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Collaborative cloud IDS in detecting denial of service by dendritic cell mechanism (Article)

Ahmad, A.^a , Kama, M.N.^b , Azmi, A.^b , Idris, N.B.^c 

^aFaculty of Science and Technology, Universiti Sains Islam Malaysia, Malaysia

^bAdvanced Informatics School, Universiti Teknologi Malaysia, Malaysia

^cKulliyyah of Information and Communication Technology, International Islamic University Malaysia, Malaysia

Abstract

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The term Cloud computing is not new anymore in computing technology. This form of computing technology previously considered only as marketing term, but today Cloud computing not only provides innovative improvements in resource utilisation but it also creates a new opportunity in data protection mechanisms where the advancement of intrusion detection technologies are blooming rapidly. From the perspective of security, Cloud computing also introduces concerns about data protection and intrusion detection mechanism. This paper aims to provide Denial of Service (DoS) detection for Cloud computing environment. As a result, we provide an experiment to examine the capability of the proposed system. The result shows that the proposed system was able to detect all types of attacks that conducted during the experiment. We conclude the paper with a discussion on the results, then we include together with a graphical summary of the experiment's result. © 2019 Int. J. Elec. & Elecn. Eng. & Telcomm.

Author keywords

[Artificial immune system](#) [Cloud computing](#) [Dendritic cell](#) [Denial of service](#) [Information security](#)
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References (30)

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1 Jiang, Q., Ma, J., Wei, F.

On the Security of a Privacy-Aware Authentication Scheme for Distributed Mobile Cloud Computing Services

(2018) *IEEE Systems Journal*, 12 (2), pp. 2039-2042. Cited 27 times.
http://www.ieee.org/products/onlinepubs/news/0806_01.html
doi: 10.1109/JST.2016.2574719

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(2010) *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*

The dendritic cell algorithm for intrusion detection

Gu, F. , Greensmith, J. , Aicklein, U.

(2011) *Biologically Inspired Networking and Sensing: Algorithms and Architectures*

Cloud co-residency denial of service threat detection inspired by artificial immune system

Ahmad, A. , Shaifiuddin, W. , Kama, M.N.

(2018) *ACM International Conference Proceeding Series*

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- 2 Varatharajan, R., Manogaran, G., Priyan, M.K.
A big data classification approach using LDA with an enhanced SVM method for ECG signals in cloud computing

(2018) *Multimedia Tools and Applications*, 77 (8), pp. 10195-10215. Cited 28 times.
doi: 10.1007/s11042-017-5318-1

[View at Publisher](#)

- 3 Kaleeswari, C., Maheswari, P., Kuppusamy, K., Jeyabalu, M.
A brief review on cloud security scenarios
(2018) *Int. Journal of Scientific Research in Science and Technology*, 4 (5), pp. 46-50.
Mar

- 4 Dave, D., Meruliya, N., Gajjar, T.D., Ghoda, G.T., Parekh, D.H., Sridaran, R.
Cloud security issues and challenges

(2018) *Advances in Intelligent Systems and Computing*, 654, pp. 499-514.
<http://www.springer.com/series/11156>
ISBN: 978-981106619-1
doi: 10.1007/978-981-10-6620-7_48

[View at Publisher](#)

- 5 Li, J., Zhang, Y., Chen, X., Xiang, Y.
Secure attribute-based data sharing for resource-limited users in cloud computing

(2018) *Computers and Security*, 72, pp. 1-12. Cited 162 times.
doi: 10.1016/j.cose.2017.08.007

[View at Publisher](#)

- 6 Agrawal, N., Tapaswi, S.
Low rate cloud DDoS attack defense method based on power spectral density analysis

(2018) *Information Processing Letters*, 138, pp. 44-50. Cited 2 times.
doi: 10.1016/j.ipl.2018.06.001

[View at Publisher](#)

- 7 Haque, M.R.
Analysis of DDoS attack-aware software-defined networking controller placement in Malaysia
(2018) *In Recent Trends in Computer Applications*, pp. 175-188.
Springer, Jan

