes, scientific experiments, sensor networks, and high throughput instruments are largely diversified data. Fig. 1 shows the rate at which data storage requirement and computational capacity has increased [2]. Efficient results cannot be obtained if off-the-shelf technologies and techniques are used to analyse big data. The hurdles start from data capture and data curation to data analysis and data visualization. Knowledge engineering would be made possible only when the previous data can be analysed to predict the future. This is where big data benefits from its diversified usage in multiple fields.

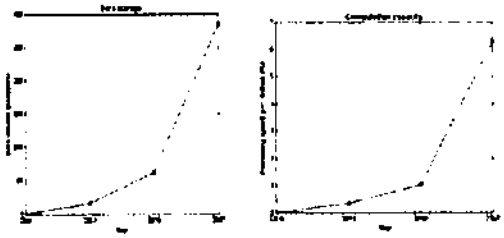

Fig. 1. Data Deluge.

Traditional management and business practices, and research strategies have been changed after the beginning of big data. The tools required to handle the big data problems are researched in the data-intensive computing field. The three scientific paradigm such as empirical science, theoretical science, and computational science are being added with a fourth paradigm known as data-intensive science [3].

Organization of paper: Section 2 introduces the big data problems. Opportunities and challenges in big data are studied in section 3. Data-intensive tools that are used in big data are described in section 4, and the seven principles for designing big data systems is covered in section 5. Section 6 discusses big data and its future works, and section 7 concludes the paper.

II. PROBLEMS IN BIG DATA

We are in the era of data-intensive computing where fields such as scientific research to social security, and global economy to public administration involves big data. United States health care, retail of the United States, European Union's public sector administration, personal

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