ORIGINAL ARTICLE

Scientific Modelling of Teaching by Master to Adolescent Students for Personality Improvement, Relationship and Vividness for Improving the Electrical Energy Quality

Lenin Kanagasabai[1]*

Department of EEE, Prasad V. Potluri Siddhartha Institute of Technology, Kanuru, Vijayawada, Andhra Pradesh -520007.India

*Corresponding author: gklenin@gmail.com

Received: 17th August 2023
Revised: 11th September 2023
Accepted: 15th September 2023

OPEN ACCESS

Abstract: In this paper Scientific Modelling of Teaching by Master to Adolescent students for Personality Improvement, Relationship and Vividness (TMASPRV) algorithm applied to the engineering domain problem in order to increase the power productivity by Improving the Electrical Energy Quality. Each Adolescent students fitness value is computed by utilizing (substituting) the characteristics (decision variables) in the standard fitness. An estimated model between the individuals and their fitness values created based on Chebyshev functional-link network. By Least Squares Estimation, the proposed model optimized. Analogous to selecting preliminary populace, selecting the preeminent solution in the new population to the role of the Prime Teacher, rendering to all the other Teacher and Student's - location is significant. This choice will regulate the convergence rapidity as well as the accurateness of the procedure. Therefore, the procedure's principal phase is to discover an operative solution to play a protagonist of the preeminent solution to upsurge the convergence and accurateness of the exploration iterations. In the segment of Self-experiences (local search) every Human being has assertiveness in the direction of each factor in the on-going life. Mathematical Design of Teaching by Master to Adolescent students for Personality Improvement, Relationship and Vividness (TMASPRV) algorithm validated in benchmark test functions. In engineering domain Electrical problem projected TMASPRV algorithm performed well in reducing the electrical real power loss.

Keywords: Master, Adolescent students, Personality Improvement, Relationship, Vividness

Introduction

In this paper, Scientific Modelling of Teaching by Master to Adolescent students for Personality Improvement, Relationship and Vividness (TMASPRV) presented. A Master enhances the knowledge of Adolescent students through teaching. Adolescent students move in this period of life and physiological mode how Adolescent student's searches for solutions mathematically formulated. Adolescent students will seek the independency and search for answers for various questions faced in day-to-day practical life. Each phase of the actions performed will analyze individually. This phase will be major transition period in the Adolescent student's life. Very particularly they form their own Characteristics with respect to actions which they facing day to day in their life. Mainly three cases considered in the design of the algorithm. First is creating own characteristics by an individual Adolescent students. Secondly, Adolescent students may intimate another person in the same age group as role model and Adolescent students without any reason will develop thirdly negative character. These three cases mathematically formulated to solve the problem. Primarily model is build based on the primary behavior (Adolescent students will produce own characteristics). A predictable model between the individuals and their

fitness values formed based on Chebyshev functional-link network. Through Least Squares Estimation, the projected model optimized. Naturally, Master will put maximum effort to identify the inner questions of the Adolescent students and solutions delivered to him in the desired way of the Adolescent students. How an Adolescent students moves in this period of life, physiological mode how a Adolescent students search for solutions are mathematically formulated and contestant solution is called as a tender. Initially, a set of contestant solutions arbitrarily engendered in the exploration space subsequently, every tender appraised, and subsequently its price function computed. Then Master explains about the Devotional relationship between Teacher and Student. Residential monasteries are a category of teaching structure in primeval Bharat country with Student existing adjacent or with the Prime Teacher, in the same Residential monasteries. Teacher, Student learn from the preaching is of Prime Teacher. Analogous to selecting preliminary populace, selecting the preeminent solution in the new population to the role of the Prime Teacher, rendering to all the other Teacher and Student's - location is significant. This choice will regulate the convergence rapidity as well as the accurateness of the procedure. Therefore, the procedure's principal phase is to discover an operative solution to play a protagonist of the preeminent solution to upsurge the convergence and accurateness of the exploration iterations.

The relationship between Prime Teacher, Teacher and Student's is alike attraction of the particles in the material and law of the motion has been utilized in the design, since the Prime Teacher positioned in the centre point and around him Teacher and Students are located with an divine attraction which is equivalent to gravitational attraction.

Then Master explains about Vividness. The struggles of human beings to attain the Vividness in their life are endless aspect. Since the alteration in vividness is probable, lone by means of an alteration in human beings thoughts. Mathematical Design of Teaching by Master to Adolescent students for Personality Improvement, Relationship and Vividness (TMASPRV) validated in benchmark test functions.

Validity of TMASPRV has proved by successfully applying in engineering problem. In this paper, only certain aspects of Human beings imitated to formulate the algorithm. Human beings in their life alter their opinion rendering to the influential powerful human beings, their own experiences and other struggling conditions. Human being thoughts are altered in periods; rendering to Powerful human begins, own experiences from various experiences obtained from day to day life and through many struggling conditions in the life span. However, Human beings intention is to attain the point of Vividness. It depends on the individual how that point reached since Human being's mind thoughts are is inconclusive. The quantity of personality's Vividness is quantifiable concerning his perceptions on the road of dissimilar scopes in lifespan. Human beings opinion on happenings in life are not stable it alters rendering to other conditions and it highly complicated. Number of Human beings is defined as N_P and if Vividness be contingent on G factor, principally everybody arbitrarily be appropriate to a G dimensional atmosphere of opinions. In this work the conditions considered are; a. Self-experiences (local search) (S) b. Powerful human beings determination and scholarly crusade towards them (P) and c. Unexpected fluctuations in the individual humbling perceptions about life (Q).

Mathematical Design of Teaching by Master to Adolescent Students for Personality Improvement, Relationship and Vividness

A Master enhances the knowledge of Adolescent students through teaching. Adolescent students improves the personality at the age 10 to almost 20 through the Teaching of the Master. From the age of 10 to 20 naturally Adolescent students will search for the independency and explore for answers for assorted questions faced in day to day realistic life [1- 8]. This age will act as basic character for lifelong of the Adolescent students. At this period, Adolescent students will hate advices and almost never listens to the words of parents and even teachers in the education system. Now around the globe in all religion Masters always put forth their efforts to build the Adolescent students character in good mode. Then a Master molding the Adolescent student's psychological character displayed. In the way of exploring, the characteristics there are three possible behaviors (considered) in the Adolescent students of same age group. i. At first the Adolescent students will create own characteristics by means of watching, interpretation, ethical values, traditional beliefs and thoughts of the same age group. ii. Secondly, Adolescent students may keep another person as role model and imitate completely that person's character in all actions. iii. Next the Adolescent students might take on unconstructive actions such as smoking, consuming drugs and alcohol, premature sexual doings with harassment. Initially model is constructed based on the first behaviour (Adolescent students will

create own characteristics). Naturally, Master will put maximum effort to identify the inner questions of the Adolescent students and solutions delivered to him in the desired way of the Adolescent students.
In mathematical design, each phase of the events will evaluated individually. This phase will be most important shift period in the Adolescent student's life.

$$y_j^i = \text{Lowerbound} + U(0,1)_j \times (\text{Lowerbound} - \text{Upperbound}) \quad (1)$$

Adolescent student's population with characteristics symbolized in the matrix form as follows,

$$\text{Pop. matrix}(Y) = \begin{bmatrix} y_1^1 & \cdots & y_n^1 \\ \vdots & \ddots & \vdots \\ y_1^N & \cdots & y_n^N \end{bmatrix}_{NXn} \quad (2)$$

Each Adolescent students fitness value is computed by utilizing (substituting) the characteristics (decision variables) in the standard fitness function and the computed values are stored in matrix as follows,

$$\text{Existingpopulation'sfitness } (f(Y)) = \begin{bmatrix} f_1[y_1^1,..,y_n^1] \\ f_2[y_1^2,..,y_n^2] \\ . \\ f_N[y_1^N,..,y_n^N] \end{bmatrix}_{NXn} \quad (3)$$

An estimated model between the individuals and their fitness values created based on Chebyshev functional-link network. Least Squares Estimation [9-15] optimizes the proposed model. Chebyshev functional polynomial [16-22] are engendered as,

$$T_k(y) := \begin{cases} 1. \ ; \text{if} k = 1 \\ y. \ ; \text{if} k = 1 \\ 2yT_{k-1}(y) - T_{k-2}(y). ; \text{if} k \geq 2 \end{cases} \quad (4)$$

Then the normalized value of the characteristics are defined as follows

$$\hat{y}_j^i = 2\frac{\left(y_j^i - \text{Lowerbound}\right)}{(\text{Upperbound} - \text{Lowerbound})} - 1; i = 1,2,3,..,N; j = 1,2,3,..,n \quad (5)$$

