Appendix A

List of Publications

- **Ashish Kumar Maurya** and Anil Kumar Tripathi, "On Benchmarking Task Scheduling Algorithms for Heterogeneous Computing Systems," *The Journal of Supercomputing*, Springer, vol. 74, no. 7, pp. 3039-3070, 2018 [**SCI**].

- **Ashish Kumar Maurya** and Anil Kumar Tripathi, "An Edge Priority-based Clustering Algorithm for Multiprocessor Environments," *Concurrency and Computation: Practice and Experience*, Wiley, 2018 (in press) [**SCIE**].

- **Ashish Kumar Maurya** and Anil Kumar Tripathi, "ECP: A Novel Clustering-based Technique to Schedule Precedence Constrained Tasks on Multiprocessor Computing Systems," *Computing*, Springer, pp. 1-25, 2018 (available as Online First article), [**SCI**].

- **Ashish Kumar Maurya** and Anil Kumar Tripathi, "An Energy Aware Edge Priority-based Scheduling Algorithm for Multiprocessor Environments," *in Proceedings of the* 24^{th} *International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA'18)*, pp. 42-46, 2018, USA.

- **Ashish Kumar Maurya** and Anil Kumar Tripathi, "Performance Comparison of HEFT, Lookahead, CEFT and PEFT Scheduling Algorithms for Heterogeneous Computing Systems," *in Proceedings of the* 7^{th} *International Conference on Computer and Communication Technology (ICCCT-2017)*, ACM, pp. 128–132, 2017, India.

Bibliography

[1] Y.-K. Kwok and I. Ahmad, "Static scheduling algorithms for allocating directed task graphs to multiprocessors," *ACM Computing Surveys (CSUR)*, vol. 31, no. 4, pp. 406–471, 1999. https://doi.org/10.1145/344588.344618.

[2] C. H. Papadimitriou and M. Yannakakis, "Towards an architecture-independent analysis of parallel algorithms," *SIAM journal on computing*, vol. 19, no. 2, pp. 322–328, 1990.

[3] V. Sarkar, "Partitioning and scheduling parallel programs for execution on multiprocessors," tech. rep., Stanford Univ., CA (USA), 1987.

[4] E. G. Coffman and R. L. Graham, "Optimal scheduling for two-processor systems," *Acta informatica*, vol. 1, no. 3, pp. 200–213, 1972.

[5] J. D. Ullman, "Np-complete scheduling problems," *Journal of Computer and System sciences*, vol. 10, no. 3, pp. 384–393, 1975.

[6] M. R. Garey and D. S. Johnson, *Computers and intractability*, vol. 29. wh freeman New York, 2002.

[7] H. Arabnejad and J. Barbosa, "List scheduling algorithm for heterogeneous systems by an optimistic cost table," *IEEE Transactions on Parallel and Distributed Systems*, vol. 25, no. 3, pp. 682–694, 2014. https://doi.org/10.1109/TPDS.2013.57.

[8] O. Sinnen, *Task Scheduling for Parallel Systems*, vol. 60. John Wiley & Sons, 2007. ISBN 978-0-471-73576-2.

[9] M. Daoud and N. Kharma, "A high performance algorithm for static task scheduling in heterogeneous distributed computing systems," *Journal of Parallel and Distributed Computing*, vol. 68, no. 4, pp. 399–409, 2008. https://doi.org/10.1016/j.jpdc.2007.05.015.

[10] H. Topcuoglu, S. Hariri, and M.-y. Wu, "Performance-effective and low-complexity task scheduling for heterogeneous computing," *IEEE Transactions on Parallel and Distributed Systems*, vol. 13, no. 3, pp. 260–274, 2002. https://doi.org/10.1109/71.993206.

[11] M.-Y. Wu and D. Gajski, "Hypertool: A programming aid for message-passing systems," *IEEE Transactions on Parallel and Distributed Systems*, vol. 1, no. 3, pp. 330–343, 1990. https://doi.org/10.1109/71.80160.

[12] H. El-Rewini and T. G. Lewis, "Scheduling parallel program tasks onto arbitrary target machines," *Journal of parallel and Distributed Computing*, vol. 9, no. 2, pp. 138–153, 1990.

