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Modified Invasive Weed Optimization Algorithm for Media Independent Handover for Maximizing Seamless Vertical Handover

Soumya.B.peddi[1], Dr. Siddarama R Patil[2], Dr. Jayashree Agarkhed[3]

[1]*Assistant Professor, Department of CSE, P.D.A College of Engineering Gulbarga, India*
[2]*Professor & Dean Academics, Department of ECE, P.D.A College of Engineering, Gulbarga, India*
[3]*Professor Department of CSE, P.D.A College of Engineering, Gulbarga, India*

ABSTRACT:

Modified invasive weed optimization algorithm for media independent handover of maximizing seamless vertical handovers. In the global scenario, a variety of wireless access networks are available. Different types of applications such as real time, non real time, and high bandwidth availability are used for heterogeneous wireless networks. Therefore, it is necessary for a service provider to make an appropriate connection support. We consider the numerous credit for progress the consumer quality dimensions, pro instance, statistics broadcast, handoff immobility, received signal strength (RSS), consumer portability, power exploitation, network cost, consumer inclination, as well as QoS dimensions (handoff deferral, throughput, plus parcel misfortune proportion). At to tip we plan multi-useful Intuitionist feathery TOPSIS (MIF-TOPSIS) base dynamic computation to figure the consumer accurate organization region. At last, the planned O-VHO computation apply to assorted HWNs, pro instance, WLANs, MANETs plus VANETs. The recreation outcome shows the planned O-VHO choice computations perform influential than existing VHO calculation as far as QoS dimensions. We choose finest organization utilize planned multi-criteria decision making (MDM) computation, which procedure the consumer found precise organization zone. The choice cycle predictable to depend on computation to play out an accurate choice, as well as to alter to finest up-and-comer network within a tremendously brief timeframe. At last, the planned ETOVH computation is accessed via HWNs through set of hub as of WLAs, MANETs plus VANETs.

KEYWORDS: *Received Signal Strength (RSS), Invasive Weed Optimization (IWO), Vertical Handoff, Mobile Node (MN), Quality of Service (QoS), Heterogeneous wireless Network (HWN).*

1 INTRODUCTION

Mobile communication is one of the fastest growing sectors in the global scenario. The number of users has increased rapidly over the last few decades. Operators are consistently making an effort to fulfill user requirements. Heterogeneous wireless network is an integration of two different access networks, namely cellular and WLAN. In wireless heterogeneous networks, a MN(Mobile Nodes) should be able to move from one radio access network to another by performing a Vertical Handoff. During handoff, it is very important to carefully adjust the bandwidth allocation and reallocation which provide better Quality of Service (QoS) for the existing users. Integration of WLAN and cellular networks has additional advantages in terms of mobility, coverage area and bandwidth. WLAN technology provides high bandwidth at low cost and also supports low speed mobility. These features of WLAN make it a suitable technology for deployment at hot spots in heterogeneous networks. UMTS (cellular Network) is the Universal Mobile Telecommunications System, which provides wide coverage and high speed mobility for the users and is used at all locations other than the hot spots . The limitations of Handoff shall not affect the continuity of the session during migration. That is when we move into a new cell in a cellular network (horizontal handoff) or between two subnets in a wireless local area network (WLAN) continuity must be maintained. In addition to horizontal handoff, a roaming within homogeneous sub networks (consisting of Wireless LANs only or cellular networks only), supporting continuous services i.e.

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continual Vertical Handoffs among heterogeneous wireless networks is essential for achieving QoS and incessant call connectivity .

The evolutionary algorithm meant for invasive weed optimization, widely known as the IWO has been used in this paper, to perform the decision making during handoff. IWO VHD algorithm includes consideration of the battery lifetime of load balancing across the attachment points

2 RELATED WORK

1 J. McNair and F. Zhu[1]

Vertical Handoffs in Fourth-generation Multi network Environments

A heterogeneous network consists of multiple access networks interworking together. Vertical handover is the technique that allows for seamless connectivity among these networks. This vertical handover when used specifically during the off periods of the VoIP (Voice over Internet Protocol) connection, then the QoS can be improved. This paper provides such a method in which we derive a simplified two-state Markov model from the six-state Brady model in which both the talk-spurt period and mutual silence period characteristics are obtained. Then the handover execution time and packet loss time are taken as parameters to analyze the performance. The result is that decrease in VoIP packet loss time. However vertical handover procedure increases within the allowable limit.