Through matrix the normalized value of the characteristics defined by,

$$\hat{Y} = \begin{bmatrix} \hat{Y}_1^1 & \cdots & \hat{Y}_n^1 \\ \vdots & \ddots & \vdots \\ \hat{Y}_1^N & \cdots & \hat{Y}_n^N \end{bmatrix}_{NXn} \quad (6)$$

Then for every input element the matrix (regressor (Ψ), sub-regressor (ψ)) are defined as,

$$\text{Regressor } (\Psi) = \begin{bmatrix} T_1(\hat{Y}_1^1) & \cdots & T_k(\hat{Y}_n^1) \\ \vdots & \ddots & \vdots \\ T_1(\hat{Y}_1^N) & \cdots & T_k(\hat{Y}_n^N) \end{bmatrix}_{Nx(n\ x\ k)} = \begin{bmatrix} \psi_1^1 & \cdots & \psi_n^1 \\ \vdots & \ddots & \vdots \\ \psi_1^N & \cdots & \psi_n^N \end{bmatrix} \quad (7)$$

By utilizing Least Squares Estimation weighting factors obtained as follows,

$$\widehat{\omega f} = \left(\Psi^T \Psi\right)^{-1} \Psi^T f$$
$$\text{weightingfactors}\left(\widehat{\omega f}\right) = [\omega f_1^1 \ldots\ldots\ldots \omega f_n^1]_{1x(n\ x\ k)}^T$$
$$= [\omega f^1 \ldots\ldots \omega f^n]^T \quad (8)$$

Then the partial fitness value obtained by,

$$\widehat{pf}_j^i = \Psi_j^i \omega^i \quad (9)$$

$$\widehat{PF} = \begin{bmatrix} \widehat{pf}_1^1 & \cdots & \widehat{pf}_n^1 \\ \vdots & \ddots & \vdots \\ \widehat{pf}_1^N & \cdots & \widehat{pf}_n^N \end{bmatrix}_{N \times n} \quad (10)$$

Most excellent characteristics of existing population is defined by,

$$y_j^* = y_j^{\min^j} \quad (11)$$

$$\min^j = \underset{l}{\arg\min}\left\{\widehat{pf}_j^I | I=1,2,3,..,N\right\}, \forall_j \quad (12)$$

The new characteristics of Adolescent students is found by,

$$y_{new}^i = y^i - \text{rand}_1(y^i - y^*) \quad (13)$$

Secondly, Adolescent students may keep another person as role model and imitate completely that person's character in all actions. The role model will choose from the same age group who possess the most excellent fitness value and with reference to this the new characteristics of Adolescent students of defined as follows,

$$y_{new}^i = y^i - \text{rand}_2\left(y^{\text{pth Adolescent students}} - y^{\text{role model}}\right)$$

(14)

In third case the Adolescent students might take on unconstructive actions such as smoking, consuming drugs and alcohol, premature sexual doings with harassment and with reference to this the new characteristics of Adolescent students of defined as follows,

$$y^{i}_{new} = y^{i} - rand_3(y^{i} - y^{negative}) \quad (15)$$

$$y^{negative} = [y^{u} \quad y^{u} \quad y^{u}]^{T}_{1\times n} \quad (16)$$

With reference to all three cases the new characteristics generation segment of Adolescent students defined as follows,

$$y^{i}_{new} =$$

$$\begin{cases} y^{i} - rand_1(y^{i} - y^{*}) \ , rand_4 \le 1/3 \\ y^{i} - rand_2(y^{pth\ Adolescent\ students} - y^{role\ model}), \\ 1/3 < rand_4 < 2/3 \\ y^{i} - rand_3(y^{i} - y^{negative}), 2/3 < rand_4 \end{cases} \quad (17)$$

a. Start

b. Parameters are defined

c. Preliminary population engendered

d. Each Adolescent students fitness value is computed

e. while stopping criterion is not sastisfied do

f. Matrix (regressor (Ψ), sub-regressor (ψ)) are created

$$\text{Regressor } (\Psi) = \begin{bmatrix} T_1(\hat{Y}_1^1) & \cdots & T_k(\hat{Y}_n^1) \\ \vdots & \ddots & \vdots \\ T_1(\hat{Y}_1^N) & \cdots & T_k(\hat{Y}_n^N) \end{bmatrix}_{Nx(n\ x\ k)}$$

$$= \begin{bmatrix} \psi_1^1 & \cdots & \psi_n^1 \\ \vdots & \ddots & \vdots \\ \psi_1^N & \cdots & \psi_n^N \end{bmatrix}$$

g. By utilizing Least Squares Estimation weighting factors are calculated

$$weightingfactors(\widehat{\omega f}) =$$

$$\widehat{\omega f} = (\Psi^{T}\Psi)^{-1}\Psi^{T}f$$

$$[\omega f_1^1 \dots \dots \dots \omega f_n^1]^{T}_{1x(n\ x\ k)} = [\omega f^{1} \dots \dots \omega f^{n}]^{T}$$

h. Create matrix $\widehat{PF}$

$$\widehat{pf}_j^i = \Psi_j^i \omega^i$$

$$\widehat{PF} = \begin{bmatrix} \widehat{pf}_1^1 & \cdots & \widehat{pf}_n^1 \\ \vdots & \ddots & \vdots \\ \widehat{pf}_1^N & \cdots & \widehat{pf}_n^N \end{bmatrix}_{N\times n}$$

i. Most excellent characteristics of existing population is found

$$y_j^{*} = y_j^{min^j}; \ min^j = \underset{l}{\arg\min}\{\widehat{pf}_j^l | l=1,2,3,..,N\}, \forall_j$$

j. for i = 1 to Ndo

k. Modernize $rand_4 \sim U(0,1)$

l. $y^{i}_{new} =$

$$\begin{cases} y^{i} - rand_1(y^{i} - y^{*}) \ , rand_4 \le 1/3 \\ y^{i} - rand_2(y^{pth\ Adolescent\ students} - y^{role\ model}) \\ , 1/3 < rand_4 < 2/3 \\ y^{i} - rand_3(y^{i} - y^{negative}), 2/3 < rand_4 \end{cases}$$

m. Modernize $rand_3 \sim U(0,1)$

n. Find the role model with most excellent solution

o. Arbitrarily pick one of Adolescent students

$$y^{i}_{new} = y^{i} - rand_2(y^{pth\ Adolescent\ students} - y^{role\ model})$$

p. Or else

q. Modernize $rand_3 \sim U(0,1)$

$$y^{i}_{new} = y^{i} - rand_3(y^{i} - y^{negative})$$

r. End if

s. Apply updating and boundary control mechanism

t. Return the most excellent optimal solution

u. End

Naturally, Master will put maximum effort to identify the inner questions of the Adolescent students and solutions delivered to him in the desired way of the Adolescent students. How a Adolescent students moves in this period of life, physiological mode how a Adolescent students search for solutions are mathematically formulated and contestant solution is called as a tender. Initially, a set of contestant solutions arbitrarily engendered in the exploration space subsequently, every tender appraised, and subsequently its price function computed. Psychological search is one of the key operators in the algorithm and it explores the environs of

every tender by using a Levy flight division (distribution) [22]. Key objective of levy flight distribution is that it engenders numerous petite steps and afterwards an extensive jump will performed. Consequently, it amplifies the exploration (owed to extensive jumps) and exploitation (owing to petite steps) concomitantly. In k-means, clustering separation of the section will do and analogous sections plunge into the similar alliance. Arbitrary clustering approach integrated to amplify the competence of the algorithm. Probabilistic factor is set up through k-means. Therefore, in the projected clustering approach, k-means [22] not implemented in iterations. A new-fangled tender engendered by stirring the previous tender towards the excellent tender in the conqueror cluster It is merit to declare that the excellent tender in the conqueror cluster is not essentially the most excellent bid in the populace of tender.
A new-fangled tender created as follows,

$$N_m S_s = \text{Tender} + S_s \quad (18)$$

$$S_s = \left(2 - \text{iteration} * \left(\frac{2}{\text{maximumiteration}}\right)\right) * \alpha \oplus \text{Levyflight} \quad (19)$$

Then the modification of the step size done as follows,

$$S_s = \left(2 - \text{iteration} * \left(\frac{2}{\text{maximumiteration}}\right)\right) * 0.01 * \frac{U}{V^{\frac{1}{\beta}}} * (y^i - y^*) \quad (20)$$

On the commencement of the algorithm, it is hefty and accordingly it accentuates the exploration. In the subsequent iterations, the downhill factor condensed which pilot to enhanced exploitation of the algorithm. Ultimately, every tender budge on the street to the most excellent tender in the conqueror cluster as follows,

$$t + 1_{\text{tender}_n} = t_{\text{tender}_n} + G * \left(\text{rand} \times t_{\text{conqueror}_n} - t_{\text{tender}_n}\right); \text{rand} \in [0,1] \quad (21)$$

