



An adaptive algorithm for super-peer selection considering peer's capacity in mobile peer-to-peer networks based on learning automata

Peer-to-Peer Networking and Applications

January 2018, Volume 11, Issue 1, pp 74–89 | Cite as

Article

First Online: 24 August 2016

Received: 08 February 2016

Accepted: 16 August 2016

- 76 Downloads

Abstract

Mobile peer-to-peer (MP2P) networks refer to the peer-to-peer overlay networks superimposing above the mobile ad-hoc networks. Heterogeneity of capacity and mobility of the peers as well as inherent limitation of resources along with the wireless networks characteristics are challenges on MP2P networks. In some MP2P networks, in order to improve network performances, special peers, are called super-peers, undertake to perform network managerial tasks. Selection of super-peers, due to their influential position, requires a protocol which considers the capacity of peers. Lack of general information about the capacity of other peers, as well as peers mobility along with dynamic nature of MP2P networks are the major challenges that impose uncertainty in decision making of the super-peer management algorithms. This paper proposes an adaptive super-peer selection algorithm considering peers capacity based on learning automata in MP2P networks, called SSBLA. In the proposed algorithm, each peer is equipped with a learning automaton which is used locally in the operation of super-peer selection by that peer. It has been shown that the suggested algorithm is superior to the existing algorithms. The results of the simulation show that the proposed algorithm can maximize capacity utilization by minimum number of super-peer and improve robustness against failures of super-peers while minimizing selection communication overhead.

Keywords

Mobile peer-to-peer network Super-peer Learning automata

This is a preview of subscription content, [log in](#) to check access

Appendix

In this section, we present the results of statistical tests. To evaluate the result of experiment, one way ANOVs and tucky statistical tests are used.

Table 2

One way ANOVs test

ANOVA**Method**

	Sum of Squares	df	Mean Square	F	Sig
--	----------------	----	-------------	---	-----

Between Groups	27,412.433	2	13,706.217	215.501	.000
----------------	------------	---	------------	---------	------

Fig. 4 Within Groups	3625.300	57	63.602		
----------------------	----------	----	--------	--	--

Total	31,037.733	59			
-------	------------	----	--	--	--

Between Groups	24,255.633	2	12,127.817	84.002	.000
----------------	------------	---	------------	--------	------

Fig. 5 Within Groups	8229.350	57	144.375		
----------------------	----------	----	---------	--	--

Total	32,484.983	59			
-------	------------	----	--	--	--

Between Groups	1.848E9	2	9.240E8	4.115	.021
----------------	---------	---	---------	-------	------

Fig. 6 Within Groups	1.280E10	57	2.245E8		
----------------------	----------	----	---------	--	--

Total	1.465E10	59			
-------	----------	----	--	--	--

Between Groups	10,929.433	2	5464.717	33.811	.000
----------------	------------	---	----------	--------	------

Fig. 9 Within Groups	9212.750	57	161.627		
----------------------	----------	----	---------	--	--

Total	20,142.183	59			
-------	------------	----	--	--	--

Between Groups	13,939.300	2	6969.650	21.514	.000
----------------	------------	---	----------	--------	------

Fig. 10 Within Groups	18,465.300	57	323.953		
-----------------------	------------	----	---------	--	--

Total	32,404.600	59			
-------	------------	----	--	--	--

ANOVA

Method

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	2993.033	2	1496.517	23.478	.000
Within Groups	3633.300	57	63.742		
Total	6626.333	59			

Table 3

Tuky test

Multiple Comparisons

method
Tukey HSD

95 % Confidence Interval

(I)	(J)	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
-----	-----	-----------------------	------------	------	-------------	-------------

Fig. 4	MIS	SSBDC	-1.45000000	2.52193883E0	.834	-7.5188394	4.6188394
		SSBLA	44.60000000*	2.52193883E0	.000	38.5311606	50.6688394
	SSBDC	MIS	1.45000000	2.52193883E0	.834	-4.6188394	7.5188394
		SSBLA	46.05000000*	2.52193883E0	.000	39.9811606	52.1188394
Fig. 5	SSBLA	MIS	-4.46000000E1*	2.52193883E0	.000	-50.6688394	-38.5311606
		SSBDC	-4.60500000E1*	2.52193883E0	.000	-52.1188394	-39.9811606
	MIS	SSBDC	9.65000000*	3.79966527	.036	.5064165	18.7935835
		SSBLA	-37.00000000*	3.79966527	.000	-46.1435835	-27.8564165
Fig. 6	SSBDC	MIS	-9.65000000*	3.79966527	.036	-18.7935835	-5.064165
		SSBLA	-46.65000000*	3.79966527	.000	-55.7935835	-37.5064165
	SSBLA	MIS	37.00000000*	3.79966527	.000	27.8564165	46.1435835
		SSBDC	46.65000000*	3.79966527	.000	37.5064165	55.7935835
	MIS	SSBDC	-2370.10000000	4738.46128182	.872	-1.3772819E4	9032.6192591

SSBDC	SSBLA	10,407.300000000	4738.46128182	.080	-995.4192591	21,810.0192591
	MIS	2370.100000000	4738.46128182	.872	-9032.6192591	13,772.8192591
	SSBLA	12,777.400000000*	4738.46128182	.025	1374.6807409	24,180.1192591
	MIS	-10,407.300000000	4738.46128182	.080	-2.1810019E4	995.4192591
SSBLA	SSBDC	-12,777.400000000*	4738.46128182	.025	-2.4180119E4	-1374.6807409
	SSBDC	-.650000000	4.02028846	.986	-10.3244951	9.0244951
	MIS	28.300000000*	4.02028846	.000	18.6255049	37.9744951
	SSBLA	.650000000	4.02028846	.986	-9.0244951	10.3244951
Fig. 9 SSBDC	SSBLA	28.950000000*	4.02028846	.000	19.2755049	38.6244951
	MIS	-28.300000000*	4.02028846	.000	-37.9744951	-18.6255049
	SSBLA	-28.950000000*	4.02028846	.000	-38.6244951	-19.2755049
	SSBDC	-28.950000000*	4.02028846	.000	-38.6244951	-19.2755049
Fig. 10 MIS	SSBDC	-.850000000	5.69168368	.988	-14.5465710	12.8465710
	SSBLA	-32.750000000*	5.69168368	.000	-46.4465710	-19.0534290