2 W. Chen and Y. Shu[2]

,**Active Application Oriented Vertical Handoff in Next Generation Wireless Networks**

The coexistence of heterogeneous wireless networks providing service anywhere at any time is an inevitable trend in the development of next-generation wireless data networks. Vertical handoff is the switching of the mobile terminal (MT) among different types of wireless networks. How and when to carry out vertical handoff directly affects the performance and quality of network services. In this paper, we propose a novel vertical handoff scheme in which the MT can request and initiate the handoff actively, contrary to other schemes where the MTs participate passively during the handoff process. Our active application oriented scheme provides an efficient interface management for multi-interface MTs to reduce the power consumption caused by unnecessary interface activation. By treating the application running in the MT as the main vertical handoff decision factor, the proposed scheme is able to switch the MT at the right time to the most suitable network to minimize the waste of network resources. Finally, simulation results are presented to show the improved performance over passive schemes.

3. W. Zhang, [3]

Handover Decision Using Fuzzy MADM in Heterogeneous Networks

Dynamic network selection algorithm selects the appropriate network for single or group of calls from multi mode terminal in heterogeneous networks. Network selection support for a single call is the existing solution available, in this paper a Dynamic. In this paper a Dynamic network algorithm is used to addresses the Fuzzy Analytical Hierarchy Process (FAHP). FAHP algorithm is to assign the weight on all other networks and ranked (prioritised) by TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) with reduce the number of handoff for long distance communication. The performance measure of proposed algorithm improves the vertical handoff decision process and the simulated results shows effectiveness of the algorithm compared with existing system by Ns2.

4 E. Stevens-Navarro and V. Wong[5]

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Comparison between Vertical Handoff Decision Algorithms for Heterogeneous Wireless Networks

One of the major design issues in heterogeneous wireless networks is the support of vertical handoff. Vertical handoff occurs when a mobile terminal switches from one network to another (e.g., from WLAN to CDMA 1timesRTT). The objective of this paper is to determine the conditions under which vertical handoff should be performed. The problem is formulated as a Markov decision process. A link reward function and a signaling cost function are introduced to capture the tradeoff between the network resources utilized by the connection and the signaling and processing load incurred on the network. A stationary deterministic policy is obtained when the connection termination time is geometrically distributed. Numerical results show good performance of our proposed scheme over two other vertical handoff decision algorithms, namely: SAW (simple additive weighting) and GRA (grey relational analysis).

