PSO Algorithm for the Selection of Best Diaspora Website

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Abstract - The PSO algorithm is the bio-inspired algorithm which can select best values from the multiple values. The optimization function of the PSO algorithm is dynamic due to which it gave good results. This research is based on the selection of best Diaspora website. The 30 features of each Diaspora website is taken for the selection of best Diaspora website in this work. The PSO algorithm is proposed to search features of the website and best website is recommended on the basis of their features. The performance of PSO algorithm is tested in terms of accuracy and execution time.

***Keywords - *** *Optimization, PSO, Diaspora, Content management system*

I. INTRODUCTION

As the World Wide Web (www) has matured, so have individuals' expectations of their Web encounters. Subsequent to getting comfortable with what they find and how to discover it, web visitors have started to expect increasingly and timelier information from the Web sites they visit [1]. Web managers, thusly, have needed to discover better approaches for meeting these expectations. Content Management System (CMS) is not just on Web development. It is tied with picking up control over the creation and distribution of information and functionality. It is integrated with realizing what value you bring to the table, which needs what parts of that value, and how they need you to deliver it. A CMS is software that enables non-information technology (IT) users to change web site content straight forwardly without assistance from IT department or web master[2]. A Content Management System (CMS) is a PC program that permits publishing, editing and modifying content and maintenance from a central interface. Such systems of content management give procedures to manage workflow in a community oriented condition. These procedures can be manual steps or an automated cascade [3]. A Diaspora is a large group of people with a similar heritage or homeland who have since moved out to places all over the world. Diaspora, (a Greek word derived from meaning "scattering, dispersion") is the movement or migration of a group of people, such as those sharing a national and/or ethnic identity, away from an established or ancestral homeland. Digital Diaspora is a new concept that emerged as the Internet extended virtual networking among dispersed people across boundaries causing different Diasporas to go online for social and academic fronts. The website offers platform for Diasporic people to share and experience their life and problems [4]. In a research study, various Diaspora websites and 30 features of each website are considered to calculate overall rating of the website. Each feature of the website is considered as the model which represents website performance due to which selection of best Diaspora website is the multi-model problem. The communication as well as information organizations have been including various sectors in which the various activities are performed on daily basis. A family is the smallest unit within the society. Due to the numerous changes occurring within the society, the family is affected for sure. The changes occurring and modifications being made within the technology are consumed every day due to which this impact is mentioned [5]. There is a need to study this impact on the communication technology which has affected the quality of communications and the users on personal basis. There is a need to study the various modifications being made by the communication technology after being utilized by the families living in Filipino. This is to be studied on the basis of Diaspora website. There is a need to analyze the web database application system optimization within the CMS [6]. The research includes a proper analysis related to hardware configuration, system and database. There is a need to study the functioning of disk I/O, the operating system and the environment of the network. This helps in providing optimization which is very basic. There are numerous problems that arise due to the clustering of the pages of college training teaching management system. This becomes difficult to manage these systems.

II.   LITERATURE REVIEW

Cosmin A. Contu et.al (2016) presented that the content included within these systems goes through various activities such as it is gathered, converted, stored, enhanced, and eliminated as per the needs of the user that is applying that system [7]. **Shailesh Kumar and Shivakumar (2017)** presented that there are numerous challenges being faced by the researchers while developing a robust CMS. Some of these challenges such as variations in content structure, presence of content silos, challenges related to content migration, challenges within modeling taxonomy and metadata hierarchy, modeling business processes, publishing delays and so on are presented in this paper. Further, there solutions are also discussed [8].

Shailesh Kumar and Shivakumar (2017) presented that the human workflow is dealt with the help of enterprise content management. The system which has huge practical value and methods which can help in gathering the data in efficient manner is known as content management system. There are numerous CMSs present within the applications these days which include high level of products and methods. There are numerous issues arising within these systems which can help in studying the scenarios included within CMS [9]. **Rudy McDaniel et.al (2017)** presented in the paper the evaluation of creativity and configuration of this system with the help of various experiments. There are various novel ideas introduced which might help in evaluating and assessing a system such that the design is as per the certain category. The various experiences of the users are also to be considered as an important factor here [10]. **Benny Thomas et.al (2017)** represents the Representational State Transfer (REST) protocol in order to integrate the best features amongst various open source CMSs. With the application of this protocol, the security of the system is ensured and there is no user sessions stored within the system [11]. **DennisPriefer et.al (2016)** proposed in this paper an environment for model-driven development of software extensions namely JooMDD. It can apply within the Joomla application of web content management systems. The standard software extensions which need to minimize the technical information related to Joomla are provided with the help of JooMDD [12]. **Huaan Zhang (2014)** proposed a novel approach which utilizes the Evolutility4.0 method. It helps in optimizing the college engineering training teaching management system depending on the originality of the data. This helps in making the page simple and unified such that it is easy to be managed. It also helps in minimizing the issues arising during its maintenance [13]. **Chengzhi (2015)** proposed the need to introduce the optimization is studied in brief manner. In order to change the performance, the right diagnosis is identified which helps in implementing the reasonable optimization operation. It helps in improving the performance of Web database application system [14]. **George Anescu et.al (2016)** proposed the various principles of a novel global optimization method which can be applied within the Continuous Global Optimization Problem (CGOP). It is known as No Speeds and Coefficients Particle Swarm Optimization (NSC-PSO) which is based on the meta-heuristic optimization method. As per the results achieved it can be seen that the efficiency of the overall system is improved along with the success rates of NSC-PSO versions included within these systems [15]. **Bo Liu et.al (2013)** proposed a novel approach to solve the various issues arising within these applications. Within this approach the PSO is combined with the up-crossing method. As per the simulation results achieved it is seen that the proposed approach performs better and provides higher accuracy level in comparison to the existing approaches being utilized earlier