The excellent solution has constructive information, which perks up the competence of the algorithm. Consequently, modernize the progress equation by integrating excellent tender to lead the movements of the tenders, sequentially to augment the exploitation.

$$t + 1_{\text{tender}_n} = t_{\text{tender}_n} + G * \left(\text{rand}_1 \times t_{\text{conqueror}_n} - t_{\text{tender}_n}\right) + G * \left(\text{rand}_2 \times t_{\text{most excellent}_n} - t_{\text{tender}_n}\right) \quad (22)$$

a. Start
b. Initialization of the parameters
c. $Y = \text{initializationofpopulation} N_m \text{tenders}$
d. Compute the price function value of tenders
e. $y^* = \text{fromthepreliminary}$ population find the most excellent tender
f. $\text{Forifrom } 1 \text{to} N_{\text{mpopulation}} \text{do}$
g. $\beta_i = \text{Engenderthearbitrarynumberbetween}$ lower and upperbound
h. End for
i. For iteration from 1 to maximum iteration do
j. Employ psychological search
k. $\text{Forifrom } 1 \text{to} N_{\text{mpopulation}} \text{do}$
l. $Q_i = \text{Engender arbitrary number}$ between maximum and minimum number of psychological search process
m. End for
n. $\text{Forifrom } 1 \text{to} N_{\text{mpopulation}} \text{do}$
o. For j from 1 to Q_i do
p. $S_s = \left(2 - \text{iteration} * \left(\frac{2}{\text{maximumiteration}}\right)\right) * 0.01 * \frac{U}{V^{\frac{1}{\beta}}} * (y^i - y^*)$
q. $N_m S_{s,j} = Y^i + S_s$
r. End for
s. $t =$ compute $N_m S_s$ for lowest price function value
t. if $\text{price}(t) < \text{price}(t^i)$ then
u. $Y^i = t$
v. End if
w. End for
x. Employ arbitrary clustering stratagem
y. if arbitrary $<$ probability clustering ; then
z. Cluster N_m population tenders into k clusters

aa. For cluster compute the average price functional value

bb. Choose the cluster which possess lower price functional value as conqueror cluster

cc. $\text{Conqueror} =$ choose the most excellent tender in the conqueror cluster

dd. End if

ee. Based on the most excellent tender tenders are moved to best stratagem

ff. $\text{Forifrom } 1\text{to}N_{\text{mpopulation}}\text{do}$

gg. $\text{For nfrom } 1\text{to}N_{\text{mvariables}}\text{do}$

hh. $t + 1_{\text{tender}_n} = t_{\text{tender}_n} + G * (\text{rand}_1 \times t_{\text{conqueror}_n} - t_{\text{tender}_n}) + G * (\text{rand}_2 \times t_{\text{most excellent}_n} - t_{\text{tender}_n})$

ii. End for

jj. End for

kk. $\text{Forifrom } 1 \text{ to } N_{\text{mpopulation}} \text{ do}$

ll. $\beta_i = \text{Engender the arbitrary number between lower and upperbound}$

mm. End for

nn. $y^+ = \text{find the most excellent tender in the current tender}$

oo. $\text{if price}(x^+) < \text{price}(x^*) \text{ then}$

pp. $y^* = y^+$

qq. End if

rr. End for

ss. End the process

Then Master explains about the Devotional relationship between Teacher and Student. Residential monasteries are a category of teaching structure in primeval Bharat country with Student existing adjacent or with the Prime Teacher, in the same Residential monasteries. Teacher, Student learn from the preaching is of Prime Teacher. Especially Student will learn spiritual things and life teachings from the Prime Teacher. Other Teachers also in the system who are all in the advanced learning everyday learn from the Prime Teacher preaching's. The structure will be – chief is Prime Teacher around him Teachers will position and then Student will be located. The prime aim of Teacher and Student is to attain the divine knowledge given by Prime Teacher systematically. However, it's not easy for both Teacher and Student to reach the Prime Teacher level of knowledge.

These decades' Residential monasteries are set up and divine knowledge has spread to the society. The transformation of knowledge generation to generation is happening sequentially. In the proposed algorithm, Prime Teacher will be in the centre point then the next layer Teacher will positioned around the Prime Teacher. Sequentially the Teacher will maintain the Student's in an order around them in next layer. The Prime Teacher will act as the excellent solution. In the Exploration region, Prime Teacher will possess the high divine knowledge. Next, the Teachers will position and further Students positioned in an order. However, there is no time limit or any guarantee that all the Teacher and Student will attain the divinity of the Prime Teacher. Sometimes few may exit from the Residential monasteries learning. It all depends on the self-discipline, hard work and eagerness towards the divine knowledge. Analogous to selecting preliminary populace, selecting the preeminent solution in the new population to the role of the Prime Teacher, rendering to all the other Teacher and Student's - location is significant. This choice will regulate the convergence rapidity as well as the accurateness of the procedure. Therefore, the procedure's principal phase is to discover an operative solution to play a protagonist of the preeminent solution to upsurge the convergence and accurateness of the exploration iterations. The relationship between Prime Teacher, Teacher and Student's is alike attraction of the particles in the material and law of the motion has been utilized in the design, since the Prime Teacher positioned in the centre point and around him Teacher and Students are located with an divine attraction which is equivalent to gravitational attraction.

$$\left|\overrightarrow{\text{Foa}}\right| = \text{GC} * O_1 * O_2/D^2 \quad (23)$$

where $O_1 * O_2$ define the Teacher and Student's mass

GC specify the gravitational constant

$\overrightarrow{\text{Foa}} \rightarrow$ Force of attraction

Then the moment (Q) of attraction defined as,

$$\left|\vec{Q}\right| = \left|\overrightarrow{\text{Foa}}\right| * D \quad (24)$$

$$Q = \left|\overrightarrow{\text{Foa}}\right| \cdot D_{ij} = \text{GC}\frac{O_i, O_j}{D_{ij}^2} * D_{ij} \quad (25)$$

$$O_i, O_j = 1/c^{ob.f_{ij}/\delta} \quad (26)$$

$ob.f_{ij} \rightarrow$ objective function

$c = 2.0$

$\delta = |m(obj) - Obj_{Prime\ Teacher}|$

obj → objective functional value

$$D_{ij} = \|Z_i^t - Z_j^t\| = \sqrt{\sum_{k=1}^{dimension}(Z_i^t - Z_j^t)^2} \quad (27)$$

GC → unity in the proposed approach

Global search defined as,

$$\vec{Z}_{t+1} = \vec{Z}_t + e * \alpha * Random_1 * (Z_{Prime\ Teacher}^t - Z_i^t) \quad (28)$$

$\vec{Z}_t$ → present position of Teacher and Shishya'

$\alpha = \frac{Q_i^t}{Q_{max}^t}$

Q_i^t → divine attraction of Parameshti Teacher

Q_{max}^t → value of m(obj)

$Z_{Prime\ Teacher}^t$ →

prsent location of Parameshti Teacher

$\alpha \in [0,1]$

$Random_1 \in [0,1]$

$b = 2.0$

Local search the accurate position is always the anticipated aim to found. When the distance (in terms of attaining the divine knowledge) between Prime Teacher and Teacher, Student's is little then local search procedure will be executed.

$$\vec{Z}_{t+1} = \vec{Z}_t + f * Random_1 * (GD * Z_{Prime\ Teacher}^t - Z_i^t) \quad (29)$$

$f = f_0 - \frac{t}{T}$

where t , T are current and maximum iteration

$f_0 = 2$

GD → Gauss distribution

$$f(z, \mu, \sigma) = \frac{1}{\sigma\sqrt{2\pi}} \exp\left(-\frac{(z-\sigma)^2}{2\sigma^2}\right) \quad (30)$$

$\mu = 0.50$

$\sigma = 0.2$

In order to balance the exploration and exploitation D_{min} parameter applied.