SSBDC	MIS	.85000000	5.69168368	.988	-12.8465710	14.5465710
	SSBLA	-31.90000000*	5.69168368	.000	-45.5965710	-18.2034290
SSBLA	MIS	32.75000000*	5.69168368	.000	19.0534290	46.4465710
	SSBDC	31.90000000*	5.69168368	.000	18.2034290	45.5965710
MIS	SSBDC	8.75000000*	2.52471989	.003	2.6744682	14.8255318
	SSBLA	-8.55000000*	2.52471989	.004	-14.6255318	-2.4744682
Fig. 11 SSBDC	MIS	-8.75000000*	2.52471989	.003	-14.8255318	-2.6744682
	SSBLA	-17.30000000*	2.52471989	.000	-23.3755318	-11.2244682
SSBLA	MIS	8.55000000*	2.52471989	.004	2.4744682	14.6255318
	SSBDC	17.30000000*	2.52471989	.000	11.2244682	23.3755318

References

1. Elgazzar K, Ibrahim W, Oteafy S, Hassanein HS (2013) "RobP2P: a robust architecture for resource sharing in mobile peer-to-peer networks", presented at the The 4th International Conference on Ambient Systems, Networks and Technologies (ANT 2013)
[Google Scholar](https://scholar.google.com/scholar?q=Elgazzar%20K%2C%20Ibrahim%20W%2C%20Oteafy%20S%2C%20Hassanein) (<https://scholar.google.com/scholar?q=Elgazzar%20K%2C%20Ibrahim%20W%2C%20Oteafy%20S%2C%20Hassanein>)

%20HS%20%282013%29%20%E2%80%9CRobP2P%3A%20a%20robust%20arc
hitecture%20for%20resource%20sharing%20in%20mobile%20peer-to-
peer%20networks%E2%80%9D%2C%20presented%20at%20the%20The%204th
%20International%20Conference%20on%20Ambient%20Systems%2C%20Netwo
rks%20and%20Technologies%20%28ANT%202013%29)

2. Guo FA, Xu JB (2011) Searching methods of MP2P based on diffusion strategy of resources index. *Comput Netw Inf Secur* 3:26–33
[Google Scholar](http://scholar.google.com/scholar_lookup?title=Searching%20methods%20of%20MP2P%20based%20on%20diffusion%20strategy%20of%20resources%20index&author=FA.%20Guo&author=JB.%20Xu&journal=Comput%20Netw%20Inf%20Secur&volume=3&pages=26-33&publication_year=2011) (http://scholar.google.com/scholar_lookup?title=Searching%20methods%20of%20MP2P%20based%20on%20diffusion%20strategy%20of%20resources%20index&author=FA.%20Guo&author=JB.%20Xu&journal=Comput%20Netw%20Inf%20Secur&volume=3&pages=26-33&publication_year=2011)
3. Gholami S, Meybodi MR, Saghiri AM (2014) “A learning automata-based version of SG-1 protocol for super-peer selection in peer-to-peer networks,” in the 10th International Conference on Computing and Information Technology (IC2IT2014), pp. 189–201
[Google Scholar](https://scholar.google.com/scholar?q=Gholami%20S%2C%20Meybodi%20MR%2C%20Saghiri%20AM%20%282014%29%20%E2%80%9CA%20learning%20automata-based%20version%20of%20SG-1%20protocol%20for%20super-peer%20selection%20in%20peer-to-peer%20networks%2C%E2%80%9D%20in%20the%2010th%20International%20Conference%20on%20Computing%20and%20Information%20Technology%20%28IC2IT2014%29%2C%20pp.%20189%E2%80%93201) (<https://scholar.google.com/scholar?q=Gholami%20S%2C%20Meybodi%20MR%2C%20Saghiri%20AM%20%282014%29%20%E2%80%9CA%20learning%20automata-based%20version%20of%20SG-1%20protocol%20for%20super-peer%20selection%20in%20peer-to-peer%20networks%2C%E2%80%9D%20in%20the%2010th%20International%20Conference%20on%20Computing%20and%20Information%20Technology%20%28IC2IT2014%29%2C%20pp.%20189%E2%80%93201>)
4. Bin L, Huan XY, Yan Z, Ting CB, Jian W (2012) “The algorithm of super-peer selection based on dynamic performance in mobile peer-to-peer network,” presented at the EICE2012, Macau, China
[Google Scholar](https://scholar.google.com/scholar?q=Bin%20L%2C%20Huan%20XY%2C%20Yan%20Z%2C%20Ting%20CB%2C%20Jian%20W%20%282012%29%20%E2%80%9CThe%20algorithm%20of%20super-peer%20selection%20based%20on%20dynamic%20performance%20in%20mobile%20peer-to-peer%20network%2C%E2%80%9D%20presented%20at%20the%20EICE2012%2C%20Macau%2C%20China) (<https://scholar.google.com/scholar?q=Bin%20L%2C%20Huan%20XY%2C%20Yan%20Z%2C%20Ting%20CB%2C%20Jian%20W%20%282012%29%20%E2%80%9CThe%20algorithm%20of%20super-peer%20selection%20based%20on%20dynamic%20performance%20in%20mobile%20peer-to-peer%20network%2C%E2%80%9D%20presented%20at%20the%20EICE2012%2C%20Macau%2C%20China>)
5. Androutsellis-Theotokis S, Spinellis D (2004) A survey of peer-to-peer content distribution technologies. *ACM Comput Surv* 36:335–371
[CrossRef](https://doi.org/10.1145/1041680.1041681) (<https://doi.org/10.1145/1041680.1041681>)
[Google Scholar](http://scholar.google.com/scholar_lookup?title=A%20survey%20of%20peer-to-peer%20content%20distribution%20technologies&author=S.%20Androutsellis-Theotokis&author=D.%20Spinellis&journal=ACM%20Comput%20Surv&volume=36&pages=335-371&publication_year=2004) (http://scholar.google.com/scholar_lookup?title=A%20survey%20of%20peer-to-peer%20content%20distribution%20technologies&author=S.%20Androutsellis-Theotokis&author=D.%20Spinellis&journal=ACM%20Comput%20Surv&volume=36&pages=335-371&publication_year=2004)
6. Lua EK, Crowcroft J, Pias M, Sharma R, Lim S (2005) A survey and comparison of peer-to-peer overlay network schemes. *IEEE Commun Surv Tutorials* 72–93
[Google Scholar](https://scholar.google.com/scholar?q=Lua%20EK%2C%20Crowcroft%20J%2C%20Pias%20M%2C%20Sharma%20R%2C%20Lim%20S%20%282005%29%20A%20survey%20and%20comparison%20of%20peer-to-peer%20overlay%20network%20schemes) (<https://scholar.google.com/scholar?q=Lua%20EK%2C%20Crowcroft%20J%2C%20Pias%20M%2C%20Sharma%20R%2C%20Lim%20S%20%282005%29%20A%20survey%20and%20comparison%20of%20peer-to-peer%20overlay%20network%20schemes>)

