iJRASET

International Journal For Research in
Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 Issue: XI Month of publication: November 2020

DOI: <https://doi.org/10.22214/ijraset.2020.32120>

www.ijraset.com

Call: 08813907089

E-mail ID: ijraset@gmail.com

LTE Downlink Scheduling with Sharing Spectrum for Surviving LTE-WiFi System

Poonam Damara¹, Yashika Sharma²

¹M.Tech Scholar, ²Asst Professor, Doon Valley Institute of Engg & Technology, Karnal

Abstract: In this work, it provides a concept on an analysis of effect of cell performance by use of packet scheduling. It then presents a concept on adaptive scheduler to overcome the effect of downlink delay on scheduler performance in LTE. Deployment of smart cells importance in LTE system provides support in bandwidth requirement and consumption of power in network. The system proposes scheduling algorithm for improvement in throughput of system. It uses Hungarian algorithm for optimization and for packet success rate improvement. The main objective is to improve throughput of system by using optimization scheduling method. The new planning calculation will bring about a worthy throughput and gives some reasonableness between clients. The result showed the improvement in throughput distribution and Packet Success Rate (PSR) by use of Hungarian optimization. All the simulations has been done in the MATLAB software.

Keywords: LTE, WiFi, Hungarian Algorithm, Optimization of Network etc.

I. INTRODUCTION

Long Term Evolution (LTE) recommends a few significant accomplishments over last innovations like Universal Mobile Telecommunications System (UMTS) and (High Speed Packet Access (HSPA) by altering physical layer and center system so as to give higher range productivity, delay, vitality utilization decrease, adaptable transfer speed arrangements and fast information transmission with consistent versatility for portable clients [1]. Concurrent streamlining of the throughput, reasonableness and QoS is one of the difficult issues in a LTE cell organize with the goal that each planning calculation makes an alternate exchange off among these targets. For instance, planning calculations meaning to have an improved throughput are not reasonable enough to the clients who are far away from the base station or have horrible channel conditions, (for example, cell-edge clients). In addition, booking procedures that attempt to keep decency among User Equipment (UEs) are not proficient enough as far as framework throughput [2].

With the advancement of phones, the enthusiasm of high data rate and Quality of Service (QoS) augments rapidly. Thus, 3GPP has decided new rules for compact correspondence on GSM (Global System for adaptable correspondence)/EDGE and Universal Mobile Telecommunications System (UMTS). This causes reality that recipient is being not prepared to disconnect not at all like pictures because of deferral occurred in each copy of picture which is transmitted and arrived at beneficiary. Henceforth it requires equalizers at recipients end [3]. The response for this issue is given by usage of OFDM structure.

In each time between time, OFDMA assigns a limited quantity of structure move speed to each UE, so a couple of compact customers are affirmed for data transmission all the while and it is depended upon to help a couple of media applications and web benefits even in high transportability circumstances. Serving Gateway (SGW) is for the most part liable for steering and sending client information parcels and hand-over administration. The significant job of Packet Data Network Gateway (PGW) is giving association between LTE center system and other outer systems.

Fig 1: Structure of LTE Network [4]

B. LTE OFDM Cyclic Prefix, CP

One of the essential explanations behind utilizing OFDM as an adjustment design inside LTE (and numerous different remote frameworks so far as that is concerned) is its flexibility to multipath postponements and spread. Anyway it is as yet important to actualize strategies for adding flexibility to the framework. This defeats the between image impedance that outcomes from this. In regions where between image obstruction is normal, it tends to be dodged by embedding a watchman period into the planning toward the start of every datum image.

C. LTE OFDMA in Downlink

In spite of the fact that it is compulsory for the mobiles to have capacity to have the option to get every one of the 2048 sub-transporters, not all should be transmitted by the base station which just should have the option to help the transmission of 72 sub-bearers. Along these lines all mobiles will have the option to converse with any base station.