D_{min} →

large value then , algorithm focus on local search

D_{min} →

small value then , algorithm focus on global search

$$D_{min} = \left(\sum_1^{Dimension}(max_i - min_i)^2\right)/R_o \quad (31)$$

a. Start
b. Fix the parameters
c. Engender the preliminary population
d. Compute the fitness value
e. Identify the Excellent fitness
f. while $t < T$
g. Modernize the "f" parameter
h. $f = f_0 - \frac{t}{T}$
i. Calculate the value of Q
j. $Q = |\overrightarrow{Foa}| \cdot D_{ij} = GC\frac{O_i,O_j}{D_{ij}^2} * D_{ij}$
k. $\delta = |m(obj) - Obj_{Prime\ Teacher}|$
l. Compute the distance
m. $D_{ij} = \|Z_i^t - Z_j^t\| = \sqrt{\sum_{k=1}^{dimension}(Z_i^t - Z_j^t)^2}$
n. For $i = 1toN$
o. if $D_{Prime\ Teacher-\ Teacher,Student\ (i)} > D_{min}$, then
p. Compute $Random_1$
q. Compute α
r. $\alpha = \frac{Q_i^t}{Q_{max}^t}$
s. $\vec{Z}_{t+1} = \vec{Z}_t + e * \alpha * Random_1 * (Z_{Prime\ Teacher}^t - Z_i^t)$
t. Otherwise
u. Compute $Random_1$
v. Compute $Random_2$
w. $\vec{Z}_{t+1} = \vec{Z}_t + f * Random_1 * (GD * Z_{Prime\ Teacher}^t - Z_i^t)$
x. Compute the fitness value of Teacher, Shishya
y. Update the $Z_{Prime\ Teacher}$
z. Modernize the Excellent fitness value
aa. $t = t + 1$
bb. Output the best solution
cc. End

Then Master explains about Vividness. The struggles of human beings to attain the Vividness in their life are endless aspect. Since the alteration in vividness is probable, lone by means of an alteration in human beings thoughts. This aspect has scientifically designed as objective function of vividness in their life and the exploration region optimization is the human being opinions in their life. Preliminary populations arbitrarily initialized. At that point, the populaces are alienated into powerful, adherents, and common human beings. Human beings in their life alter their opinion rendering to the influential powerful human beings, their own experiences and other struggling conditions. The foremost objective of the human being in lifespan as the utmost brainy being in the biosphere is accomplishing Vividness and innermost serenity. This notion has been equivocal and complex. Human beings perception of Vividness is depend on multitude aspects. Many are attained supreme bliss by realization of god in various ways; some attained Vividness through materials, some through relationships, some through nature and some said they never attained Vividness. Human beings mind are wavering rendering to conditions. Master mission is to expound and create Human beings to understand the unanimity in them. In this paper, only certain aspects of Human beings imitated to formulate the algorithm. Human beings in their life alter their opinion rendering to the influential powerful human beings, their own experiences and other struggling conditions. Human being thoughts are altered in periods; rendering to Powerful human begins, own experiences from various experiences obtained from day to day life and through many struggling conditions in the life span. But Human beings intention is to attain the point of Vividness. It depends on the individual how that point reached since Human being's mind thoughts are is inconclusive. The quantity of personality's Vividness is quantifiable concerning his perceptions on the road of dissimilar scopes in lifespan. Human beings opinion on happenings in life are not stable it alters rendering to other conditions and it highly complicated. Number of Human beings is defined as N_P and if Vividness be contingent on G factor, principally everybody arbitrarily be appropriate to a G dimensional atmosphere of opinions. In this work the conditions considered are; a. Self-experiences (local search) (S) b. Powerful human beings determination and scholarly crusade towards them (P) and c. Unexpected fluctuations in the individual humbling perceptions about life (Q).

In the segment of Self-experiences (local search) [10-22] every Human being has assertiveness in the direction of each factor in the on-going life. Human beings alter one or more magnitudes of it to accomplish additional Vividness and these thoughts are not through the influence from others.

$$\text{Vividness}(n, S+1, P, Q) = \text{Vividness}(n, S, P, Q) + E(l) \cdot \varphi \quad (32)$$

$E(l)$define the individual Human being step length
φ is random and $E(l)$ gives the quantity of alteration

Human beings may alter their perceptions rendering to the powerful human beings. In the proposed work choosing a Powerful people is rendering to the pastime and current is considered. Then the number of powerful human beings in the population will be around ten percentages.

Powerful human beings have a significant guidance on the opinions of Rishis, sadhus and yogis in the life span. Cliques start altering their opinions speedily and synchronize themselves with Powerful human beings. These Human beings as adherents of a conservatory of opinions see the biosphere from the viewpoint of the Powerful human beings since they are skilled by them. Powerful human beings with a superior position have more devotees. The entire number of adherents is N_A.

$$N_{A\ ofPowerful}(O, P+1, Q) = \frac{\frac{1}{\sum_{j=1}^{N_{Self}} \text{Vividness}(O,S,P,Q)}}{\sum_{n=1}^{N_{powerful}} \frac{1}{\sum_{j=1}^{N_{Self}} \text{Vividness}(O,S,P,Q)}} * N_A, O \leq \text{Powerful human beings} \quad (33)$$

$N_{A\ of\ Powerful}(O, P\ 1, Q)$ define the quantity of adherents of Oth Powerful human beings

Any individual human being considered as Powerful human being when less than $\sum_{j=1}^{N_{Self}} \text{Vividness}(O, S, P, Q)$

The fluctuations in the approaches of the adherents in the life is defined as,

$$\text{Vividness}\ (\text{adherent}(t), j, S, P+1, Q) = H * \text{Vividness}(\text{adherent}(t), j, S, P, Q) + M * \big(\text{Vividness}(\text{Powerful human being}(O), j, S, P, Q)\big) - \text{Vividness}(\text{adherent}(t), j, S, P, Q) \quad (34)$$

where $H = M = 1$

$$\text{Vividness}(\text{adherent}(t), j, S, P+1, Q) = \text{Vividness}(\text{Powerful human being}(O), j, S, P, Q) \quad (35)$$

$H = 1, M \neq 1 \rightarrow$ adherents connection with powerful human being alters

When the common Human beings perceptions alters rendering one or more Powerful human beings then the position of the common Human beings is defined as,

$$\text{Vividness}(n, S+1, P, Q) = \delta * \text{Vividness}(n, S, P, Q) + \gamma * \left(\text{Vividness}(\text{Powerful human being}(O), j, S, P, Q)\right) - \text{Vividness}(n, S, P, Q) \quad (36)$$

$5 < \delta < 1.01$ and $0 < \gamma <$ 0.20 is unique random of Powerful human beings

δ and γ are randomly choosen to evade local optima

If a Human being loses his preceding experiences and the domicile of his former opinions, and in exercise the possibility of attaining the optimum declines. In accumulation to the quantified task, by stirring δ away from the value of 1 then, the probability of Human being moving out of limits is momentously enlarged. Since each facet habitually has admissible limits, while modernizing the location of entities, choosing very trivial or big standards for δ upsurge the probability of moving out of the limits. There are also few reasons for the change of the perception of the Human beings during very tough and bitter conditions while death of close ones, war or huge sized battle, Natural calamities. Those time majority human beings perception on life and Vividness will be different.

1. Start
2. Engender the parameters
3. Allocate Vividness to each human being randomly
4. For $N_{\text{alteration}}$
5. Discover the $N_{\text{Poweful human being}}$
6. Count the quantity of adherents
7. $N_{A\ \text{ofPowerful}}(O, P+1, Q) = \frac{\frac{1}{\sum_{j=1}^{N_{\text{Self}}} \text{Vividness}(O,S,P,Q)}}{\sum_{n=1}^{N_{\text{powerful}}} \frac{1}{\sum_{j=1}^{N_{\text{Self}}} \text{Vividness}(O,S,P,Q)}} * N_A, O \leq$ Powerful human beings
8. $\text{Vividness}(\text{adherent}(t), j, S, P+1, Q) = \text{Vividness}\left(\begin{matrix}\text{Powerful} \\ \text{human being}(O), j, S, P, Q\end{matrix}\right)$
9. Alter the Vividness of adherents
10. $\text{Vividness}(\text{adherent}(t), j, S, P+1, Q) = H * \text{Vividness}(\text{adherent}(t), j, S, P, Q) + M * \left(\begin{matrix}\text{Vividness} \\ (\text{Powerful human being}(O), j, S, P, Q)\end{matrix}\right) - \text{Vividness}(\text{adherent}(t), j, S, P, Q)$
11. Modify the Vividness of N_{popular}
12. $\text{Vividness}(n, S+1, P, Q) = \delta * \text{Vividness}(n, S, P, Q) + \gamma * \left(\begin{matrix}\text{Vividness} \\ (\text{Powerful human being}(O), j, S, P, Q)\end{matrix}\right) - \text{Vividness}(n, S, P, Q)$
13. For N_{entity}
14. Execute the local search
15. $\text{Vividness}(n, S+1, P, Q) = \text{Vividness}(n, S, P, Q) + E(l) \cdot \varphi$
16. For$N_{\text{uni-directional}}$mode
17. If Vividness upsurges then follow the Preceding direction
18. End if
19. End for
20. Alteration of few Human beings who posses least Vividness
21. $t = t + 1$
22. Output the best solution
23. End

Algorithm of Mathematical Design of Teaching by Master to Adolescent students for Personality Improvement, Relationship and Vividness (TMASPRV)

Master enhances the knowledge of Adolescent students through teaching. Through the teachings, Adolescent students learnt about life, relationship and Vividness. These actions imitated and mathematically formulated in the work.