oof%20peer-to-peer%20overlay%20network%20schemes.%20IEEE%20Commun%20Surv%20Tutorials%2072%E2%80%9393)

7. Han JS, Lee KJ, Song JW, Yang SB (2008) "Mobile peer-to-peer systems using super peers for mobile environments," presented at the The International Conference on Information Networking 2008, Busan, Korea
[Google Scholar](https://scholar.google.com/scholar?q=Han%20JS%2C%20Lee%20KJ%2C%20Song%20JW%2C%20Yang%20SB%20%282008%29%20%E2%80%93CMobile%20peer-to-peer%20systems%20using%20super%20peers%20for%20mobile%20environments%2C%E2%80%93D%20presented%20at%20the%20The%20International%20Conference%20on%20Information%20Networking%202008%2C%20Busan%2C%20Korea) (https://scholar.google.com/scholar?q=Han%20JS%2C%20Lee%20KJ%2C%20Song%20JW%2C%20Yang%20SB%20%282008%29%20%E2%80%93CMobile%20peer-to-peer%20systems%20using%20super%20peers%20for%20mobile%20environments%2C%E2%80%93D%20presented%20at%20the%20The%20International%20Conference%20on%20Information%20Networking%202008%2C%20Busan%2C%20Korea)
8. Kim J-H, Song J-W, Kim T-H, Yang S-B (2011) An enhanced double-layered P2p system for the reliability in dynamic mobile environments. Ad Hoc Sensor Wirel Netw 30:467
[MATH](http://www.emis.de/MATH-item?06699814) (http://www.emis.de/MATH-item?06699814)
[Google Scholar](http://scholar.google.com/scholar_lookup?title=An%20enhanced%20double-layered%20P2p%20system%20for%20the%20reliability%20in%20dynamic%20mobile%20environments&author=J-H.%20Kim&author=J-W.%20Song&author=T-H.%20Kim&author=S-B.%20Yang&journal=Ad%20Hoc%20Sensor%20Wirel%20Netw&volume=30&pages=467&publication_year=2011) (http://scholar.google.com/scholar_lookup?title=An%20enhanced%20double-layered%20P2p%20system%20for%20the%20reliability%20in%20dynamic%20mobile%20environments&author=J-H.%20Kim&author=J-W.%20Song&author=T-H.%20Kim&author=S-B.%20Yang&journal=Ad%20Hoc%20Sensor%20Wirel%20Netw&volume=30&pages=467&publication_year=2011)
9. Mahdy AM, Deogun JS, Wang AJ (2007) "A dynamic approach for the selection of super peers in ad hoc networks" presented at the the Sixth International Conference on Networking Martinique, France
[Google Scholar](https://scholar.google.com/scholar?q=Mahdy%20AM%2C%20Deogun%20JS%2C%20Wang%20AJ%20%282007%29%20%E2%80%93CA%20dynamic%20approach%20for%20the%20selection%20of%20super%20peers%20in%20ad%20hoc%20networks%E2%80%93D%20presented%20at%20the%20the%20Sixth%20International%20Conference%20on%20Networking%20Martinique%2C%20France) (https://scholar.google.com/scholar?q=Mahdy%20AM%2C%20Deogun%20JS%2C%20Wang%20AJ%20%282007%29%20%E2%80%93CA%20dynamic%20approach%20for%20the%20selection%20of%20super%20peers%20in%20ad%20hoc%20networks%E2%80%93D%20presented%20at%20the%20the%20Sixth%20International%20Conference%20on%20Networking%20Martinique%2C%20France)
10. Henriques PMDS (2011) A lightweight distributed super peer election algorithm for unstructured dynamic P2P systems," Master of Electrical Engineering and Computer, Department of Electrical Engineering, the Faculty of Sciences and Technology New University of Lisbon
[Google Scholar](https://scholar.google.com/scholar?q=Henriques%20PMDS%20%282011%29%20A%20lightweight%20distributed%20super%20peer%20election%20algorithm%20for%20unstructured%20dynamic%20P2P%20systems%2C%E2%80%93D%20Master%20of%20Electrical%20Engineering%20and%20Computer%2C%20Department%20of%20Electrical%20Engineering%2C%20the%20Faculty%20of%20Sciences%20and%20Technology%20New%20University%20of%20Lisbon) (https://scholar.google.com/scholar?q=Henriques%20PMDS%20%282011%29%20A%20lightweight%20distributed%20super%20peer%20election%20algorithm%20for%20unstructured%20dynamic%20P2P%20systems%2C%E2%80%93D%20Master%20of%20Electrical%20Engineering%20and%20Computer%2C%20Department%20of%20Electrical%20Engineering%2C%20the%20Faculty%20of%20Sciences%20and%20Technology%20New%20University%20of%20Lisbon)
11. Fitzek FHP, Charaf H (2009) Introduction to WLAN IEEE802.11 communication on mobile devices. In: Mobile Peer to Peer (P2P): A Tutorial Guide. John Wiley & Sons