- 8 Chaudhary, D., Bhushan, K., Gupta, B.B.
Survey on DDoS attacks and defense mechanisms in cloud and fog computing

(2018) *International Journal of E-Services and Mobile Applications*, 10 (3), pp. 61-83. Cited 5 times.
www.igi-global.com/journal/international-journal-services-mobile-applications/1114
doi: 10.4018/IJESMA.2018070104

[View at Publisher](#)

- 9 Sharma, P., Sengupta, J., Suri, P.K.
WLI-FCM and artificial neural network based cloud intrusion detection system
(2018) *Int. J. Adv. Netw. Appl.*, 10 (1), pp. 3698-3703. Cited 4 times.
Jul

10 Ahmad, A., Idris, N.B., Kama, M.N.

CloudIDS: Cloud intrusion detection model inspired by dendritic cell mechanism

(2017) *International Journal of Communication Networks and Information Security*, 9 (1), pp. 67-75. Cited 4 times.

<http://www.ijcnis.org/index.php/ijcnis/article/download/2233/210>

11 Zarepoor, M., Shamsolmoali, P., Alam, M.A.

Advance DDOS detection and mitigation technique for securing cloud

(2018) *International Journal of Computational Science and Engineering*, 16 (3), pp. 303-310. Cited 2 times.

<http://www.inderscience.com/ijcse>

doi: 10.1504/IJCSE.2018.091765

[View at Publisher](#)

12 Chen, Z., Yeo, C.K., Lee, B.S., Lau, C.T.

Power spectrum entropy based detection and mitigation of low-rate DoS attacks

(2018) *Computer Networks*, 136, pp. 80-94. Cited 5 times.

<http://www.journals.elsevier.com/computer-networks/>

doi: 10.1016/j.comnet.2018.02.029

[View at Publisher](#)

13 Modi, C., Patel, D.

A feasible approach to intrusion detection in virtual network layer of Cloud computing

(2018) *Sadhana - Academy Proceedings in Engineering Sciences*, 43 (7), art. no. 114. Cited 2 times.

<http://www.springer.com/engineering/journal/12046>

doi: 10.1007/s12046-018-0910-2

[View at Publisher](#)

14 Song, C., Pons, A., Yen, K.

AA-HMM: An anti-adversarial Hidden Markov model for network-based intrusion detection [\(Open Access\)](#)

(2018) *Applied Sciences (Switzerland)*, 8 (12), art. no. 2421.

<https://www.mdpi.com/2076-3417/8/12/2421/pdf>

doi: 10.3390/app8122421

[View at Publisher](#)

15 Deshpande, P., Sharma, S.C., Peddoju, S.K., Junaid, S.

HIDS: A host based intrusion detection system for cloud computing environment

(2018) *International Journal of Systems Assurance Engineering and Management*, 9 (3), pp. 567-576. Cited 9 times.

<http://www.springer.com/engineering/production+eng/journal/13198>

doi: 10.1007/s13198-014-0277-7

[View at Publisher](#)

16 Wang, C., Yao, H., Liu, Z.

An efficient DDoS detection based on SU-Genetic feature selection

(2018) *Cluster Computing*, pp. 1-11.

<http://www.kluweronline.com/issn/1386-7857>

doi: 10.1007/s10586-018-2275-z

[View at Publisher](#)

17 Boufenar, C., Batouche, M., Schoenauer, M.

An artificial immune system for offline isolated handwritten arabic character recognition

(2018) *Evolving Systems*, 9 (1), pp. 25-41. Cited 6 times.

<http://www.springer.com/engineering/journal/12530>

doi: 10.1007/s12530-016-9169-1

[View at Publisher](#)

18 Forrest, S., Javornik, B., Smith, R.E., Perelson, A.S.

Using genetic algorithms to explore pattern recognition in the immune system

(1993) *Evol. Comput.*, 1 (3), pp. 191-211. Cited 222 times.