a. Start

b. Parameters are defined

c. Preliminary population engendered

d. Each Adolescent students fitness value is computed

e. while stopping criterion is not sastisfied do

f. Matrix (regressor (Ψ), sub-regressor (ψ)) are created

$$\text{Regressor}(\Psi) = \begin{bmatrix} T_1(\hat{Y}_1^1) & \cdots & T_k(\hat{Y}_n^1) \\ \vdots & \ddots & \vdots \\ T_1(\hat{Y}_1^N) & \cdots & T_k(\hat{Y}_n^N) \end{bmatrix}_{Nx(n\ x\ k)}$$

$$= \begin{bmatrix} \psi_1^1 & \cdots & \psi_n^1 \\ \vdots & \ddots & \vdots \\ \psi_1^N & \cdots & \psi_n^N \end{bmatrix}$$

g. By utilizing Least Squares Estimation weighting factors are calculated

$$\text{weightingfactors}(\widehat{\omega f}) = \widehat{\omega f} = (\Psi^T\Psi)^{-1}\Psi^T f$$

$$[\omega f_1^1 \dots\dots\dots \omega f_n^1]_{1x(n\ x\ k)}^T = [\omega f^1 \dots\dots \omega f^n]^T$$

h. Create matrix $\widehat{PF}$

$$\widehat{pf}_j^i = \Psi_j^i \omega^i$$

$$\widehat{PF} = \begin{bmatrix} \widehat{pf}_1^1 & \cdots & \widehat{pf}_n^1 \\ \vdots & \ddots & \vdots \\ \widehat{pf}_1^N & \cdots & \widehat{pf}_n^N \end{bmatrix}_{N\times n}$$

i. Most excellent characteristics of existing population is found

$$y_j^* = y_j^{\min^j};\ \min^j = \underset{l}{\arg\min}\left\{\widehat{pf}_j^I | I=1,2,3,..,N\right\}, \forall_j$$

j. for i = 1 to Ndo

k. Modernize $rand_4 \sim U(0,1)$

l. $y_{new}^i =$

$$\begin{cases} y^i - rand_1(y^i - y^*)\ , rand_4 \le 1/3 \\ y^i - rand_2\left(y^{\text{pth Adolescent students}} - y^{\text{role model}}\right) \\ \quad , 1/3 < rand_4 < 2/3 \\ y^i - rand_3(y^i - y^{\text{negative}}), 2/3 < rand_4 \end{cases}$$

m. Modernize $rand_3 \sim U(0,1)$

n. Find the role model with most excellent solution

o. Arbitrarily pick one of Adolescent students

p. $y_{new}^i = y^i - rand_2\left(y^{\text{pth Adolescent students}} - y^{\text{role model}}\right)$

q. Or else

r. Modernize $rand_3 \sim U(0,1)$

$y_{new}^i = y^i - rand_3(y^i - y^{\text{negative}})$

tt. $Y = \text{initializationofpopulation} N_m \text{tenders}$

uu. Compute the price function value of tenders

vv. $y^* = \text{fromthepreliminary}$ population find the most excellent tender

ww. Forifrom $1\text{to}N_{\text{mpopulation}}$ do

xx. $\beta_i = \text{Engenderthearbitrarynumberbetween}$ lower and upperbound

yy. End for

zz. For iteration from 1 to maximum iteration do

aaa. Employ psychological search

bbb. Forifrom $1\text{to}N_{\text{mpopulation}}$ do

ccc. $Q_i = \text{Engender arbitrary number}$ between maximum and minimum number of psychological search process

ddd. End for

eee. Forifrom $1\text{to}N_{\text{mpopulation}}$ do

fff. For j from 1 to Q_i do

ggg. $S_s = \left(2 - \text{iteration} * \left(\frac{2}{\text{maximumiteration}}\right)\right) * 0.01 * \frac{U}{V^{\frac{1}{\beta}}} * (y^i - y^*)$

hhh. $N_m S_{s,j} = Y^i + S_s$

iii. End for

jjj. t = compute $N_m S_s$ for lowest price function value

kkk. if $\text{price}(t) < \text{price}(t^i)$ then

lll. $Y^i = t$

mmm. End if

nnn. End for

ooo. Employ arbitrary clustering stratagem

ppp. if arbitrary $<$ probability clustering ; then

qqq. Cluster N_m population tenders into k clusters

rrr. For cluster compute the average price functional value

sss. Choose the cluster which possess lower price functional value as conqueror cluster

ttt. Conqueror $=$ choose the most excellent tender in the conqueror cluster

uuu. End if

vvv. Based on the most excellent tender tenders are moved to best stratagem

www. Forifrom $1toN_{mpopulation}$do

xxx. For nfrom $1toN_{mvariables}$do

yyy. $t+1_{tender_n} = t_{tender_n} + G * (rand_1 \times t_{conqueror_n} - t_{tender_n}) + G * (rand_2 \times t_{most\ excellent_n} - t_{tender_n})$

zzz. End for

aaaa. End for

bbbb. Forifrom $1toN_{mpopulation}$do

cccc. $\beta_i =$ Engenderthe arbitrary number between lower and upperbound

dddd. End for

eeee. $y^+ =$ find the most excellent tender in the current tender

ffff. if $price(x^+) < price(x^*)$ then

gggg. $y^* = y^+$

hhhh. Modernize the "f" parameter

iiii. $f = f_0 - \frac{t}{T}$

jjjj. Calculate the value of Q

kkkk. $Q = \left|\overrightarrow{Foa}\right| \cdot D_{ij} = GC\frac{O_i,O_j}{D_{ij}^2} * D_{ij}$

llll. $\delta = |m(obj) - Obj_{Prime\ Teacher}|$

mmmm. Compute the distance

nnnn. $D_{ij} = \left\|Z_i^t - Z_j^t\right\| = \sqrt{\sum_{k=1}^{dimension}\left(Z_i^t - Z_j^t\right)^2}$

oooo. For $i = 1toN$

pppp. if $D_{Prime\ Teacher-\ Teacher,Student\ (i)} > D_{min}$, then

qqqq. Compute $Random_1$

rrrr. Compute α

ssss. $\alpha = \frac{Q_i^t}{Q_{max}^t}$

tttt. $\vec{Z}_{t+1} = \vec{Z}_t + e * \alpha * Random_1 * (Z_{Prime\ Teacher}^t - Z_i^t)$

uuuu. Otherwise

vvvv. Compute $Random_1$

wwww. Compute $Random_2$

xxxx. $\vec{Z}_{t+1} = \vec{Z}_t + f * Random_1 * (GD * Z_{Prime\ Teacher}^t - Z_i^t)$

yyyy. Compute the fitness value

zzzz. Update the $Z_{Prime\ Teacher}$

aaaaa. Modernize the Excellent fitness value

bbbbb. Allocate Vividness to each human being randomly

ccccc. For $N_{alteration}$

ddddd. Discover the $N_{Poweful\ human\ being}$

eeeee. Count the quantity of adherents

fffff. $N_{A\ ofPowerful}(O, P+1, Q) = \frac{\frac{1}{\sum_{j=1}^{N_{Self}} Vividness(O,S,P,Q)}}{\sum_{n=1}^{N_{powerful}} \frac{1}{\sum_{j=1}^{N_{Self}} Vividness(O,S,P,Q)}} * N_A, O \leq$ Powerful human beings

ggggg. $Vividness(adherent(t), j, S, P+1, Q) = Vividness\left(\begin{matrix}Powerful\\ human\ being(O)\end{matrix}, j, S, P, Q\right)$

hhhhh. Alter the Vividness of adherents

iiiii. $Vividness(adherent(t), j, S, P+1, Q) = H * Vividness(adherent(t), j, S, P, Q) + M *$

$$\left(\begin{matrix}\text{Vividness}\\(\text{Powerful human being}(O), j, S, P, Q)\end{matrix}\right) -$$

$\text{Vividness}(\text{adherent}(t), j, S, P, Q)$

jjjjj. Modify the Vividness of $N_{popular}$

kkkkk. $\text{Vividness}(n, S+1, P, Q) = \delta *$

$\text{Vividness}(n, S, P, Q) + \gamma *$

$$\left(\begin{matrix}\text{Vividness}\\(\text{Powerful human being}(O), j, S, P, Q)\end{matrix}\right) -$$

$\text{Vividness}(n, S, P, Q)$

lllll. For N_{entity}

mmmmm. Execute the local search

nnnnn. $\text{Vividness}(n, S+1, P, Q) =$

$\text{Vividness}(n, S, P, Q) + E(l) \cdot \varphi$

ooooo. For$N_{uni-directional}$mode

ppppp. If Vividness upsurges then follow the Preceding direction

qqqqq. End if

rrrrr. End for

sssss. Alteration of few Human beings who posses least Vividness

ttttt. End if

uuuuu. Apply updating and boundary control mechanism

vvvvv. $t = t + 1$

wwwww. Return the most excellent optimal solution

xxxxx. End

Simulation Results

Validity of Mathematical Design of Teaching by Master to Adolescent students for Personality Improvement, Relationship and Vividness (TMASPRV) is Verified in benchmark functions (Main 7- Unimodal, succeeding 6-Multimodal, final 10- fixed-dimension multimodal) [23]. Table I shows the outcomes on the benchmark test functions. Fig 1 shows the flow chart of TMASPRV algorithm.