in these systems [16]. **Tarun Kumar Sharma et.al (2013)** proposed a variant known as Local Global variant Artificial Bee Colony (LGABC). It is mainly proposed in order to control the exploration and exploitation present within Artificial Bee Colony Optimization method. It is seen through the results achieved that the proposed method has better quality solutions in comparison to other approaches [17].

III.   PROBLEM FORMULATION

The optimization problem is the problem to find the best solution among all the available options. The optimization problems are broadly classified into continuous and discrete categories. The discrete type of optimization problem is the combination of various problems. The continuous problem is the multi-model type of problem which can be solved individually. In this research, various Diaspora websites are considered and 30 features of each website are considered to calculate overall rating of the website. Each feature of the website is considered as the model which represents website performance due to which selection of best Diaspora website is the multi-model problem. As discussed, the optimization problem on which we are working is the multi-model problem due to which the objective function is also multi-objective. The multi-objective function is used to maximize or minimize to a given function. The PSO algorithm is applied which is the algorithm to solve the optimization problem. In the PSO algorithm, the objective function is defined dynamically by comparing the value of the current iteration with the previous iteration. The value, at which iteration is maximum is considered as the objective function. Due to dynamic nature of optimization function accuracy is increase for the selection of best website.

IV.   RESEARCH METHODOLOGY

The research work focuses on provide rating to each website. The evolutionary algorithm works in three phases.

1. In the first phase initial population is taken in which rating to each project is provided by calculating the average value.
2. In the second phase the PSO algorithm is applied to calculate the best value for each website
3. In the last phase overall rating of the project is calculated and the project with the highest rating is considered as the best project.

Algorithm
 Input: Rating of each website
 Output: Selection of best website
1. Start
2. Initialize population
3. Optimize
 (a) Evaluate fitness value fk i at xi
(b) If fk i $< p_{best}$ then $p_{best} =$ fk i
(c) If stopping condition is satisfied go to
(d) Update particle velocity v_{i+1} and position vector x_{i+1}