3 SYSTEM MODEL (ARCHITECTURE)

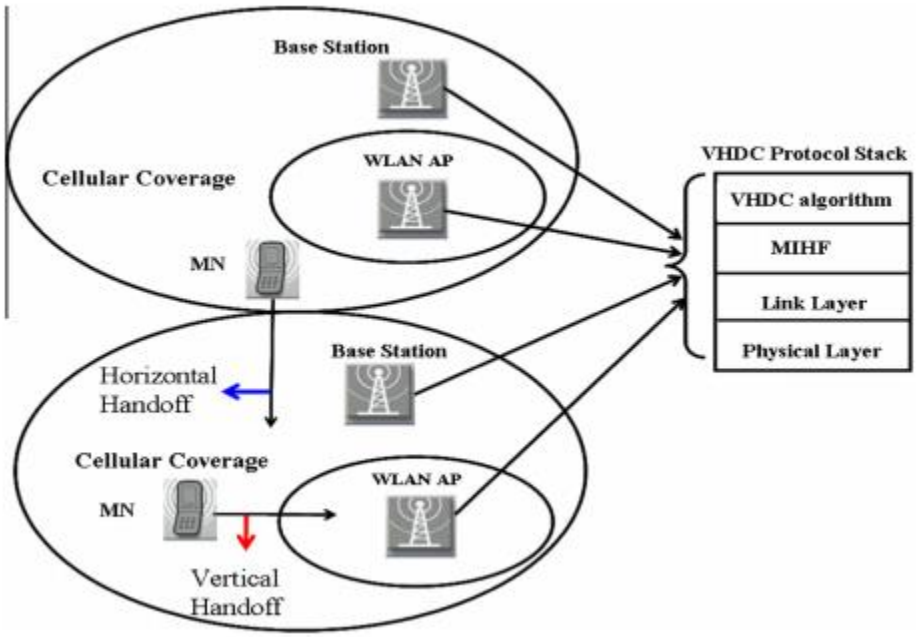

FIGure 1:SYSTEM ARCHITECTURE

Figure 1 depicts a simple two tier system architecture which consists of 3/4G networks along with the Wireless LAN networks. The wireless LANs placed inside the coverage area of the 3/4G network and hence it moves to a different environment, so a seamless Vertical Handoff is required. Handoff is the process in which the user can move from one to another network. There are two types of handoff Horizontal Handoff and Vertical Handoff. In Horizontal Handoff (HHO), Mobile Node (MN) can move from WLAN to WLAN or cellular to cellular system. In Vertical Handoff (VHO) a Mobile Node (MN) can move from WLAN to cellular or cellular to WLAN system . Both APs and BSs include the mobile nodes that have come into the vicinity of a new attachment point by virtue of motion.

3.1 IMPLEMENTATION

The IWO algorithm is a kind of stochastic optimization algorithm to simulate the behavior of weed intrusion expansion. The population is a collection of all the weeds. In the process of evolution, weeds proceed seeds according to their own fitness. Seeds grow to weeds according to the normal distribution

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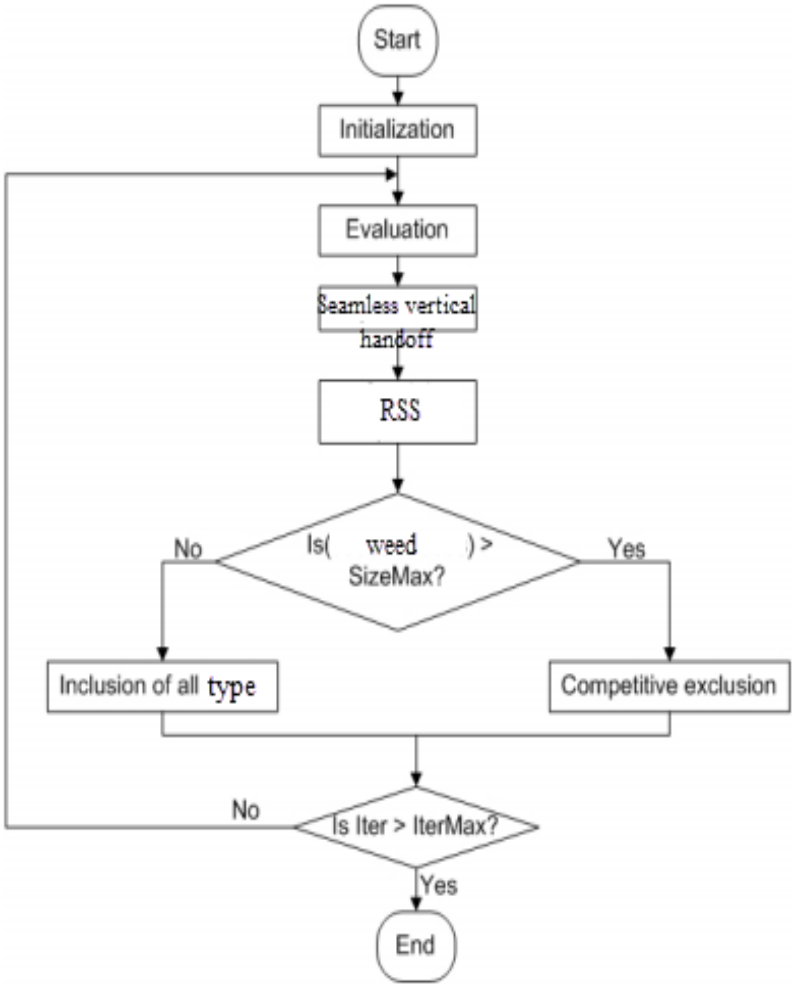
step around weeds, then weeds and seeds are as the research object together. If researching the maximum population number, the competition survival is conducted according to the fitness values. The procedure of IWO algorithm includes four stages: population initialization, seed propagation, spatial diffusion and competitive exclusion.