Table I. outcome OF TMASPRV in benchmark test functions

Function	TECHSS [23]	ITECHSS [23]	TMASPRV
1	6.38×10^{-12}	6.96×10^{-9}	6.25×10^{-12}
2	3.08×10^{-7}	5.48×10^{-6}	3.01×10^{-7}
3	2.53×10^{-1}	4.35×10^{-10}	2.12×10^{-1}
4	6.71×10^{-7}	1.19×10^{-5}	6.51×10^{-7}
5	4.110208	117.4396	4.110002
6	3.19×10^{-10}	4.50×10^{-10}	3.01×10^{-10}
7	2.23×10^{-5}	0.002002	2.03×10^{-5}
8	−2877.61	−3052.87	−2851.09
9	1.01×10^{-12}	22.85084	1.01×10^{-12}
10	4.79×10^{-7}	0.810233	4.52×10^{-7}
11	5.91×10^{-12}	0.33718	5.3×10^{-12}
12	2.56×10^{-12}	0.051897	2.1×10^{-12}
13	0.000366	0.001099	0.000270
14	0.998004	0.998004	0.997871
15	0.000307	0.000829	0.000223
16	−1.03163	−1.03163	−1.03104
17	0.397887	0.397887	0.397129
18	3	3	3
19	−3.86278	−3.86278	−3.86131
20	−3.23084	−3.21497	−3.23001
21	−10.1532	−8.80506	−10.1128
22	−10.0486	−8.46635	−10.0121
23	−10.5364	−9.28557	−10.5126

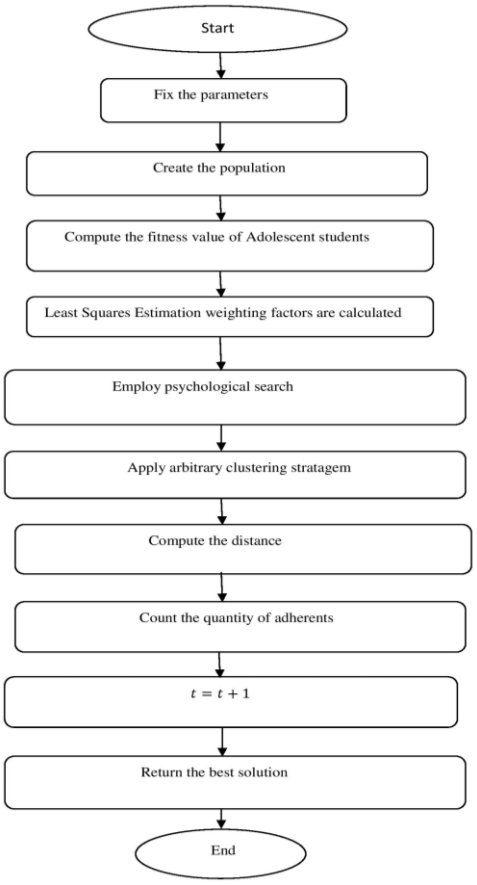

Figure 1. Flow chart of TMASPRV algorithm

Mathematical Design of Teaching by Master to Adolescent students for Personality Improvement, Relationship and Vividness (TMASPRV) performed well in the in benchmark functions. This simulation indicates the better performance of the proposed algorithm.

Application of Mathematical Design of Teaching by Master to Adolescent students for Personality Improvement, Relationship and Vividness (TMASPRV) for solving the engineering domain problem in order to increase the industrial productivity.

Mathematical Design of Teaching by Master to Adolescent students for Personality Improvement, Relationship and Vividness (TMASPRV) applied to solve the Electrical Real power loss reduction problem and TMASPRV algorithm is validated in IEEE 354 bus test system [26] and WDN 220 KV [28], rendering to engineering power loss reduction problem. Table II show the loss dwindling calculation and Figs 2 and 3 gives the evaluation. Mathematical objective of objective of the power problem [23, 24] defined as,

$$\text{Min } \tilde{F}(\bar{m}, \bar{n}) \quad (37)$$

$$m = \begin{bmatrix} VG_1, .., VG_{Ng}; \\ QC_1, .., QC_{Nc}; T_1, .., T_{N_T} \end{bmatrix}$$

$$n = \begin{bmatrix} PG_{slack}; VL_1, .., VL_{N_{Load}}; \\ QG_1, .., QG_{Ng}; SL_1, .., SL_{N_T} \end{bmatrix}$$

$m, n \rightarrow$ control and dependent parameters

$$F_1 = P_{Min} = \text{Min}\left[\sum_m^{NTL} G_m \left[\begin{matrix} V_i^2 + \\ V_j^2 - 2 * V_i V_j \cos\emptyset_{ij} \end{matrix}\right]\right] \quad (38)$$

$$F_2 = \text{Min}\left[\begin{matrix} \sum_{i=1}^{N_{LB}} \left|V_{Lk} - V_{Lk}^{desired}\right|^2 \\ + \sum_{i=1}^{Ng} \left|Q_{GK} - Q_{KG}^{Lim}\right|^2 \end{matrix}\right] \quad (39)$$

$F -$ objective function

$gk -$ conductance branch

Vi and Vj are voltages at buses i, j

$Nbr -$ number of transmission lines

$\theta_{ij} -$ phase angles

$V_{Lk} \rightarrow$ Load voltage in k^{th} load bus

$V_{Lk}^{desired} \rightarrow$ Voltage desired at the k^{th} load bus

$Q_{GK} \rightarrow$ reactive power generated

at k^{th} load bus generators

$Q_{KG}^{Lim} \rightarrow$ reactive power limits

N_{LB}, $Ng \rightarrow$ number load and generating units

$$F_3 = \text{Min } L_{Max}: L_{Max} = \text{Max}\left[1 - [Y_1]^{-1}[Y_2] \times \frac{V_i}{V_j}\right] \quad (40)$$

$$0 = PG_i - PD_i - V_i \sum_{j \in N_B} V_j \left[G_{ij}\cos\left[\emptyset_i - \emptyset_j\right] + B_{ij}\sin\left[\emptyset_i - \emptyset_j\right]\right] \quad (41)$$

$$0 = QG_i - QD_i - V_i \sum_{j \in N_B} V_j \left[G_{ij}\sin\left[\emptyset_i - \emptyset_j\right] + B_{ij}\cos\left[\emptyset_i - \emptyset_j\right]\right] \quad (42)$$

$NB \rightarrow$ number of buses

$PG \rightarrow$ real power of the generator

$QG \rightarrow$ reactive power of the generator

$PD \rightarrow$ real load of the generator

$QD \rightarrow$ reactive load of the generator

$Gij \rightarrow$ mutual conductance of bus i and bus j

$Bij \rightarrow$ susceptance of of bus i and bus j

Equality and inequality constraints defined as,

$$P_g^{min} \le P_g \le P_g^{max} : \quad Q_g^{min} \le Q_g \le Q_g^{max}, i \in N_g$$

$$VL_i^{min} \le VL_i \le VL_i^{max}, i \in NL$$

$$T_i^{min} \le T_i \le T_i^{max}, i \in N_T$$

$$Q_c^{min} \le Q_c \le Q_C^{max}, i \in N_C$$

$$|SL_i| \le S_{L_i}^{max}, i \in N_{TL}$$

$$VG_i^{min} \le VG_i \le VG_i^{max}, i \in N_g$$

$Pg -$ active power of slack bus

$Qg -$ reactive power of generators

$\max, \min \rightarrow$ maximum and minimum value

$VL_i \rightarrow$ bus voltage magnitude

$T_i \rightarrow$ transformers tap ratio

Objective function in multi objective mode defined as,

$$MOF = F_1 + r_i F_2 + uF_3 = F_1 + \left[\sum_{i=1}^{NL} x_v\left[VL_i - VL_i^{min}\right]^2 + \sum_{i=1}^{NG} r_g\left[QG_i - QG_i^{min}\right]^2\right] + r_f F_3 \quad (43)$$

$$VL_i^{minimum} = \begin{cases} VL_i^{max}, VL_i > VL_i^{max} \\ VL_i^{min}, VL_i < VL_i^{min} \end{cases}$$

$$QG_i^{minimum} = \begin{cases} QG_i^{max}, QG_i > QG_i^{max} \\ QG_i^{min}, QG_i < QG_i^{min} \end{cases}$$