- Google Scholar (<https://scholar.google.com/scholar?q=Fitzek%20FHP%2C%20Charaf%20H%20%282009%29%20Introduction%20to%20WLAN%20IEEE802.11%20communication%20on%20mobile%20devices.%20In%3A%20Mobile%20Peer%20to%20Peer%20%28P2P%29%3A%20A%20Tutorial%20Guide.%20John%20Wiley%20%26%20Sons>)
12. Schiller JH (2003) Mobile communications, 2nd ed.: Addison-Wesley
Google Scholar (<https://scholar.google.com/scholar?q=Schiller%20JH%20%282003%29%20Mobile%20communications%2C%202nd%20ed.%3A%20Addison-Wesley>)
13. Okdem S (2015) A cross-layer adaptive mechanism for low-power wireless personal area networks. Comput Commun
Google Scholar (<https://scholar.google.com/scholar?q=Okdem%20S%20%282015%29%20A%20cross-layer%20adaptive%20mechanism%20for%20low-power%20wireless%20personal%20area%20networks.%20Comput%20Commun>)
14. Najim K, Poznyak AS (1994) Learning automata: theory and application. In: Tarrytown
Google Scholar (<https://scholar.google.com/scholar?q=Najim%20K%2C%20Poznyak%20AS%20%281994%29%20Learning%20automata%3A%20theory%20and%20application.%20In%3A%20Tarrytown>)
15. Thathachar KSNMA L (1989) Learning automata: An introduction. Prentice-Hall
Google Scholar (<https://scholar.google.com/scholar?q=Thathachar%20KSNMA%20L%20%281989%29%20Learning%20automata%3A%20An%20introduction.%20Prentice-Hall>)
16. Castro MC, Kassler AJ, Chiasserini C-F, Casetti C, Korpeoglu I (2010) Peer-to-peer overlay in mobile ad-hoc networks. In: Shen X, Yu H, Buford J, Akon M (eds) Handbook of peer-to-peer networking. Springer, New York, pp 1045–1080
CrossRef (https://doi.org/10.1007/978-0-387-09751-0_37)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Peer-to-peer%20overlay%20in%20mobile%20ad-hoc%20networks&author=MC.%20Castro&author=AJ.%20Kassler&author=C-F.%20Chiasserini&author=C.%20Casetti&author=I.%20Korpeoglu&pages=1045-1080&publication_year=2010)
17. Seet BC (2005) “Mobile P2Ping: a super-peer based structured P2P system using a fleet of city buses,” presented at the IEEE3th International Conference on Pervasive Computing and Communications Workshops, Kauai Island, Hawaii
Google Scholar (<https://scholar.google.com/scholar?q=Seet%20BC%20%282005%29%20%E2%80%9CMobile%20P2Ping%3A%20a%20super-peer%20based%20structured%20P2P%20system%20using%20a%20fleet%20of%20city%20buses%2C%E2%80%9D%20presented%20at%20the%20IEEE3th%20International%20Conference%20on%20Pervasive%20Computing%20and%20Communications%20Workshops%2C%20Kauai%20Island%2C%20Hawaii>)
18. Tang B, Zhou Z, Kashyap A, Chiueh TC (2005) “An integrated approach for P2P file sharing on multi-hop wireless networks,” presented at the IEEE International Conference on Wireless And Mobile Computing, Networking And Communications, Montreal, Canada

Google Scholar ([https://scholar.google.com/scholar?](https://scholar.google.com/scholar?q=Tang%20B%2C%20Zhou%20Z%2C%20Kashyap%20A%2C%20Chiueh%20TC%20%282005%29%20%E2%80%9CAn%20integrated%20approach%20for%20P2P%20file%20sharing%20on%20multi-hop%20wireless%20networks%2C%E2%80%9D%20presented%20at%20the%20IEEE%20International%20Conference%20on%20Wireless%20And%20Mobile%20Computing%2C%20Networking%20And%20Communications%2C%20Montreal%2C%20Canada)

[q=Tang%20B%2C%20Zhou%20Z%2C%20Kashyap%20A%2C%20Chiueh%20TC%20%282005%29%20%E2%80%9CAn%20integrated%20approach%20for%20P2P%20file%20sharing%20on%20multi-hop%20wireless%20networks%2C%E2%80%9D%20presented%20at%20the%20IEEE%20International%20Conference%20on%20Wireless%20And%20Mobile%20Computing%2C%20Networking%20And%20Communications%2C%20Montreal%2C%20Canada](https://scholar.google.com/scholar?q=Tang%20B%2C%20Zhou%20Z%2C%20Kashyap%20A%2C%20Chiueh%20TC%20%282005%29%20%E2%80%9CAn%20integrated%20approach%20for%20P2P%20file%20sharing%20on%20multi-hop%20wireless%20networks%2C%E2%80%9D%20presented%20at%20the%20IEEE%20International%20Conference%20on%20Wireless%20And%20Mobile%20Computing%2C%20Networking%20And%20Communications%2C%20Montreal%2C%20Canada))