[13] G. C. Sih and E. A. Lee, "A compile-time scheduling heuristic for interconnection-constrained heterogeneous processor architectures," *IEEE Transactions on Parallel and Distributed systems*, vol. 4, no. 2, pp. 175–187, 1993.

[14] Y.-K. Kwok and I. Ahmad, "Dynamic critical-path scheduling: An effective technique for allocating task graphs to multiprocessors," *IEEE Transactions on Parallel and Distributed Systems*, vol. 7, no. 5, pp. 506–521, 1996. https://doi.org/10.1109/71.503776.

[15] E. Ilavarasan and P. Thambidurai, "Low complexity performance effective task scheduling algorithm for heterogeneous computing environments," *Journal of Computer Sciences*, vol. 3, no. 2, pp. 94–103, 2007.

[16] C. Gogos, C. Valouxis, P. Alefragis, G. Goulas, N. Voros, and E. Housos, "Scheduling independent tasks on heterogeneous processors using heuristics and column pricing," *Future Generation Computer Systems*, vol. 60, pp. 48–66, 2016.

[17] B. Kruatrachue and T. Lewis, "Grain size determination for parallel processing," *IEEE Software*, vol. 5, no. 1, pp. 23–32, 1988. https://doi.org/10.1109/52.1991.

[18] S. Bansal, P. Kumar, and K. Singh, "An improved duplication strategy for scheduling precedence constrained graphs in multiprocessor systems," *IEEE Transactions on Parallel and Distributed Systems*, vol. 14, no. 6, pp. 533–544, 2003. https://doi.org/10.1109/TPDS.2003.1206502.

[19] R. Bajaj and D. Agrawal, "Improving scheduling of tasks in a heterogeneous environment," *IEEE Transactions on Parallel and Distributed Systems*, vol. 15, no. 2, pp. 107–118, 2004. https://doi.org/10.1109/TPDS.2004.1264795.

[20] T. Hagras and J. Janeček, "A high performance, low complexity algorithm for compile-time task scheduling in heterogeneous systems," *Parallel Computing*, vol. 31, no. 7, pp. 653–670, 2005. https://doi.org/10.1016/j.parco.2005.04.002.

[21] X. Tang, K. Li, G. Liao, and R. Li, "List scheduling with duplication for heterogeneous computing systems," *Journal of Parallel and Distributed Computing*, vol. 70, no. 4, pp. 323–329, 2010. https://doi.org/10.1016/j.jpdc.2010.01.003.

[22] M. Hu, J. Luo, Y. Wang, and B. Veeravalli, "Adaptive scheduling of task graphs with dynamic resilience," *IEEE Transactions on Computers*, vol. 66, no. 1, pp. 17–23, 2017. https://doi.org/10.1109/TC.2016.2574349.

[23] S. Kim and J. Browne, "A general approach to mapping of parallel computation upon multiprocessor architectures," *Proceedings of the International Conference on Parallel Processing*, vol. 3, no. 1, p. 8, 1988.

[24] T. Yang and A. Gerasoulis, "Dsc: Scheduling parallel tasks on an unbounded number of processors," *IEEE Transactions on Parallel and Distributed Systems*, vol. 5, no. 9, pp. 951–967, 1994. https://doi.org/10.1109/71.308533.

[25] J.-C. Liou and M. Palis, "An efficient task clustering heuristic for scheduling dags on multiprocessors," in *Proceedings of the Workshop on Resource Management, Symposium on Parallel and Distributed Processing*, pp. 152–156, 1996.

[26] D. Kadamuddi and J. Tsai, "Clustering algorithm for parallelizing software systems in multiprocessors environment," *IEEE Transactions on Software Engineering*, vol. 26, no. 4, pp. 340–361, 2000. `https://doi.org/10.1109/32.844493`.

[27] A. Mishra and A. Tripathi, "An extention of edge zeroing heuristic for scheduling precedence constrained task graphs on parallel systems using cluster dependent priority scheme," in *Proceedings of the International Conference on Computer and Communication Technology (ICCCT)*, pp. 647–651, IEEE, 2010. `https://doi.org/10.1109/ICCCT.2010.5640450`.