(e) Increment i. If i > p then increment k, i = 1

(f) If fk g $<g_{best}$ then $g_{best}=$ fk g

 (g) Go to 2(a)
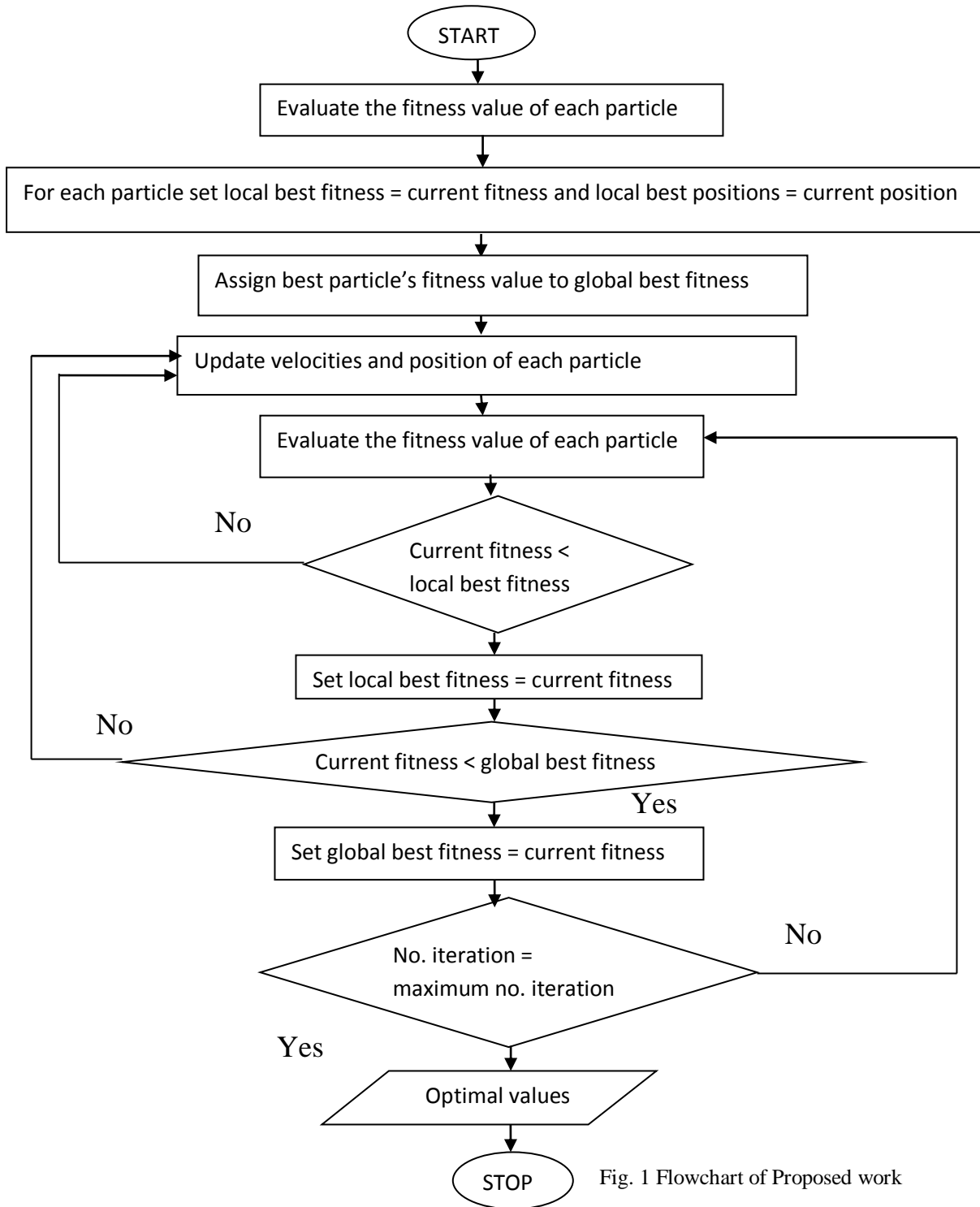
4. Report results

5. End

Flowchart

Fig. 1 Flowchart of Proposed work

V.   EXPERIMENTAL RESULTS

Open Source Content Management Systems are preferable software tools for managing and distributing website content. Content Management Systems tools have implications for design and website implementation.

Table 1: Simulation Parameters

Parameters	Values
Number of websites	3
Number of features	30
Ranking maximum factor	3
Ranking Minimum factor	1
Rating variation	0.5
Probability of optimization function	0.1
Survey taken	surveymonkey

As illustrated in table 1, the various simulation parameters are defined on which PSO algorithm is applied for the selection of best Diaspora website

	FEATURES	www.uohyd.ac.in	www.cdspup.ac.in	www.ngu.ac.in
1				
2	Credibility	2.3	2.45	1.25
3	site map	1.64	2.34	2.02
4	contact detail	2	2.55	1.45
5	security	1.57	2.56	1.86
6	social media integration	2.07	2.2	1.73
7	accessibility	1.91	2.39	1.7
8	FAQ	1.8	2.52	1.68
9	Appearance	1.64	2.34	2.02
10	Design	2.16	2.16	1.68
11	Navigation	1.64	2.7	1.66
12	Functionality	1.98	2.23	1.8
13	Optimize	2.14	2.3	1.57
14	Purpose	1.95	2.48	1.57
15	Graphical user interface	1.86	2.61	1.52
16	Usability	1.98	2.23	1.8
17	Relevant	1.77	2.55	1.68
18	Performance	2.05	2.5	1.45
19	Up-to-date	2.14	2.34	1.52
20	Compatibility	2.11	2.57	1.32
21	User focus	1.68	2.41	1.91
22	Theme design	1.91	2.52	1.57
23	link to library resources	1.75	2.57	1.68
24	Photo gallery	1.59	2.39	2.02
25	Events and programs	1.8	2.57	1.64
26	Independent URL	2.02	2.45	1.52
27	Accreditation information	1.73	2.43	1.84
28	Responsive design	2.05	2.07	1.89
29	Content	1.8	2.43	1.77
30	Consistent	1.95	2.5	1.55
31	Faculty detail	1.93	2.61	1.45