19. Gerla M, Tsai JTC (1995) Multicluster, mobile, multimedia radio network. *Wirel Netw* 1:255–265
CrossRef (<https://doi.org/10.1007/BF01200845>)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Multicluster%2C%20mobile%2C%20multimedia%20radio%20network&author=M.%20Gerla&author=JTC.%20Tsai&journal=Wirel%20Netw&volume=1&pages=255-265&publication_year=1995)
20. Wang TI, Tsai KH, Lee YH (2004) “Crown: an efficient and stable distributed resource lookup protocol distributed resource lookup protocol,” presented at the International Conference EUC 2004, Aizu-Wakamatsu, Japan
Google Scholar (<https://scholar.google.com/scholar?q=Wang%20TI%2C%20Tsai%20KH%2C%20Lee%20YH%20%282004%29%20%E2%80%9CCrown%3A%20an%20efficient%20and%20stable%20distributed%20resource%20lookup%20protocol%20distributed%20resource%20lookup%20protocol%2C%E2%80%9D%20presented%20at%20the%20International%20Conference%20EUC%202004%2C%20Aizu-Wakamatsu%2C%20Japan>)
21. Wei Y, Xie G, Li Z (2007) A hierarchical cross-layer protocol for group communication in MANET,” presented at the Telecommunications and Malaysia International Conference on Communications, Penang, Malaysia
Google Scholar (<https://scholar.google.com/scholar?q=Wei%20Y%2C%20Xie%20G%2C%20Li%20Z%20%282007%29%20A%20hierarchical%20cross-layer%20protocol%20for%20group%20communication%20in%20MANET%2C%E2%80%9D%20presented%20at%20the%20Telecommunications%20and%20Malaysia%20International%20Conference%20on%20Communications%2C%20Penang%2C%20Malaysia>)
22. Kim SK, Lee KJ, Yang SB (2011) An enhanced super-peer system considering mobility and energy in mobile environments,” in 6th International Symposium on Wireless and Pervasive Computing (ISWPC) pp. 1–5
Google Scholar (<https://scholar.google.com/scholar?q=Kim%20SK%2C%20Lee%20KJ%2C%20Yang%20SB%20%282011%29%20An%20enhanced%20super-peer%20system%20considering%20mobility%20and%20energy%20in%20mobile%20environments%2C%E2%80%9D%20in%206th%20International%20Symposium%20on%20Wireless%20and%20Pervasive%20Computing%20%28ISWPC%29%20pp.%201%E2%80%935>)
23. Lee K-J, Choi J-H, Yang S-B (2012) Fuzzy inference-based super peer selection for a practical double-layered mobile peer-to-peer system. *Ad Hoc Sensor Wirel Netw* 21:327–351

Google Scholar (http://scholar.google.com/scholar_lookup?title=Fuzzy%20inference-based%20super%20peer%20selection%20for%20a%20practical%20double-layered%20mobile%20peer-to-peer%20system&author=K-J.%20Lee&author=J-H.%20Choi&author=S-B.%20Yang&journal=Ad%20Hoc%20Sensor%20Wirel%20Netw&volume=21&pages=327-351&publication_year=2012)

24. Merz P, Priebe M, Wolf S (2008) Super-peer selection in peer-to-peer networks using network coordinates,” In: Internet and Web Applications and Services, 2008. ICIW’08. Third International Conference on, pp. 385–390
Google Scholar (<https://scholar.google.com/scholar?q=Merz%20P%20Priebe%20M%20Wolf%20S%20%282008%29%20Super-peer%20selection%20in%20peer-to-peer%20networks%20using%20network%20coordinates%20%E2%80%9D%20In%3A%20Internet%20and%20Web%20Applications%20and%20Services%2C%202008.%20ICIW%E2%80%9908.%20Third%20International%20Conference%20on%20%2C%20pp.%20385%E2%80%93390>)
25. Torkestani JA, Meybodi MR (2010) An intelligent backbone formation algorithm for wireless ad hoc networks based on distributed learning automata. Comput Netw Int J Comput Telecommun Netw 54(5):826–843
MATH (<http://www.emis.de/MATH-item?1213.68102>)
Google Scholar (http://scholar.google.com/scholar_lookup?title=An%20intelligent%20backbone%20formation%20algorithm%20for%20wireless%20ad%20hoc%20networks%20based%20on%20distributed%20learning%20automata&author=JA.%20Torkestani&author=MR.%20Meybodi&journal=Comput%20Netw%20Int%20J%20Comput%20Telecommun%20Netw&volume=54&issue=5&pages=826-843&publication_year=2010)
26. Safavi S, Meybodi MR, Esnaashari M (2014) Learning automata based face-aware Mobicast. Wirel Pers Commun 77:1923–1933
CrossRef (<https://doi.org/10.1007/s11277-014-1616-3>)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Learning%20automata%20based%20face-aware%20Mobicast&author=S.%20Safavi&author=MR.%20Meybodi&author=M.%20Esnaashari&journal=Wirel%20Pers%20Commun&volume=77&pages=1923-1933&publication_year=2014)
27. Misra S, Chatterjee SS, Guizani M (2015) Stochastic learning automata-based channel selection in cognitive radio/dynamic spectrum access for WiMAX networks. Int J Commun Syst 28:801–817
CrossRef (<https://doi.org/10.1002/dac.2704>)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Stochastic%20learning%20automata%E2%80%99based%20channel%20selection%20in%20cognitive%20radio%20dynamic%20spectrum%20access%20for%20WiMAX%20networks&author=S.%20Misra&author=SS.%20Chatterjee&author=M.%20Guizani&journal=Int%20J%20Commun%20Syst&volume=28&pages=801-817&publication_year=2015)
28. Krishna PV, Misra S, Joshi D, Gupta A, Obaidat MS (2014) Secure socket layer certificate verification: a learning automata approach. Secur Commun Netw 7:1712–1718