[28] Y.-C. Lee, "Distributed computing: principles and applications," *Scalable Computing: Practice and Experience*, vol. 8, no. 2, 2007.

[29] A. S. Tanenbaum and M. Van Steen, *Distributed systems: principles and paradigms*. Prentice-Hall, 2007.

[30] G. F. Coulouris, J. Dollimore, and T. Kindberg, *Distributed systems: concepts and design*. pearson education, 2005.

[31] M. J. Quinn and M. J. Quinn, *Parallel computing: theory and practice*, vol. 2. McGraw-Hill New York, 1994.

[32] P. Brucker and P. Brucker, *Scheduling algorithms*, vol. 3. Springer, 2007.

[33] T. L. Casavant and J. G. Kuhl, "A taxonomy of scheduling in general-purpose distributed computing systems," *IEEE Transactions on software engineering*, vol. 14, no. 2, pp. 141–154, 1988.

[34] X. He, X. Sun, and G. Von Laszewski, "Qos guided min-min heuristic for grid task scheduling," *Journal of Computer Science and Technology*, vol. 18, no. 4, pp. 442–451, 2003.

[35] J. Yu, R. Buyya, and K. Ramamohanarao, "Workflow scheduling algorithms for grid computing," in *Metaheuristics for scheduling in distributed computing environments*, pp. 173–214, Springer, 2008.

[36] S. K. Baruah, L. E. Rosier, and R. R. Howell, "Algorithms and complexity concerning the preemptive scheduling of periodic, real-time tasks on one processor," *Real-time systems*, vol. 2, no. 4, pp. 301–324, 1990.

[37] E. S. Hou, N. Ansari, and H. Ren, "A genetic algorithm for multiprocessor scheduling," *IEEE Transactions on parallel and distributed systems*, vol. 5, no. 2, pp. 113–120, 1994.

[38] M. Wieczorek, A. Hoheisel, and R. Prodan, "Towards a general model of the multi-criteria workflow scheduling on the grid," *Future Generation Computer Systems*, vol. 25, no. 3, pp. 237–256, 2009.

[39] M. Cosnard, M. Marrakchi, Y. Robert, and D. Trystram, "Parallel gaussian elimination on an mimd computer," *Parallel Computing*, vol. 6, no. 3, pp. 275–296, 1988. https://doi.org/10.1016/0167-8191(88)90070-1.

[40] Y.-C. Chung and S. Ranka, "Applications and performance analysis of a compile-time optimization approach for list scheduling algorithms on distributed memory multiprocessors," in *Proceedings of the 1992 ACM/IEEE Conference on Supercomputing*, pp. 512–521, IEEE Computer Society Press, 1992.

[41] O. H. Ibarra and S. M. Sohn, "On mapping systolic algorithms onto the hypercube," *IEEE Transactions on Parallel and Distributed Systems*, vol. 1, no. 1, pp. 48–63, 1990.

[42] G. Berriman, J. Good, A. Laity, A. Bergou, J. Jacob, D. Katz, E. Deelman, C. Kesselman, G. Singh, M.-H. Su, *et al.*, "Montage: A grid enabled image mosaic service for the national virtual observatory," in *Astronomical Data Analysis Software and Systems (ADASS) XIII*, vol. 314, p. 593, 2004.

[43] E. Deelman, G. Singh, M.-H. Su, J. Blythe, Y. Gil, C. Kesselman, G. Mehta, K. Vahi, G. B. Berriman, J. Good, *et al.*, "Pegasus: A framework for mapping complex scientific workflows onto distributed systems," *Scientific Programming*, vol. 13, no. 3, pp. 219–237, 2005.

[44] G. Juve, A. Chervenak, E. Deelman, S. Bharathi, G. Mehta, and K. Vahi, "Characterizing and profiling scientific workflows," *Future Generation Computer Systems*, vol. 29, no. 3, pp. 682–692, 2013.

[45] D. A. Brown, P. R. Brady, A. Dietz, J. Cao, B. Johnson, and J. McNabb, "A case study on the use of workflow technologies for scientific analysis: Gravitational wave data analysis," *Workflows for e-Science*, pp. 39–59, 2007.