III. PROPOSED WORK

In this work, it shows that the LTE has undisturbed channel access during the whole of the ABS is a rearrangements that affects concurrence. Unique in relation to most methodologies, it plans LTE under the suspicion that the AP and the BS can't expressly trade data. It likewise don't present any progressions inside the LTE standard. It attempts an efficient report on the effects on Wi-Fi PSR and transporter detecting instrument brought about by different pilot flags in various ABS setups through benchmarks consistent physical layer waveform re-enactments.

It empower self-setup of hubs into direct gatherings with sending transfers utilizing PSR as a choice measurement. It at that point proposes an adjusted Hungarian calculation with well-characterized multifaceted nature rather than computationally costly improvement methods for the arrangement of such gatherings. The Proportional Fair scheduler means to find some kind of harmony among decency and framework throughput.

Fig 3: Proposed System Model

The proposed model is shown in Fig 3. In this, it uses Hungarian optimization algorithm for improvement in system. Initially, an irregular information stream is produced by information generator for LTE framework. There are different information parameters which are utilized like recurrence, data transfer capacity, number of PRBs, transporter parts and so forth. After this, SC-FDMA plot is utilized in uplink side and OFDMA conspire is utilized in downlink side. Just single transporter is utilized in uplink side and multi-bearer symmetrical sign is given in downlink side.

A. Hungarian Method

The task issue depicted here comprises in allocating n errands to n potential competitors on a coordinated premise in an ideal manner. For this reason, it must be considered that there are actually $n!$ approaches to relegate n undertakings to n applicants, and that so as to locate the ideal portion, all $n!$ blends would need to be checked until finding the ideal mix giving the base worldwide expense. The Hungarian strategy depends on the hypothesis that is expressed, If a steady is included (or subtracted) to each component of any line (or section) of a given n -by- n cost network in a task issue, at that point the task which limits the complete expense for the new framework will likewise limit the all-out cost lattice. In such manner, $C_{ij} \geq 0$ is the expense of allotting the i_{th} contender to the j_{th} undertaking to fabricate the info cost network. In this way, the ideal balanced task is accomplished when the capacity appeared beneath is limited.

$$Optimal Allotment = \sum \sum C_{ij} A_{ij} \quad (1)$$

When the calculation's scientific viewpoints have been talked about, the technique illustrated by the Hungarian strategy to locate an ideal arrangement comprises of the accompanying advances:

- 1) Stage 1: To distinguish and subtract the base number in each column from the whole line segment.
- 2) Stage 2: To recognize and subtract the base number in every section from the whole segment
- 3) Stage 3: Cross every one of the zeros in the grid with as not many lines (even as well as vertical just) as could be expected under the circumstances.
- 4) Stage 4: Test for optimality
- 5) Stage 5: To decide the littlest passage not secured by any line. Subtract this passage from each revealed line, and afterward add it to each secured segment. Come back to Step 3.

IV. RESULTS & DISCUSSION

This work describes the results of proposed system in LTE-Wifi. This work provides the LTE scheduling method with improvement in throughput by use of optimization method. It uses packet scheduling method for maximize throughput. All simulations are presented using MATLAB Tool.

In this work, it shows that the LTE has undisturbed channel access during the whole of the ABS is a rearrangements that affects concurrence. Unique in relation to most methodologies, it plans LTE under the suspicion that the AP and the BS can't expressly trade data. It likewise don't present any progressions inside the LTE standard. When gadgets are advised, all hubs measure their normal individual PSR that enables them to self-decide if they lie in the protected zone. Any hub in this zone is a potential transfer and accept the job of a LTE Direct gathering pioneer. It at that point starts the gadget revelation process by giving disclosure signals and logs all non-safe zone hubs that start association demands. On getting a lot of answers from non-safe zone hubs, the competitor transfer figures out which neighbor hub would encounter improved PSR through a one-jump Direct-based handing-off versus direct AP correspondence.