[CrossRef](https://doi.org/10.1002/sec.867) (https://doi.org/10.1002/sec.867)

[Google Scholar](http://scholar.google.com/scholar_lookup?title=Secure%20socket%20layer%20certificate%20verification%3A%20a%20learning%20automata%20approach&author=PV.%20Krishna&author=S.%20Misra&author=D.%20Joshi&author=A.%20Gupta&author=MS.%20Obaidat&journal=Secure%20Commun%20Netw&volume=7&pages=1712-1718&publication_year=2014) (http://scholar.google.com/scholar_lookup?

title=Secure%20socket%20layer%20certificate%20verification%3A%20a%20learning%20automata%20approach&author=PV.%20Krishna&author=S.%20Misra&author=D.%20Joshi&author=A.%20Gupta&author=MS.%20Obaidat&journal=Secure%20Commun%20Netw&volume=7&pages=1712-1718&publication_year=2014)

29. Kumar N, Lee J-H (2015) Collaborative-learning-automata-based channel assignment with topology preservation for wireless mesh networks under QoS constraints. *IEEE Syst J* 9:675–685

[CrossRef](https://doi.org/10.1109/JSYST.2014.2355113) (https://doi.org/10.1109/JSYST.2014.2355113)

[Google Scholar](http://scholar.google.com/scholar_lookup?title=Collaborative-learning-automata-based%20channel%20assignment%20with%20topology%20preservation%20for%20wireless%20mesh%20networks%20under%20QoS%20constraints&author=N.%20Kumar&author=J-H.%20Lee&journal=IEEE%20Syst%20J&volume=9&pages=675-685&publication_year=2015) (http://scholar.google.com/scholar_lookup?title=Collaborative-learning-automata-based%20channel%20assignment%20with%20topology%20preservation%20for%20wireless%20mesh%20networks%20under%20QoS%20constraints&author=N.%20Kumar&author=J-H.%20Lee&journal=IEEE%20Syst%20J&volume=9&pages=675-685&publication_year=2015)

30. Kumar N, Lee J-H, Rodrigues JJ (2015) Intelligent mobile video surveillance system as a bayesian coalition game in vehicular sensor networks: learning automata approach. *IEEE Trans Intell Transp Syst* 16:1148–1161

[CrossRef](https://doi.org/10.1109/TITS.2014.2354372) (https://doi.org/10.1109/TITS.2014.2354372)

[Google Scholar](http://scholar.google.com/scholar_lookup?title=Intelligent%20mobile%20video%20surveillance%20system%20as%20a%20bayesian%20coalition%20game%20in%20vehicular%20sensor%20networks%3A%20learning%20automata%20approach&author=N.%20Kumar&author=J-H.%20Lee&author=JJ.%20Rodrigues&journal=IEEE%20Trans%20Intell%20Transp%20Syst&volume=16&pages=1148-1161&publication_year=2015) (http://scholar.google.com/scholar_lookup?title=Intelligent%20mobile%20video%20surveillance%20system%20as%20a%20bayesian%20coalition%20game%20in%20vehicular%20sensor%20networks%3A%20learning%20automata%20approach&author=N.%20Kumar&author=J-H.%20Lee&author=JJ.%20Rodrigues&journal=IEEE%20Trans%20Intell%20Transp%20Syst&volume=16&pages=1148-1161&publication_year=2015)

31. Kumar N, Misra S, Obaidat M, Rodrigues J, Pati B (2014) Networks of learning automata for the vehicular environment: a performance analysis study. *IEEE Wirel Commun* 21:41–47

[CrossRef](https://doi.org/10.1109/MWC.2014.7000970) (https://doi.org/10.1109/MWC.2014.7000970)

[Google Scholar](http://scholar.google.com/scholar_lookup?title=Networks%20of%20learning%20automata%20for%20the%20vehicular%20environment%3A%20a%20performance%20analysis%20study&author=N.%20Kumar&author=S.%20Misra&author=M.%20Obaidat&author=J.%20Rodrigues&author=B.%20Pati&journal=IEEE%20Wirel%20Commun&volume=21&pages=41-47&publication_year=2014) (http://scholar.google.com/scholar_lookup?title=Networks%20of%20learning%20automata%20for%20the%20vehicular%20environment%3A%20a%20performance%20analysis%20study&author=N.%20Kumar&author=S.%20Misra&author=M.%20Obaidat&author=J.%20Rodrigues&author=B.%20Pati&journal=IEEE%20Wirel%20Commun&volume=21&pages=41-47&publication_year=2014)

32. Kumar N, Misra S, Obaidat MS (2015) Collaborative learning automata-based routing for rescue operations in dense urban regions using vehicular sensor networks. *IEEE Syst J* 9:1081–1090

[CrossRef](https://doi.org/10.1109/JSYST.2014.2335451) (https://doi.org/10.1109/JSYST.2014.2335451)

[Google Scholar](http://scholar.google.com/scholar_lookup?title=Collaborative%20learning%20automata-based%20routing%20for%20rescue%20operations%20in%20dense%20urban%20regions%20using%20vehicular%20sensor%20networks&author=N.%20Kumar&author=S.%20Misra&author=MS.%20Obaidat&journal=IEEE%20Syst%20J&volume=9&pages=1081-1090&publication_year=2015) (http://scholar.google.com/scholar_lookup?title=Collaborative%20learning%20automata-based%20routing%20for%20rescue%20operations%20in%20dense%20urban%20regions%20using%20vehicular%20sensor%20networks&author=N.%20Kumar&author=S.%20Misra&author=MS.%20Obaidat&journal=IEEE%20Syst%20J&volume=9&pages=1081-1090&publication_year=2015)