19 Spafford, E.H.

Computer viruses as artificial life

(1994) *Artif. Life*, 1 (3), pp. 249-265. Cited 48 times.

20 Kim, J., Bentley, P.J., Aickelin, U., Greensmith, J., Tedesco, G., Twycross, J.

Immune system approaches to intrusion detection - A review

(2007) *Natural Computing*, 6 (4), pp. 413-466. Cited 172 times.

doi: 10.1007/s11047-006-9026-4

[View at Publisher](#)

21 Hightower, R., Forrest, S., Perelson, A.S.

The Baldwin effect in the immune system: Learning by somatic hypermutation

(1996) In *Adaptive Individuals in Evolving Populations: Models and Algorithms*. Cited 26 times.

Addison-Wesley Longman Publishing Co., Inc., Boston, MA

22 Xu, N., Ding, Y., Ren, L., Hao, K.

Degeneration Recognizing Clonal Selection Algorithm for Multimodal Optimization

(2018) *IEEE Transactions on Cybernetics*, 48 (3), art. no. 7849180, pp. 848-861. Cited 4 times.

<https://www.ieee.org/membership-catalog/productdetail/>

doi: 10.1109/TCYB.2017.2657797

[View at Publisher](#)

23 Zhang, R., Xiao, X.

Study of danger-theory-based intrusion detection technology in virtual machines of cloud computing environment

(2018) *Journal of Information Processing Systems*, 14 (1), pp. 239-251. Cited 5 times.

<http://www.jips-k.org/file/down?pn=540>

doi: 10.3745/JIPS.03.0089

[View at Publisher](#)

24 Wang, W., Ren, L., Chen, L., Ding, Y.

Intrusion detection and security calculation in industrial cloud storage based on an improved dynamic immune algorithm

(2018) *Information Sciences*. Cited 3 times.

July

25 Greensmith, J., Aickelin, U., Cayzer, S.

Introducing dendritic cells as a novel immune-inspired algorithm for anomaly detection

(2005) *Lecture Notes in Computer Science*, 3627, pp. 153-167. Cited 181 times.

[View at Publisher](#)

26 Gu, F., Greensmith, J., Aickelin, U.

Integrating real-time analysis with the dendritic cell algorithm through segmentation

(2009) *Proceedings of the 11th Annual Genetic and Evolutionary Computation Conference, GECCO-2009*, pp. 1203-1210. Cited 23 times.

ISBN: 978-160558325-9

doi: 10.1145/1569901.1570063

[View at Publisher](#)

27 Wang, S., Mu, X., Zhao, P., Zhao, D.

An improved real-time dendritic cell algorithm for intrusion detection

(2016) *In Proc. Int. Conf. on Computer Science and Technology*, pp. 424-431.

28 Chelly Dagdia, Z.

A scalable and distributed dendritic cell algorithm for big data classification

(2018) *Swarm and Evolutionary Computation*

http://www.elsevier.com/wps/find/journaldescription.cws_home/724666/description#description

doi: 10.1016/j.swevo.2018.08.009

[View at Publisher](#)

29 Ahmad, A., Kama, M.N., Yusop, O.M., Bakar, N.A.A., Idris, N.B.

Cloud denial of service detection by dendritic cell mechanism

(2018) *ISCAIE 2018 - 2018 IEEE Symposium on Computer Applications and Industrial Electronics*, pp. 179-184. Cited 2 times.

<http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=8399564>

ISBN: 978-153863527-8

doi: 10.1109/ISCAIE.2018.8405466

[View at Publisher](#)

30 Oates, R., Kendall, G., Garibaldi, J.M.

Frequency analysis for dendritic cell population tuning

(2008) *Evolutionary Intelligence*, 1 (2), pp. 145-157. Cited 22 times.

<http://www.springer.com/engineering/journal/12065>

doi: 10.1007/s12065-008-0011-y

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✉ Ahmad, A.; Faculty of Science and Technology, Universiti Sains Islam Malaysia, Malaysia;

email:azuan@usim.edu.my

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