FLOW DIAGRAM

4 ALGORITHM

Invasive weed optimization algorithm

This subdivision explains the conventional procedure of the Invasive Weed Optimization (IWO) algorithm which is given in Fig. 2 [6]. The IWO method is enthused by observing the mushrooming of botanical sea plants namely, weeds. The pioneer attempt and realization applying IWO, to solve design problems in Control Systems were done by Mehrabian and Lucas [13]. The inhabiting behavior of intrusive sea plants namely weeds, provided the basis for the IWO method. The nature of the sea plants, rather weeds extensively occupies the growth area, prompted coining of the word intrusive weed plants. The algorithm is derivative free at the same time highly convergent. It also zeroes in, to the solution of optimizing, thus removing any occurrences of optimal solutions of secondary ones [6].

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IWO is an algorithm which is integer coded and it is done by simple coding. Applications for IWO [12–15] are wide and varied; to name a few, Design for Antenna System, DNA Computing, and Piezoelectric actuators were placed in an optimal pattern found on smart structures [6].

The major jargons used in IWO are [6] as follows:

I. Seeds – Values are assigned to all units in the optimization problem with limiting conditions attached to them.
II. Plants – the ones grown as plants, which are germinated from seeds, earlier to evaluation.
III. Fitness value – Indicator of how best the plant is groomed. In simple language, how well optimized the solution is.
IV. Field – Most probable area where the solution or search is lying

Algorithm 1: IWO algorithm

Input: Number of nodes, termination condition

Output: Cluster formation

```
initialize position of sensor node, number of clusters
compute initial fitness using eqn (3)
define lower and upper bound solution
for each node
    update position using eqn. (1)
    compute new fitness
     if new fitness > initial fitness
       solution = new fitness (node move to another cluster)
     else
       solution = initial fitness (node in same cluster)
     end if
   check maximum iteration reached
end for
Return: load balancing in network
```

5 SIMULATION RESULTS

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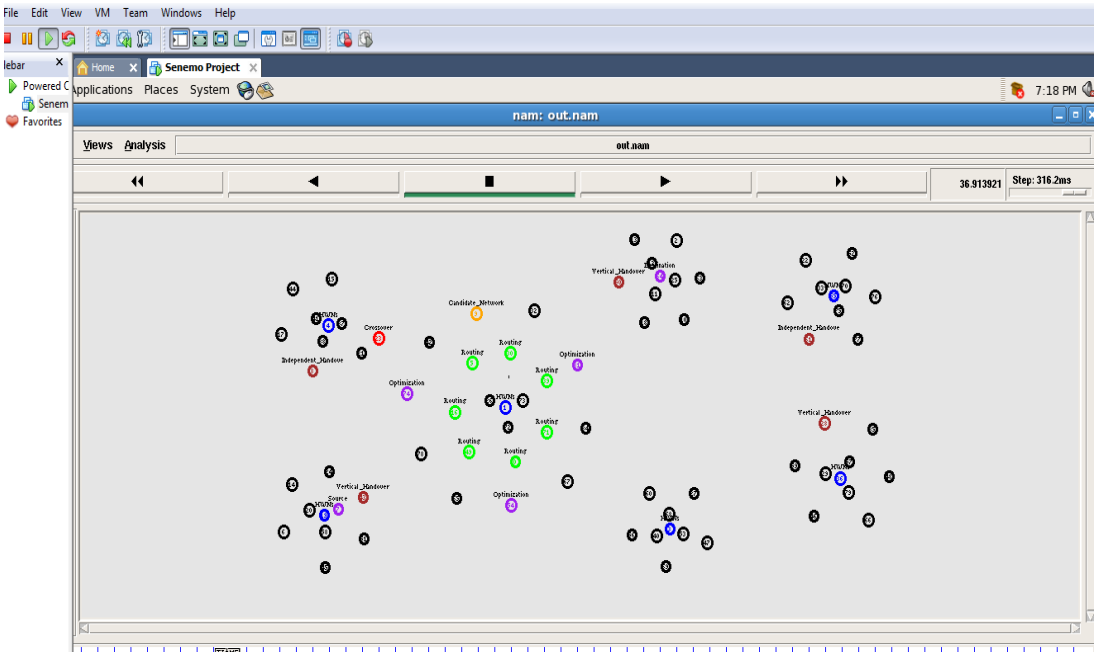