Fig 2: Result of survey

Figure 2 represent the result of survey which provides rating to each feature by calculating the average value of features.
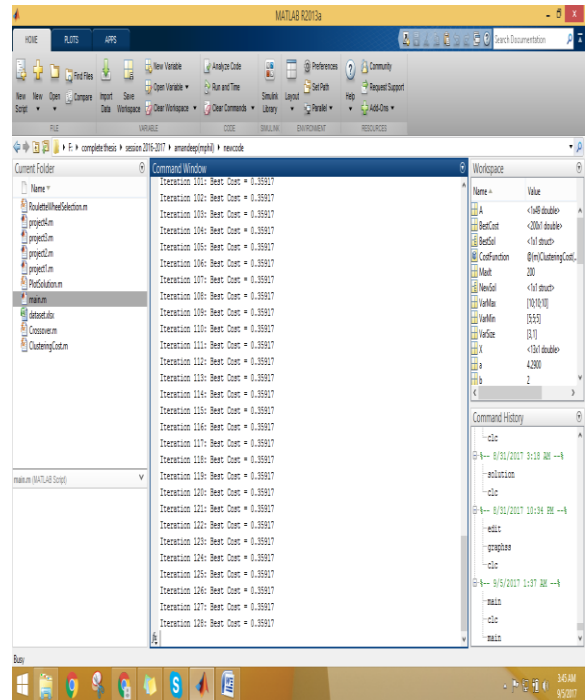
Fig 3: Apply PSO algorithm on website1

Figure 3 represent the iteration phase of first website and evaluate the optimal value for first website.
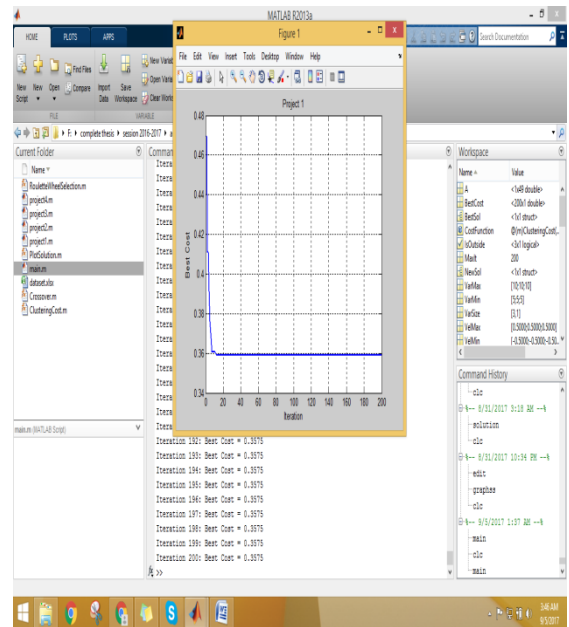
Fig 4: Graphical representation

Figure 4, shows the graphical representation of computed values for first website.
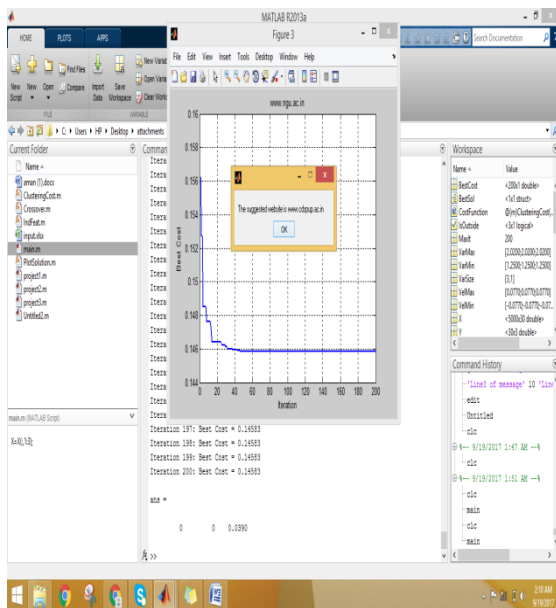
Fig 6.5: Suggested website

As shown in figure 5, the three websites are compared and best website is selected on the basis of their feature values. The website which has maximum value is considered as best website.

VI. CONCLUSION

The optimization problem is the type of problem in which single value is considered which will be selected from the multiple values. In the genetic algorithm, the optimization function is static which reduce efficiency of solving optimization problem. In the PSO algorithm, the optimization function is dynamic means it compares values of previous iteration with current iteration to generate optimal value. The PSO algorithm is applied in this research work for the selection of best Diaspora website. The rating which is given to each attribute of the website is considered as initial population. The value of each website according to their attribute rating is considered as the value of optimization function. The simulation is performed to test the proposed model by considering 3 Diaspora websites and 30 features of each website whose rating is taken from the surveymonkey.

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