33. Saghiri AM, Meybodi MR (2015) A distributed adaptive landmark clustering algorithm based on mOverlay and learning automata for topology mismatch problem in unstructured peer-to-peer networks. *Int J Commun Syst*
[Google Scholar](https://scholar.google.com/scholar?q=Saghiri%20AM%2C%20Meybodi%20MR%20%282015%29%20A%20distributed%20adaptive%20landmark%20clustering%20algorithm%20based%20on%20mOverlay%20and%20learning%20automata%20for%20topology%20mismatch%20problem%20in%20unstructured%20peer%E2%80%90to%E2%80%90peer%20networks.%20Int%20J%20Commun%20Syst) (<https://scholar.google.com/scholar?q=Saghiri%20AM%2C%20Meybodi%20MR%20%282015%29%20A%20distributed%20adaptive%20landmark%20clustering%20algorithm%20based%20on%20mOverlay%20and%20learning%20automata%20for%20topology%20mismatch%20problem%20in%20unstructured%20peer%E2%80%90to%E2%80%90peer%20networks.%20Int%20J%20Commun%20Syst>)
34. Saghiri AM, Meybodi MR (2015) A self-adaptive algorithm for topology matching in unstructured peer-to-peer networks. *J Netw Syst Manag* 1–34
[Google Scholar](https://scholar.google.com/scholar?q=Saghiri%20AM%2C%20Meybodi%20MR%20%282015%29%20A%20self-adaptive%20algorithm%20for%20topology%20matching%20in%20unstructured%20peer-to-peer%20networks.%20J%20Netw%20Syst%20Manag%201%E2%80%9334) (<https://scholar.google.com/scholar?q=Saghiri%20AM%2C%20Meybodi%20MR%20%282015%29%20A%20self-adaptive%20algorithm%20for%20topology%20matching%20in%20unstructured%20peer-to-peer%20networks.%20J%20Netw%20Syst%20Manag%201%E2%80%9334>)
35. Saghiri AM, Meybodi MR (2016) An approach for designing cognitive engines in cognitive peer-to-peer networks. *J Netw Comput Appl* 70:17–40
[CrossRef](https://doi.org/10.1016/j.jnca.2016.05.012) (<https://doi.org/10.1016/j.jnca.2016.05.012>)
[Google Scholar](http://scholar.google.com/scholar_lookup?title=An%20approach%20for%20designing%20cognitive%20engines%20in%20cognitive%20peer-to-peer%20networks&author=AM.%20Saghiri&author=MR.%20Meybodi&journal=J%20Netw%20Comput%20Appl&volume=70&pages=17-40&publication_year=2016) (http://scholar.google.com/scholar_lookup?title=An%20approach%20for%20designing%20cognitive%20engines%20in%20cognitive%20peer-to-peer%20networks&author=AM.%20Saghiri&author=MR.%20Meybodi&journal=J%20Netw%20Comput%20Appl&volume=70&pages=17-40&publication_year=2016)
36. Polatoglou M, Nicopolitidis P, Papadimitriou GI (2014) On low-complexity adaptive wireless push-based data broadcasting. *Int J Commun Syst* 27:194–200
[CrossRef](https://doi.org/10.1002/dac.2343) (<https://doi.org/10.1002/dac.2343>)
[Google Scholar](http://scholar.google.com/scholar_lookup?title=On%20low%E2%80%90complexity%20adaptive%20wireless%20push%E2%80%90based%20data%20broadcasting&author=M.%20Polatoglou&author=P.%20Nicopolitidis&author=GI.%20Papadimitriou&journal=Int%20J%20Commun%20Syst&volume=27&pages=194-200&publication_year=2014) (http://scholar.google.com/scholar_lookup?title=On%20low%E2%80%90complexity%20adaptive%20wireless%20push%E2%80%90based%20data%20broadcasting&author=M.%20Polatoglou&author=P.%20Nicopolitidis&author=GI.%20Papadimitriou&journal=Int%20J%20Commun%20Syst&volume=27&pages=194-200&publication_year=2014)
37. Nicopolitidis P, Chrysostomou C, Papadimitriou GI, Pitsillides A, Pomportsis AS (2014) On the efficient use of multiple channels by single-receiver clients in wireless data broadcasting. *Int J Commun Syst* 27:513–520
[CrossRef](https://doi.org/10.1002/dac.2375) (<https://doi.org/10.1002/dac.2375>)
[Google Scholar](http://scholar.google.com/scholar_lookup?title=On%20the%20efficient%20use%20of%20multiple%20channels%20by%20single%E2%80%90receiver%20clients%20in%20wireless%20data%20broadcasting&author=P.%20Nicopolitidis&author=C.%20Chrysostomou&author=GI.%20Papadimitriou&author=A.%20Pitsillides&author=AS.%20Pomportsis&journal=Int%20J%20Commun%20Syst&volume=27&pages=513-520&publication_year=2014) (http://scholar.google.com/scholar_lookup?title=On%20the%20efficient%20use%20of%20multiple%20channels%20by%20single%E2%80%90receiver%20clients%20in%20wireless%20data%20broadcasting&author=P.%20Nicopolitidis&author=C.%20Chrysostomou&author=GI.%20Papadimitriou&author=A.%20Pitsillides&author=AS.%20Pomportsis&journal=Int%20J%20Commun%20Syst&volume=27&pages=513-520&publication_year=2014)
38. Nicopolitidis P (2015) Performance fairness across multiple applications in wireless push systems. *Int J Commun Syst* 28:161–166
[CrossRef](https://doi.org/10.1002/dac.2648) (<https://doi.org/10.1002/dac.2648>)
[Google Scholar](http://scholar.google.com/scholar_lookup?title=Performance%20fairness%20across%20multiple%20applications%20in%20) (http://scholar.google.com/scholar_lookup?title=Performance%20fairness%20across%20multiple%20applications%20in%20)

wireless%20push%20systems&author=P.%20Nicolopolitidis&journal=Int%20J%20Commun%20Syst&volume=28&pages=161-166&publication_year=2015)