FIGURE1 :Screen appearing shows the output simulation whereas we see the HWN,vertical handover,optimized on independent handover.

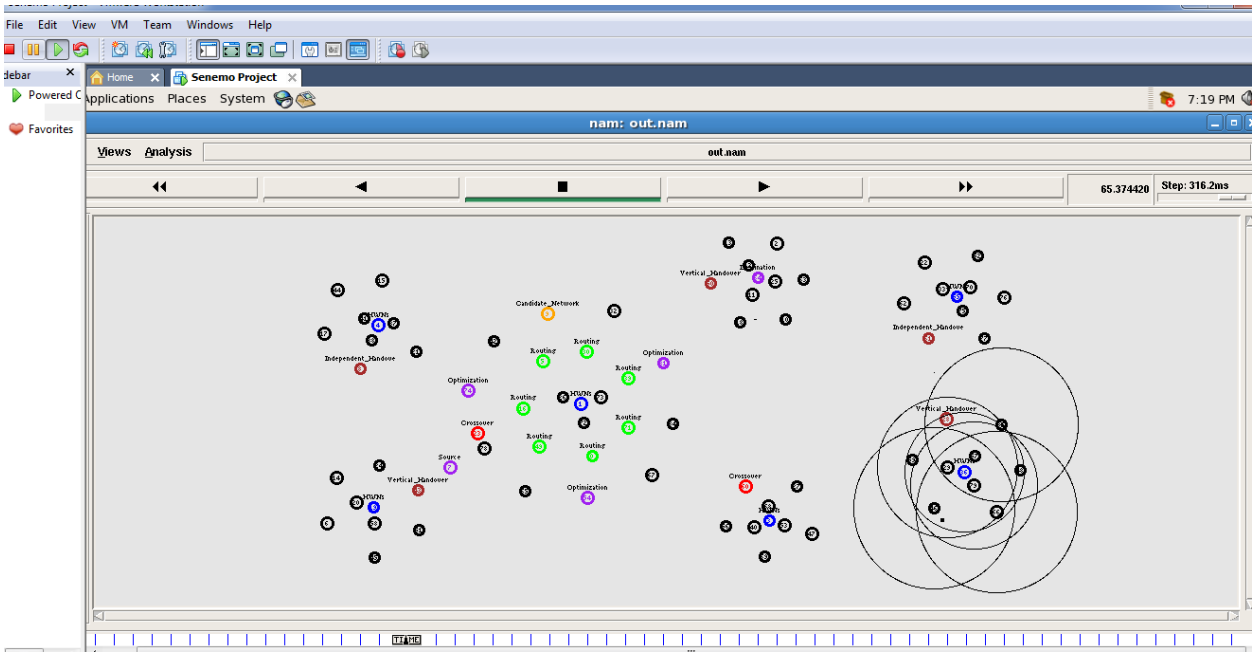

FIGURE2: Transmitting the data through crossover to optimized via vertical handover