[46] M. A. Iverson, F. Özgüner, and G. J. Follen, "Parallelizing existing applications in a distributed heterogeneous environment," in *4th Heterogeneous Computing Workshop (HCW'95*, Citeseer, 1995.

[47] T. Hagras and J. Janecek, "A simple scheduling heuristic for heterogeneous computing environments," in *null*, p. 104, IEEE, 2003.

[48] E. Ilavarasan, P. Thambidurai, and R. Mahilmannan, "High performance task scheduling algorithm for heterogeneous computing system," in *International conference on algorithms and architectures for parallel processing*, pp. 193–203, Springer, 2005.

[49] G. Liu, K.-L. Poh, and M. Xie, "Iterative list scheduling for heterogeneous computing," *Journal of Parallel and Distributed Computing*, vol. 65, no. 5, pp. 654–665, 2005.

[50] L. Bittencourt, R. Sakellariou, and E. Madeira, "Dag scheduling using a lookahead variant of the heterogeneous earliest finish time algorithm," in *Proceedings of the 18th Euromicro International Conference on Parallel, Distributed and Network-Based Processing (PDP)*, pp. 27–34, IEEE, 2010. `https://doi.org/10.1109/PDP.2010.56`.

[51] M. Khan, "Scheduling for heterogeneous systems using constrained critical paths," *Parallel Computing*, vol. 38, no. 4, pp. 175–193, 2012. `https://doi.org/10.1016/j.parco.2012.01.001`.

[52] G. Xie, R. Li, and K. Li, "Heterogeneity-driven end-to-end synchronized scheduling for precedence constrained tasks and messages on networked embedded systems," *Journal of Parallel and Distributed Computing*, vol. 83, pp. 1–12, 2015.

[53] N. Zhou, D. Qi, X. Wang, Z. Zheng, and W. Lin, "A list scheduling algorithm for heterogeneous systems based on a critical node cost table and pessimistic cost table," *Concurrency and Computation: Practice and Experience*, vol. 29, no. 5, 2017. `https://doi.org/10.1002/cpe.3944`.

[54] A. Niyom, P. Sophatsathit, and C. Lursinsap, "A fast predictive algorithm with idle reduction for heterogeneous system scheduling," *Simulation Modelling Practice and Theory*, vol. 63, pp. 83–103, 2016.

[55] M. A. Palis, J.-C. Liou, and D. S. L. Wei, "Task clustering and scheduling for distributed memory parallel architectures," *IEEE Transactions on Parallel and Distributed Systems*, vol. 7, no. 1, pp. 46–55, 1996.

[56] I. Ahmad and Y.-K. K. Y.-K. Kwok, "A new approach to scheduling parallel programs using task duplication," in *International Conference on Parallel Processing, ICPP 1994 Volume 2.*, vol. 2, pp. 47–51, IEEE, 1994.

[57] G.-L. Park, B. Shirazi, and J. Marquis, "Dfrn: A new approach for duplication based scheduling for distributed memory multiprocessor systems," in *Proceedings of the 11th International Parallel Processing Symposium*, pp. 157–166, IEEE, 1997.

[58] S. Darbha and D. P. Agrawal, "Optimal scheduling algorithm for distributed-memory machines," *IEEE transactions on parallel and distributed systems*, vol. 9, no. 1, pp. 87–95, 1998.

[59] A. Dogan and R. Ozguner, "Ldbs: A duplication based scheduling algorithm for heterogeneous computing systems," in *Parallel Processing, 2002. Proceedings. International Conference on*, pp. 352–359, IEEE, 2002.

[60] T. Hagras and J. Janecek, "A high performance, low complexity algorithm for compile-time job scheduling in homogeneous computing environments," in *Parallel Processing Workshops, 2003. Proceedings. 2003 International Conference on*, pp. 149–155, IEEE, 2003.

[61] S. Bansal, P. Kumar, and K. Singh, "Dealing with heterogeneity through limited duplication for scheduling precedence constrained task graphs," *Journal of Parallel and Distributed Computing*, vol. 65, no. 4, pp. 479–491, 2005.

[62] S. Baskiyar and C. Dickinson, "Scheduling directed a-cyclic task graphs on a bounded set of heterogeneous processors using task duplication," *Journal of Parallel and Distributed Computing*, vol. 65, no. 8, pp. 911–921, 2005.