$nc \rightarrow$ switchable reactive power sources

$ng \rightarrow$ number of generators

$nt \rightarrow$ number of transformers

Table II. Loss shrinking examination

Procedure	Loss (MW)	PEV(PU)
BOSISAI [24]	337.374	0.4978
BOSISAII [24]	338.715	0.5117
PCISA [25]	339.325	0.5216
BOSCLSO [25]	341.001	0.5354
BOSPSO [25]	341.123	0.6395
TMASPRV	310.106	0.43887

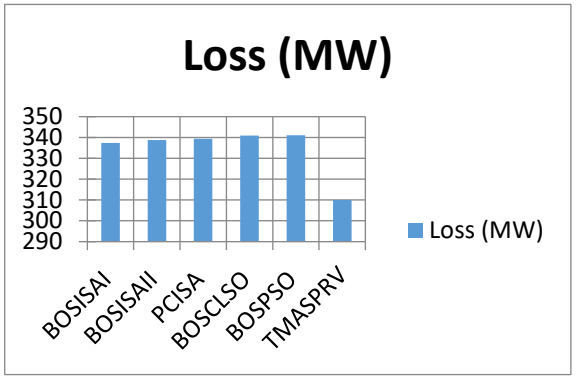

Figure 2. Valuation of loss shrinking

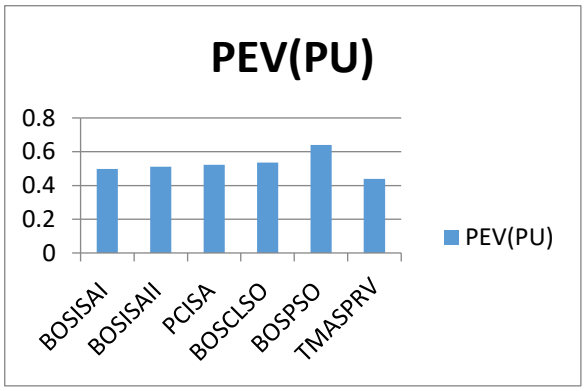

Figure 3. Examination of PEV (Voltage deviation)

Mathematical Design of Teaching by Master to Adolescent students for Personality Improvement, Relationship and Vividness (TMASPRV) algorithm validated in Practical system - WDN 220 KV [28]. Table III shows loss shrinking valuation. Figs 4 and 5 give the analysis of outcomes.

Table III. Loss shrinking assessment

Technique	Loss (MW)	PEV(PU)
BOSPSO[27]	32.314	0.5800
BOSBBA [27]	33.875	0.6327
PCBBA [27]	30.786	0.6751
TMASPRV	21. 573	0.4891

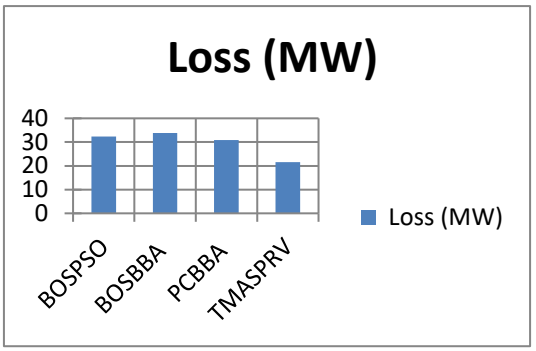

Figure 4. Evaluation of loss shrinking

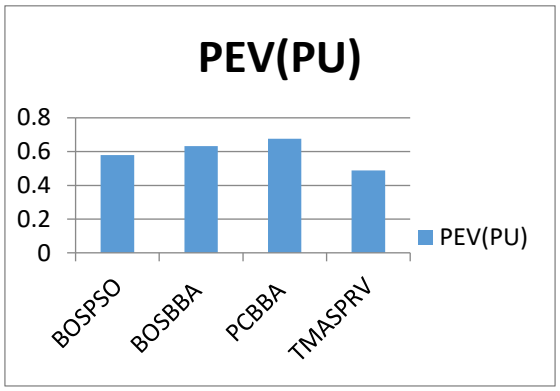

Figure 5. Investigation of PEV (Voltage deviation)

Table IV and Fig 6 show the time taken by Mathematical Design of Teaching by Master to Adolescent students for Personality Improvement, Relationship and Vividness (TMASPRV) algorithm.

Table III. Time taken by TMASPRV

Technique	354 bus T(S)	W-220 KV T(S)
TMASPRV	70.93	14.91

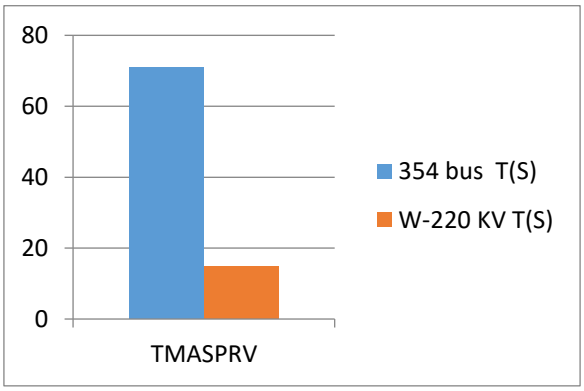

Figure 6. Time taken by TMASPRV

Discussion of Results

Mathematical Design of Teaching by Master to Adolescent students for Personality Improvement, Relationship and Vividness (TMASPRV) algorithm validated in benchmark test functions. In engineering domain Electrical real power problem, projected TMASPRV algorithm performed well in reducing the electrical real power loss.

Through this reduction of electrical real power loss, the quality of the electrical power will improved and this quality electrical power continuously improves the production in the industrial sector.

Each Adolescent student's fitness value computed by utilizing (substituting) the characteristics (decision variables) in the standard fitness function and the computed values are stored in matrix. In the initial phase, exploration, heightened on interpretation of the extended space amongst nutrition springs.

Conclusion

In this paper Mathematical Design of Teaching by Master to Adolescent students for Personality Improvement, Relationship and Vividness (TMASPRV) algorithm applied to the engineering domain problem in order to increase the power productivity. A Master enhances the knowledge of Adolescent students through teaching. Master molding the Adolescent student's psychological character displayed. Adolescent students may intimate another person in the same age group as role model and thirdly, negative character will developed by Adolescent students without any reason. These three cases mathematically formulated to solve the problem. Each Adolescent students fitness value is computed by utilizing (substituting) the characteristics (decision variables) in the standard fitness. Function and the computed values are stored in matrix. An estimated model between the individuals and their fitness values created based on Chebyshev functional-link network. By Least Squares Estimation, the proposed model optimized. The objective of alliance is to discover a capable region in the exploration space. In k-means, clustering separation of the section will do and analogous sections plunge into the similar alliance. Analogous to selecting preliminary populace, selecting the preeminent solution in the new population to the role of the Prime Teacher, rendering to all the other Teacher and Student's - location is significant. This choice will regulate the convergence rapidity as well as the accurateness of the procedure. Therefore, the procedure's principal phase is to discover an operative solution to play a protagonist of the preeminent solution to upsurge the convergence and accurateness of the exploration iterations. Number of Human beings is defined as N_P and if Vividness contingent on G factor, principally everybody arbitrarily appropriate to a G dimensional atmosphere of opinions. In this work the conditions considered are; a. Self-experiences (local search) (S) b. Powerful human beings determination and scholarly crusade towards them (P) and c. Unexpected fluctuations in the individual humbling perceptions about life (Q) and in the segment of Self-experiences (local search) every Human being has assertiveness in the direction of each factor in the on-going life. Mathematical Design of Teaching by Master to Adolescent students for Personality Improvement, Relationship and Vividness (TMASPRV) algorithm validated in benchmark test functions. In engineering domain Electrical real power problem, projected TMASPRV algorithm performed well in reducing the electrical real power loss. Through this reduction of electrical real power loss, the quality of the electrical power will improved and this quality electrical power continuously improves the production in the industrial sector.