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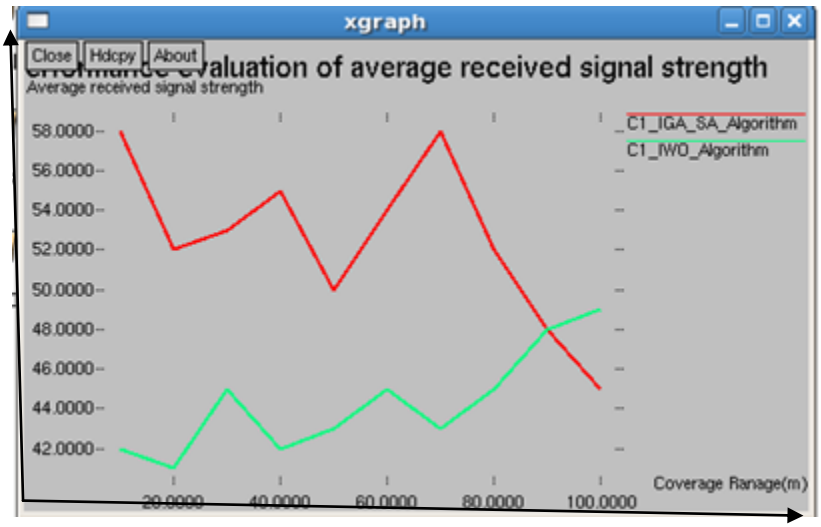

Coverage range(m)

FIGURE3:Screen appearing shows RSS(received signal strength) average of invasive weed optimization is high compare to IGA-SA Algorithm

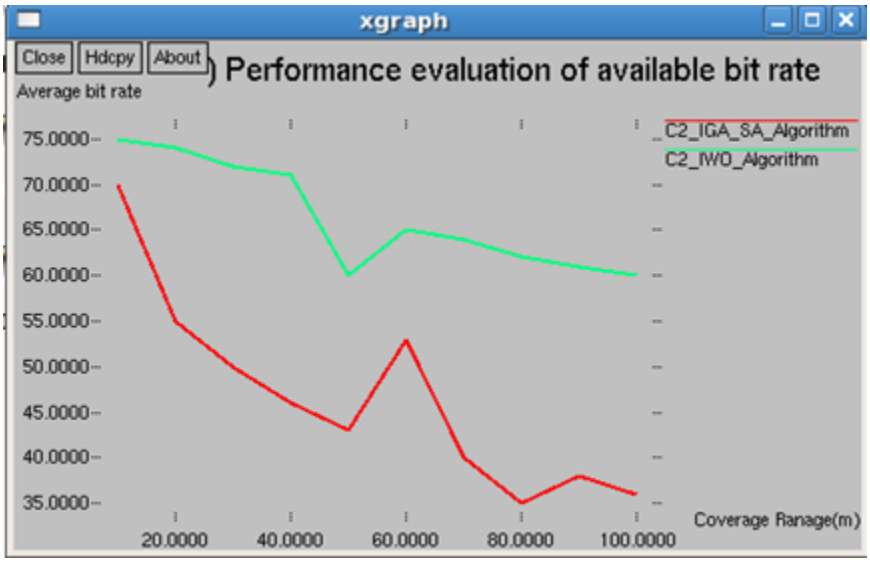

FIGURE4:Screen appearing shows performance evaluation of bit rate of invasive weed optimization is high compare to IGA-SA Algorithm

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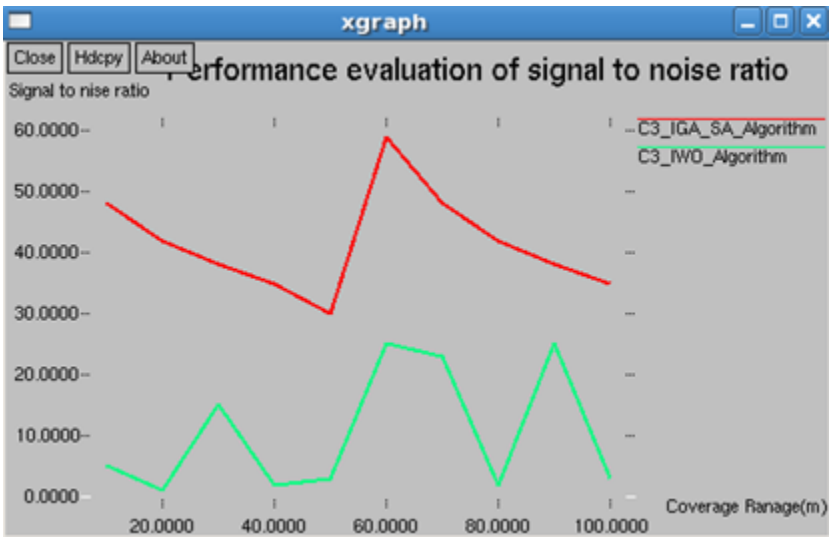