[63] D. Bozdag, U. Catalyurek, and F. Ozguner, "A task duplication based bottom-up scheduling algorithm for heterogeneous environments," in — *Proceedings 20th IEEE International Parallel & Distributed Processing Symposium*, p. 132, IEEE, 2006.

[64] J. Mei, K. Li, and K. Li, "A resource-aware scheduling algorithm with reduced task duplication on heterogeneous computing systems," *The Journal of Supercomputing*, vol. 68, no. 3, pp. 1347–1377, 2014.

[65] T. Yang and A. Gerasoulis, "A fast static scheduling algorithm for dags on an unbounded number of processors," in *Proceedings of the 1991 ACM/IEEE Conference on Supercomputing*, pp. 633–642, ACM, 1991. https://doi.org/10.1145/125826.126138.

[66] M. Dikaiakos, K. Steiglitz, and A. Rogers, "A comparison of techniques used for mapping parallel algorithms to message-passing multiprocessors," in *Proceedings of the Sixth IEEE Symposium on Parallel and Distributed Processing*, pp. 434–442, IEEE, 1994. https://doi.org/10.1109/SPDP.1994.346137.

[67] P. Mishra, K. Mishra, A. Mishra, and A. Tripathi, "A randomized scheduling algorithm for multiprocessor environments," *Parallel Processing Letters*, vol. 22, no. 04, p. 1250015, 2012.

[68] P. Mishra, K. Mishra, and A. Mishra, "A clustering heuristic for multiprocessor environments using computation and communication loads of modules," *International Journal of Computer Science & Information Technology*, vol. 2, no. 5, pp. 170–182, 2010.

[69] P. Mishra, K. Mishra, and A. Mishra, "A clustering algorithm for multiprocessor environments using dynamic priority of modules," *Ann. Math. Inform*, vol. 38, pp. 99–110, 2011.

[70] D. Khaldi, P. Jouvelot, and C. Ancourt, "Parallelizing with bdsc, a resource-constrained scheduling algorithm for shared and distributed memory systems," *Parallel Computing*, vol. 41, pp. 66–89, 2015. https://doi.org/10.1016/j.parco.2014.11.004.

[71] A. Mishra and P. Mishra, "A randomized scheduling algorithm for multiprocessor environments using local search," *Parallel Processing Letters*, vol. 26, no. 01, p. 1650002, 2016.

[72] Y.-K. Kwok and I. Ahmad, "Benchmarking and comparison of the task graph scheduling algorithms," *Journal of Parallel and Distributed Computing*, vol. 59, no. 3, pp. 381–422, 1999. https://doi.org/10.1006/jpdc.1999.1578.

[73] T. D. Braun, H. J. Siegel, N. Beck, L. L. Bölöni, M. Maheswaran, A. I. Reuther, J. P. Robertson, M. D. Theys, B. Yao, D. Hensgen, *et al.*, "A comparison of eleven static heuristics for mapping a class of independent tasks onto heterogeneous distributed computing systems," *Journal of Parallel and Distributed computing*, vol. 61, no. 6, pp. 810–837, 2001.

[74] T. Tobita and H. Kasahara, "A standard task graph set for fair evaluation of multiprocessor scheduling algorithms," *Journal of Scheduling*, vol. 5, no. 5, pp. 379–394, 2002.

[75] P. K. Mishra, A. Mishra, K. S. Mishra, and A. K. Tripathi, "Benchmarking the clustering algorithms for multiprocessor environments using dynamic priority of modules," *Applied Mathematical Modelling*, vol. 36, no. 12, pp. 6243–6263, 2012.

[76] J. Wang, X. Lv, and X. Chen, "Comparative analysis of list scheduling algorithms on homogeneous multi-processors," in *8th IEEE International Conference on Communication Software and Networks (ICCSN)*, pp. 708–713, IEEE, 2016.

[77] L. Bölöni and D. C. Marinescu, "Robust scheduling of metaprograms," *Journal of Scheduling*, vol. 5, no. 5, pp. 395–412, 2002.