LTE Direct requires every hub to be connected to just one gathering proprietor. Thus, the objective of this stage is to (i) finish the gatherings to such an extent that the hubs associate with one hand-off just, and (ii) circulate hubs consistently all through the gatherings inside the system to augment the general PSR. For this reason, it utilizes a changed Hungarian Algorithm that matches hubs to transfers utilizing the PSR. Both the AP and the hand-off of a gathering fight for the channel. On the off chance that the previous successes the conflict, at that point the goal is the hand-off. In the event that the transfer wins, at that point it starts to advance the lined parcels to its related (and downstream) direct gathering individuals.

Fig 4: LTE Channels with Users

Fig 5: Average PSR Performance Measurement by Hungarian Optimization

Fig 6: Average PSR (%) by Modified Optimization vs. without Optimization

Fig 7: Average Throughput Comparison by Modified Hungarian vs Without Optimization Method

It assesses the enhancement for the normal PHY throughput that direct customers see by utilizing handing-off abilities. Figure 7 shows the throughput dispersion for a system where 20 Wi-Fi gadgets working inside the inclusion region being meddled by a LTE-BS situated a long way from the AP. Table 1 shows the performance comparison of system. It presents the throughput performance peer to peer (P2P) with and without optimization. The results show that the performance with optimization is better as compared to without optimization.

Table 1: Throughput Performance Comparison without & With Optimization

No. of Nodes	Without Optimization (kbps)	With Optimization (kbps)
1	0	0
2	129	177
3	133	180
4	133	185
5	134	188
6	134	190
7	134	191
8	135	195
9	135	195
10	135	196
11	135	199
12	135	199
13	135	199
14	135	199
15	136	203
16	136	203
17	135	203
18	135	205
19	135	203
20	135	203

V. CONCLUSION

This work provides optimal scheduling mechanism in LTE network. It provides an optimal structure in LTE downlink system. It also provides a solution for finding optimal result for high data rate LTE downlink receiver. The main goal is to demonstrate that system is able to improve the performance of Wi-Fi nodes under several different network topologies and LTE interference levels. The proposed performance is better as compared to without optimization performance. The results show that system improvements over classical Wi-Fi range from for throughput and for PER under severe interference from LTE. The result shows the throughput distribution for a network where 20 Wi-Fi devices operating within the coverage area being interfered by an LTE-BS located far from the AP. First, system introduces 50-70% improvement on the throughput of the nodes affected by the LTE interference.

REFERENCES

- [1] ETSI TR, (2010, June), "Feasibility study for Further Advancements for E-UTRAN (LTE-Advanced) (Release 9)", 3GPP TR 36.912, Ver 9.3.0.
- [2] ETSI TR, (2011, June), "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception (Release 10), ETSI TS 136.101, Ver 10.3.0.
- [3] ETSI TR (2011, June), "Evolved Universal Terrestrial Radio Access (E-UTRA); Relay radio transmission and reception (Release 11)", TS 36.116, Ver. 11.0.0.
- [4] Fu S., He S., (2011) "A Scheduling Algorithm of LTE Based on Coverage of Physical Channels", Proceedings of IEEE IC-BNMT , pp.106-111.
- [5] Iosif O., Banica I., (2011) "LTE Uplink Analysis using Two Packet Scheduling Models", 19th Telecommunications forum TELFOR, pp.394-397.
- [6] Gavrilovska L., Talevski D., (2011) "Novel Scheduling Algorithms for LTE Downlink Transmission", 19th Telecommunications forum TELFOR, pp.398-401.
- [7] Wu S., (2013) "Fairness Uplink Packet Scheduling Strategies in LTE Networks", IEEE 2nd International Symposium on Next-Generation Electronics, pp. 244-247.