FIGURE5:Screen appearing shows performance evaluation of noise ratio is low for invasive weed optimization compare to IGA-SA Algorithm

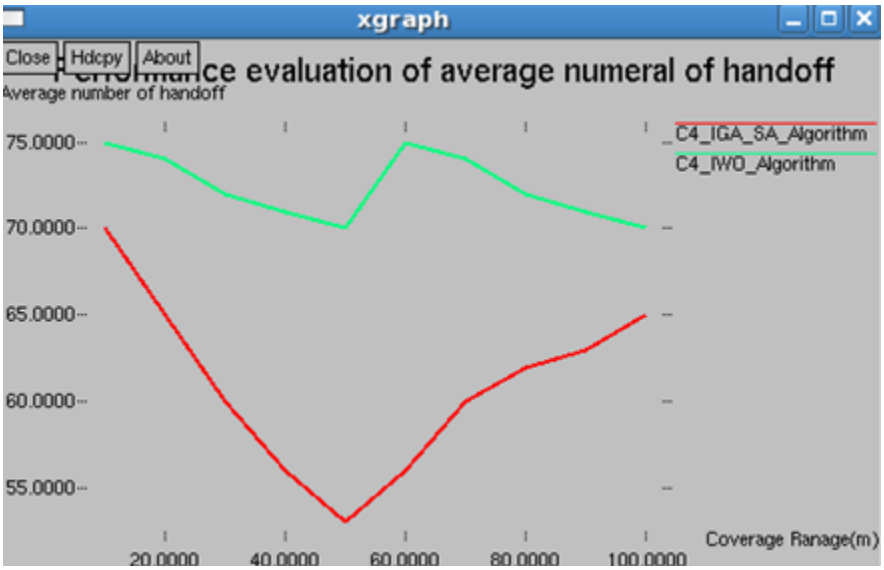

FIGURE6:Screen appearing shows performance evaluation of average numeral handoff of invasive weed optimization low as well as to compare to IGA-SA Algorithm.

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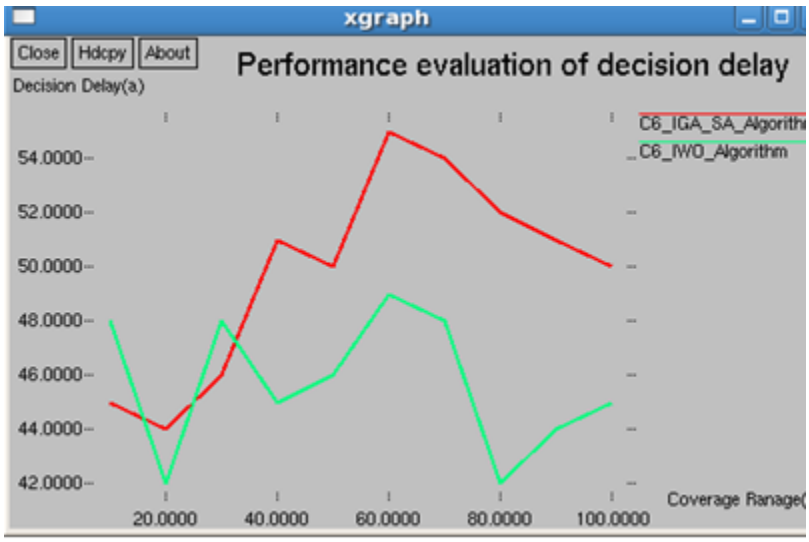