[78] Z. Shi, E. Jeannot, and J. J. Dongarra, "Robust task scheduling in non-deterministic heterogeneous computing systems," in *IEEE International Conference on Cluster Computing*, pp. 1–10, IEEE, 2006.

[79] T. Davidović and T. Crainic, "Benchmark-problem instances for static scheduling of task graphs with communication delays on homogeneous multiprocessor systems," *Computers & Operations Research*, vol. 33, no. 8, pp. 2155–2177, 2006. `https://doi.org/10.1016/j.cor.2005.01.005`.

[80] T. Davidović, *Benchmark random task graphs.* `http://www.mi.sanu.ac.rs/~tanjad/sched_results.htm`.

[81] G. Terzopoulos and H. D. Karatza, "Power-aware bag-of-tasks scheduling on heterogeneous platforms," *Cluster Computing*, vol. 19, no. 2, pp. 615–631, 2016.

[82] Z. Zong, A. Manzanares, X. Ruan, and X. Qin, "Ead and pebd: two energy-aware duplication scheduling algorithms for parallel tasks on homogeneous clusters," *IEEE Transactions on Computers*, vol. 60, no. 3, pp. 360–374, 2011.

[83] Y. C. Lee and A. Y. Zomaya, "Minimizing energy consumption for precedence-constrained applications using dynamic voltage scaling," in *Proceedings of the 9th IEEE/ACM International Symposium on Cluster Computing and the Grid*, pp. 92–99, IEEE Computer Society, 2009.

[84] Y. Hu, C. Liu, K. Li, X. Chen, and K. Li, "Slack allocation algorithm for energy minimization in cluster systems," *Future Generation Computer Systems*, vol. 74, pp. 119–131, 2017.

[85] G. Aupy, A. Benoit, and Y. Robert, "Energy-aware scheduling under reliability and makespan constraints," in *High Performance Computing (HiPC), 2012 19th International Conference on*, pp. 1–10, IEEE, 2012.

[86] H. Kimura, M. Sato, Y. Hotta, T. Boku, and D. Takahashi, "Emprical study on reducing energy of parallel programs using slack reclamation by dvfs in a power-scalable high performance cluster," in *IEEE International Conference on Cluster Computing*, pp. 1–10, IEEE, 2006.

[87] N. Kaur, S. Bansal, and R. K. Bansal, "Duplication-controlled static energy-efficient scheduling on multiprocessor computing system," *Concurrency and Computation: Practice and Experience*, vol. 29, no. 12, p. e4124, 2017.

[88] J. Mei, K. Li, and K. Li, "Energy-aware task scheduling in heterogeneous computing environments," *Cluster Computing*, vol. 17, no. 2, pp. 537–550, 2014.

[89] X. Tang and W. Tan, "Energy-efficient reliability-aware scheduling algorithm on heterogeneous systems," *Scientific Programming*, vol. 2016, p. 14, 2016.

[90] M. Sharifi, S. Shahrivari, and H. Salimi, "Pasta: a power-aware solution to scheduling of precedence-constrained tasks on heterogeneous computing resources," *Computing*, vol. 95, no. 1, pp. 67–88, 2013.

[91] L. Wang, S. U. Khan, D. Chen, J. KołOdziej, R. Ranjan, C.-Z. Xu, and A. Zomaya, "Energy-aware parallel task scheduling in a cluster," *Future Generation Computer Systems*, vol. 29, no. 7, pp. 1661–1670, 2013.

[92] R. Ge, X. Feng, and K. W. Cameron, "Performance-constrained distributed dvs scheduling for scientific applications on power-aware clusters," in *Proceedings of the ACM/IEEE Conference on Supercomputing (SC)*, pp. 34–34, IEEE, 2005.

[93] M. Y. Lim, V. W. Freeh, and D. K. Lowenthal, "Adaptive, transparent frequency and voltage scaling of communication phases in mpi programs," in *Proceedings of the ACM/IEEE Conference on Supercomputing (SC)*, pp. 14–14, IEEE, 2006.

[94] Z. Zong, A. Manzanares, B. Stinar, and X. Qin, "Energy-aware duplication strategies for scheduling precedence-constrained parallel tasks on clusters," in *IEEE International Conference on Cluster Computing*, pp. 1–8, IEEE, 2006.