- [8] Tung L., Gerla M., (2013) "LTE Resource Scheduling for Vehicular Safety Applications ", Annual Conference on Wireless On-demand Network Systems and Services, pp. 116-118.
- [9] Zhenqi S., Haifeng Y., (2013) "Research on Uplink Scheduling Algorithm Of Massive M2m And H2h Services In LTE", pp. 01-05.
- [10] Sachan R., Saxena N., (2013) "An Efficient Hybrid Scheduling Scheme for Impatience User in eMBMS over LTE", International Conference on Computer Communication and Informatics, pp. 13-17.
- [11] Niu J., Su T., Li G., (2014, April) "Joint Transmission Mode Selection and Scheduling in LTE Downlink MIMO Systems", IEEE Wireless Communications letters, Vol.3, No. 2, pp. 173-176.
- [12] Wang L., Du Q., Ren P., (2014) "Buffering-Aided Resource Allocation for Type I Relay in LTE-Advanced Cellular Networks", IEEE Global Communications Conference, pp. 4484-4489.
- [13] Eguizábal M., Hernández A., (2014) "Dynamic, Fair and Coordinated Resource Allocation for Backhaul Links for Heterogeneous Load Conditions in LTE-Advanced Relay Systems" IEEE 6th International Congress on Ultra Modern Telecommunications and Control Systems and Workshops, pp. 33-40.
- [14] Liang L., Feng G., (2014) "Game-Theoretic Hierarchical Resource Allocation for Heterogeneous Relay Networks", IEEE Transactions on Vehicular Technology, Vol. 64, No. 4, pp. 1480-1492.
- [15] Li C., Wang B., Wang W., (2014) "Component Carrier Selection for LTE-A Systems in Diverse Coverage Carrier Aggregation Scenario", IEEE 23rd International Symposium on Personal, Indoor and Mobile Radio Communications, pp. 1004-1008.
- [16] Dheshmuk M., S. Pavale P., (2014) "Carrier Aggregation for High Speed Data in LTE Advanced System", The SIJ Transactions on Computer Networks & Communication Engineering (CNCE), Vol. 1, No. 1, pp. 1-5.
- [17] Zhang R., Zheng Z., (2014) "Equivalent Capacity in Carrier Aggregation-Based LTE-A Systems: A Probabilistic Analysis", IEEE Transactions on Wireless Communications, Vol. 13, No. 11, pp. 6444-6460.
- [18] Ramli H., Isa F., (2014) "An Improved Component Carrier Selection Algorithm for Downlink long Term Evolution-Advanced", IEEE International Conference on Computer & Communication Engineering, pp. 201-204.
- [19] Lee H., Vahid S., (2014) "A Survey of Radio Resource Management for Spectrum Aggregation in LTE-Advanced", IEEE Communications Surveys & Tutorials, Vol. 16, No. 2, pp. 745-760.
- [20] Pande M., Piro G., (2014) "Optimal Resource Allocation Scheme for LTE-A Systems with Carrier Aggregation", IEEE Transactions on Wireless Communications, Vol. 13, No. 10, pp. 1-6.
- [21] Jadhav A., Mujawar S., (2017) "Optimal and water-Filling Algorithm approach for power Allocation in OFDM Based Cognitive Radio System ", International Journal of Engineering Research and Technology, Volume 10, pp. 470-476.
- [22] Abusaid O., Salem F., (2017) "Self-Organizing Techniques to Resource Block Scheduling in LTE-A Communication Systems ", ICET, pp.01-06.
- [23] Tathe P., Sharma M., (2018) "Dynamic Actor-critic: Reinforcement Learning based Radio Resource Scheduling for LTE Advanced", IEEE Cognitive Radio and Networks Symposium, pp. 01-04.
- [24] Wang C., Shih K., (2018) "User Location Recommendation Combined with MLWDF Packet Scheduling in LTE Downlink Communication", APSIPA Annual Summit and Conference, pp. 450-453.
- [25] Bocanegra C., Kennouche T., (2018) "E-Fi: Evasive Wi-Fi Measures for Surviving LTE within 5GHz Unlicensed Band", IEEE Transactions on Mobile Computing, pp. 01-16.
- [26] Chandran R., (2019) "Algorithm for CSG aware scheduling in LTE systems", IEEE Wireless Communications and Networking Conference, pp. 19-24.

10.22214/IJRASET

45.98

IMPACT FACTOR:
7.129

IMPACT FACTOR:
7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)