FIGURE7:Screen appearing shows performance evaluation of decision delay of invasive weed optimization less compare to IGA-SA Algorithm

6 CONCLUSION

This document shows the successful implementation of a genetic or evolutionary algorithm of Invasive Weed Optimization (IWO) in Vertical Handoff (VHO) application. The IWO algorithm is implemented in VHO decision making problem where the balancing of Network load is the chief constraint. The algorithm is developed to overcome the constraints of imbalance in network load and more battery consumption rate. As there are a number of parameters that can be considered as dependent variables for making the handoff decision, the algorithm can be enhanced by using a collection of other parameters or variables. The performance of the network must be measured with all the variables and the handoff be made, if the collective performance is beyond the defined threshold.

REFERENCES

[1] J. McNair and F. Zhu, "Vertical Handoffs in Fourth-generation Multi network Environments," IEEE Wireless Communications, vol. 11, no. 3, pp. 8–15, June 2004.

[2] W. Chen and Y. Shu, "Active Application Oriented Vertical Handoff in Next Generation Wireless Networks," in Proc. of IEEE WCNC'05, NewOrleans, LA, March 2005.

[3] W. Zhang, "Handover Decision Using Fuzzy MADM in Heterogeneous Networks," in Proc. of IEEE WCNC'04, Atlanta, GA, March 2004.

[4] Q. Song and A. Jamalipour, "A Network Selection Mechanism for Next Gen. Networks," in Proc. of IEEE ICC'05, Seoul, Korea, May 2005.

[5] E. Stevens-Navarro and V. Wong, "Comparison between Vertical Handoff Decision Algorithms for Heterogeneous Wireless Networks," in Proc. of IEEE VTC'06-Spring, Melbourne, Australia, May 2006.

[6] A. Sur and D. Sicker, "Multi Layer Rules Based Framework for Vertical Handoff," in Proc. of BROADNETS'05, Boston, MA, October 2005.

[7] O. Ormond, J. Murphy, and G. Muntean, "Utility-based Intelligent Network Selection in Beyond 3G Systems," in Proc. of IEEE ICC'06, Istanbul, Turkey, June 2006.

ISSN: 2233-7857 IJFGCN

[8] A. Hassawa, N. Nasser, and H. Hassanein, "Tramcar: A Context-Aware Cross-Layer Architecture for Next Generation Heterogeneous Wireless Networks," in Proc. of IEEE ICC'06, Istanbul, Turkey, June 2006.

[9] IETF, "IP Performance Metrics (IPPM) Working Group," http://www.ietf.org/html.charters/ippm-charter.html.

[10] Lee Su Kyoung, Sriram Kotikalapudi, Kim Kyungsoo, Kim Yoon Hyuk, Golmie Nada. Vertical handoff decision algorithms for providing optimized performance in heterogeneous wireless networks. IEEE Trans Veh Technol 2009.

[11] McNair J, Zhu F. Vertical handoffs in fourth-generation multinetwork environments. IEEE Wireless Commun 2004;11(3):8–15.

[12] Guo C, Guo Z, Zhang Q, Zhu W. A seamless and proactive endto-end mobility solution for roaming across heterogeneous wireless networks. IEEE J Sel Areas Commun 2004;22(5):834–48.

[13] Chakravorty R, Vidales P, Subramanian K, Pratt I, Crowcroft J. Performance issues with vertical handoversexperiences from GPRS cellular and WLAN hot-spots integration. In: Proc. IEEE PerCom. Orlando, FL; 2004. p. 155–64.

[14] Velmurugan T, SaranyaNath P. An optimized algorithm for vertical handoff in heterogeneous wireless networks. In: Published in the conference on Information and Communication Technologies (ICT2013) (IEEE-Conference). p 1206–10.

[15] Saravanan B, Vasudevan ER, Kothari DP. Unit commitment problem solution using invasive weed optimization algorithm. Electr Power Energy Syst 2013 [Elsevier].

ISSN: 2233-7857 IJFGCN