References

[1] L.Kanagasabai, "Novel Western Jackdaw Search, Antrostomus Swarm and Indian Ethnic Vedic Teaching – Inspired Optimization Algorithms for Real Power Loss Diminishing and Voltage Consistency Growth," *International Journal of System Assurance Engineering and Management*, 13(6), 2895-2919, 2022. https://doi.org/10.1007/s13198-022-01758-3

[2] S. B. Changalasetty, W. Ghribi, A. S. Badawy, H. Bangali, A. M. Ahmed, L. S. Thota, R. R. Bairsddy, and R. Pemula, "Using EM technique for Adolescent students crime zoning," *2021 5th International Conference on Information Systems and Computer Networks (ISCON), Mathura, India*, 2021, pp. 1-6. https://doi.org/10.1109/ISCON52037.2021.9702353

[3] L. S. Thota, K. Shireesha, A. Sravani, S. Rajender, S. B. Changalasetty, A. S. Badawy, A. M. Ahmed, W. Ghribi, and H. Bangali, "Rule-based Mining of Adolescent students Delinquency," *2020 International Conference on Computer Communication and Informatics (ICCCI), Coimbatore, India*, 2020, pp. 1-4. https://doi.org/10.1109/ICCCI48352.2020.9104126

[4] X. Wang, Y. Liang, S. Zheng, and Z. Wang, "Juvenile detection by LBP and SVM," *2012 IEEE 2nd International Conference on Cloud Computing and Intelligence Systems, Hangzhou, China*, 2012, pp. 1324-1327. https://doi.org/10.1109/CCIS.2012.6664600

[5] S. B. Changalasetty , B. Belgacem, A. S. Badway, W. Ghribi, A. M. Ahmed, H. Bangali, L. S. Thota, M. S. Prasad, and R. Pemula, "Assessing the Relation between Family Background and Juvenile Delinquency using Data Mining," *2019 International Conference on Computer Communication and Informatics (ICCCI), Coimbatore, India, 2019*, pp. 1-4. https://doi.org/10.1109/ICCCI.2019.8822138

[6] R. Akila, J. BrindhaMerin, R. K. Vishal, V. Krishnan S.H, "Prediction of Juvenile Delinquencies in Correlation with Education," *2020 6th International Conference on Advanced Computing and Communication Systems (ICACCS), Coimbatore, India*, 2020, pp. 987-993. https://doi.org/10.1109/ICACCS48705.2020.9074338

[7] J. X. Mo, and L. I. Wan, "Strengthening the education of juvenile delinquency prevention: structure the Education Center for juvenile delinquency prevention," *2020 International Conference on Modern Education and Information Management (ICMEIM), Dalian, China*, 2020, pp. 133-136. https://doi.org/10.1109/ICMEIM51375.2020.00037

[8] N. Tongtep, and L. Boonlamp, "Educator Personality Toward Edutainment for Preparing Youth to a Digital Society," *2021 2nd SEA-STEM International Conference (SEA-STEM), Hat Yai, Thailand*, 2021, pp. 25-29. https://doi.org/10.1109/SEA-STEM53614.2021.9668049

[9] G. Gakis, and M. C. Smith, "A Deterministic Least Squares Approach for Simultaneous Input and State Estimation," *IEEE Transactions on Automatic Control*, 2022. https://doi.org/10.1109/TAC.2022.3209415

[10] J.Ren, Q. Song, X. Wang, and X. Yang, "Chebyshev Functional Link Neural Network integrating FIR Filter Architecture for Power Amplifier Linearization," *2022 IEEE International Conference on Consumer Electronics (ICCE),* Las Vegas, NV, USA, 2022, pp. 1-5. https://doi.org/10.1109/ICCE53296.2022.9730573

[11] C. Zhao, and X. Ding, "A Levy Flight-Based Offloading Path Decision Scheme in VANET," *2022 IEEE 5th International Conference on Electronics Technology (ICET), Chengdu, China*, 2022, pp. 985-993. https://doi.org/10.1109/ICET55676.2022.9824880

[12] K. Maurice, and H. Tan, "Three new species of archerfishes from the freshwaters of Southeast Asia (Teleostei: Toxotidae) and notes on Henri Mouhot's fish collections". *Ichthyological Exploration of Freshwaters*. IEF-952: 1–19. 2018. https://doi.org/10.23788/IEF-952

[13] S. Ziesche, and R. Yampolskiy, "Introducing the concept of ikigai to the ethics of AI and of human enhancements," *2020 IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR), Utrecht, Netherlands*, 2020, pp. 138-145. https://doi.org/10.1109/AIVR50618.2020.00032

[14] T. A. Lashari, E. Amin, S. A. Lashari, M. A. Saare, and S. A. Lashari, "Development Of A Web Portal 'IKIGAI' To Assess The Psychological Well-Being Of University Students," *2020 IEEE 7th International Conference on Engineering Technologies and Applied Sciences (ICETAS), Kuala Lumpur, Malaysia,* 2020, pp. 1-6. https://doi.org/10.1109/ICETAS51660.2020.9484309

[15] M. Chen, X. Xiao, W. Zhang, and X. Gao, "Efficient and Stable Information Directed Exploration for Continuous Reinforcement Learning," *ICASSP 2022 - 2022 IEEE International Conference on Acoustics, Speech and Signal* Processing (ICASSP), Singapore, Singapore, 2022, pp. 4023-4027. https://doi.org/10.1109/ICASSP43922.2022.9746211

[16] B. Shen, "Exploration Methods in Reinforcement Learning," *2022 IEEE International Conference on Advances in Electrical Engineering and Computer Applications (AEECA), Dalian, China*, 2022, pp. 709-713. https://doi.org/10.1109/AEECA55500.2022.9918998

[17] P. Gupta, and V. Srivastava, "Deterministic Sequencing of Exploration and Exploitation for Reinforcement Learning," *2022 IEEE 61st Conference on Decision and Control (CDC), Cancun, Mexico*, 2022, pp. 2313-2318. https://doi.org/10.1109/CDC51059.2022.9992857

[18] Z. Li, W. Chen, and J. Yang, "A Dual Control Perspective for Exploration and Exploitation in Autonomous Search," *2022 European Control Conference (ECC), London, United Kingdom*, 2022, pp. 1876-1881. https://doi.org/10.23919/ECC55457.2022.9837977

[19] Z. Yang, X.Liu, and L. Ying, "Exploration. Exploitation, and Engagement in Multi-Armed Bandits with Abandonment," *2022 58th Annual Allerton Conference on Communication, Control, and Computing (Allerton), Monticello, IL, USA*, 2022, pp. 1-2. https://doi.org/10.1109/Allerton49937.2022.9929390

[20] L. Sabug, F. Ruiz, and L. Fagiano, "Trading-off safety, exploration, and exploitation in learning-based optimization: a Set Membership approach," *2021 60th*

IEEE Conference on Decision and Control (CDC), Austin, TX, USA, 2021, pp. 1462-1467. https://doi.org/10.1109/CDC45484.2021.9683334

[21] R. Lisa, N. Thierry, E. Patrick, D. Pantxika, M. Christophem, and L. Philippe, "A Process to Detect Exploitation and Exploration Student's Behaviors in Higher Vocational Education," *2022 International Conference on Advanced Learning Technologies (ICALT), Bucharest, Romania*, 2022, pp. 51-52. https://doi.org/10.1109/ICALT55010.2022.00023

[22] K. Cai, M. R. Rodavia, "K-Means Cluster Analysis Based on Consumer Behavior," *2022 4th International Conference on Artificial Intelligence and Advanced Manufacturing (AIAM), Hamburg, Germany*, 2022, pp. 143-146. https://doi.org/10.1109/AIAM57466.2022.00034

[23] A. M. Tudose, I. I. Picioroaga, D. O. Sidea, and C. Bulac, "Solving Single and Multi-Objective Optimal Reactive Power Dispatch Problem Using an Improved Salp Swarm Algorithm". *Energies*, 14,1-20, 1222, 2021. https://doi.org/10.3390/en14051222

[24] S. Mouassa, and T. Boukir, "Multi-objective ant lion optimization algorithm to solve large-scale multi-objective optimal reactive power dispatch problem", *COMPEL: The International Journal for Computation and Mathematics* in Electrical and Electronic Engineering, Vol. 35 No. 1, pp. 350-372, 2018. https://doi.org/10.1108/COMPEL-05-2018-0208

[25] K. Nagarajan, A. K. Parvathy, and A. Rajagopalan, "Multi-Objective Optimal Reactive Power Dispatch using Levy Interior Search Algorithm", *International Journal on Electrical Engineering and Informatics*. 12. 547-570. 2020. https://doi.org/10.15676/ijeei.2020.12.3.8

[26] PSTCA, Power Systems Test Case Archive, University of Washington, Available: http://www.ee.washington.edu/research/pstca/

[27] M. T. Mouwafi, A. A. A. El-Ela, and R. A. El-Sehiemy, Waleed K. Al-Zahar, Techno-economic based static and dynamic transmission network expansion planning using improved binary bat algorithm, *Alexandria Engineering Journal*, 61(2), 1383-1401, 2022. https://doi.org/10.1016/j.aej.2021.06.021

[28] A. A. El-Ela, M. Mouwafi, and W. Al-Zahar, "Optimal Transmission System Expansion Planning Via Binary Bat Algorithm", *Proc. 21st Int. Middle East Power Systems Conf. (MEPCON),* Cairo, Egypt, (2019) 238–243. https://doi.org/10.1109/MEPCON47431.2019.9008022

Publisher: Chinese Institute of Automation Engineers (CIAE)

ISSN: 2223-9766 (Online)