39. Misra S, Krishna PV, Saritha V, Obaidat MS (2013) Learning automata as a utility for power management in smart grids. *IEEE Commun Mag* 51:98–104
CrossRef (<https://doi.org/10.1109/MCOM.2013.6400445>)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Learning%20automata%20as%20a%20utility%20for%20power%20management%20in%20smart%20grids&author=S.%20Misra&author=PV.%20Krishna&author=V.%20Saritha&author=MS.%20Obaidat&journal=IEEE%20Commun%20Mag&volume=51&pages=98-104&publication_year=2013)
40. Hasanzadeh M, Meybodi MR (2015) Distributed optimization Grid resource discovery. *J Supercomput* 71:87–120
CrossRef (<https://doi.org/10.1007/s11227-014-1289-4>)
MATH (<http://www.emis.de/MATH-item?1305.68142>)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Distributed%20optimization%20Grid%20resource%20discovery&author=M.%20Hasanzadeh&author=MR.%20Meybodi&journal=J%20Supercomput&volume=71&pages=87-120&publication_year=2015)
41. Morshedlou H, Meybodi MR (2014) Decreasing impact of sla violations: a proactive resource allocation approach for cloud computing environments. *IEEE Trans Cloud Comput* 2:156–167
CrossRef (<https://doi.org/10.1109/TCC.2014.2305151>)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Decreasing%20impact%20of%20sla%20violations%3A%20a%20proactive%20resource%20allocation%20approach%20for%20cloud%20computing%20environments&author=H.%20Morshedlou&author=MR.%20Meybodi&journal=IEEE%20Trans%20Cloud%20Comput&volume=2&pages=156-167&publication_year=2014)
42. Varga A, Hornig R An overview of the OMNeT++ simulation environment. In: *The 1st international conference on Simulation tools and techniques for communications, networks and systems & workshops*
Google Scholar (<https://scholar.google.com/scholar?q=Varga%20A%2C%20Hornig%20R%20An%20overview%20of%20the%20OMNeT%2B%2B%20simulation%20environment.%20In%3A%20The%201st%20international%20conference%20on%20Simulation%20tools%20and%20techniques%20for%20communications%2C%20networks%20and%20systems%20%26%20workshops>)
43. Broch J, Maltz DA, Johnson DB, Hu Y-C, Jetcheva J (1998) A performance comparison of multi-hop wireless ad hoc network routing protocols. In: *The 4th Annual ACM/IEEE International Conference on Mobile Computing and Networking (MobiCom'98)*, pp. 85–97
Google Scholar (<https://scholar.google.com/scholar?q=Broch%20J%2C%20Maltz%20DA%2C%20Johnson%20DB%2C%20Hu%20Y-C%2C%20Jetcheva%20J%20%281998%29A%20performance%20comparison%20of%20multi-hop%20wireless%20ad%20hoc%20network%20routing%20protocols.%20In%3A%20The%204th%20Annual%20ACM%2FIEEE%20International%20Conference>)

%20on%20Mobile%20Computing%20and%20Networking%20%28MobiCom%E2%80%999998%29%2C%20pp.%2085%E2%80%99397)

44. Montresor A (2004) A robust protocol for building superpeer overlay topologies. In: Fourth International Conference on Peer-to-Peer Computing, pp. 202–209 [Google Scholar](https://scholar.google.com/scholar?q=Montresor%20A%20%282004%29%20A%20robust%20protocol%20for%20building%20superpeer%20overlay%20topologies.%20In%3A%20Fourth%20International%20Conference%20on%20Peer-to-Peer%20Computing%2C%20pp.%20202%E2%80%93209) (<https://scholar.google.com/scholar?q=Montresor%20A%20%282004%29%20A%20robust%20protocol%20for%20building%20superpeer%20overlay%20topologies.%20In%3A%20Fourth%20International%20Conference%20on%20Peer-to-Peer%20Computing%2C%20pp.%20202%E2%80%93209>)
45. Meng W, Wang X, Liu S Distributed load sharing of an inverter-based microgrid with reduced communication. IEEE Trans Smart Grid. doi: 10.1109/TSG.2016.2587685 (<https://doi.org/10.1109/TSG.2016.2587685>)

Copyright information

© Springer Science+Business Media New York 2016

About this article

Cite this article as:

Amirazodi, N., Saghiri, A.M. & Meybodi, M. Peer-to-Peer Netw. Appl. (2018) 11: 74.
<https://doi.org/10.1007/s12083-016-0503-y>

- DOI (Digital Object Identifier) <https://doi.org/10.1007/s12083-016-0503-y>
 - Publisher Name Springer US
 - Print ISSN 1936-6442
 - Online ISSN 1936-6450
-
- [About this journal](#)
 - [Reprints and Permissions](#)

Personalised recommendations

1. [Can parental monitoring and peer management reduce the selection or influence of delinquent peers? Testing the question using a dynamic social network approach](#)

Tilton-Weaver, Lauree C.... Stattin, Håkan
Developmental Psychology (2013)

2. [Raft-D: A Consensus Algorithm for Dynamic Configuration of Participant Peers](#)

Ha, Yeoun-Ui... Lee, Myung-Joon
Asia-pacific Journal of Multimedia services convergent with Art, Humanities, and Sociology (2017)

3. [Learning Automata for Cognitive Peer-to-Peer Networks](#)

Rezvanian, Alireza... Meybodi, Mohammad Reza
Recent Advances in Learning Automata (2018)

Want recommendations via email? [Sign up now](#)

Powered by: **Recommended** 



© 2017 Springer International Publishing AG. Part of [Springer Nature](#).

Not logged in Not affiliated 194.225.108.119