National College of Ireland

Evaluating Distance Based Pareto Genetic Algorithm for Task-Offloading in Edge-Fog-Cloud Systems - Configuration Manual

MSc Research Project
Cloud Computing

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Project Submission Sheet
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Evaluating Distance Based Pareto Genetic Algorithm for Task-Offloading in Edge-Fog-Cloud Systems - Configuration Manual

Muralikrishnan Vijayan Nambiar
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1 Introduction

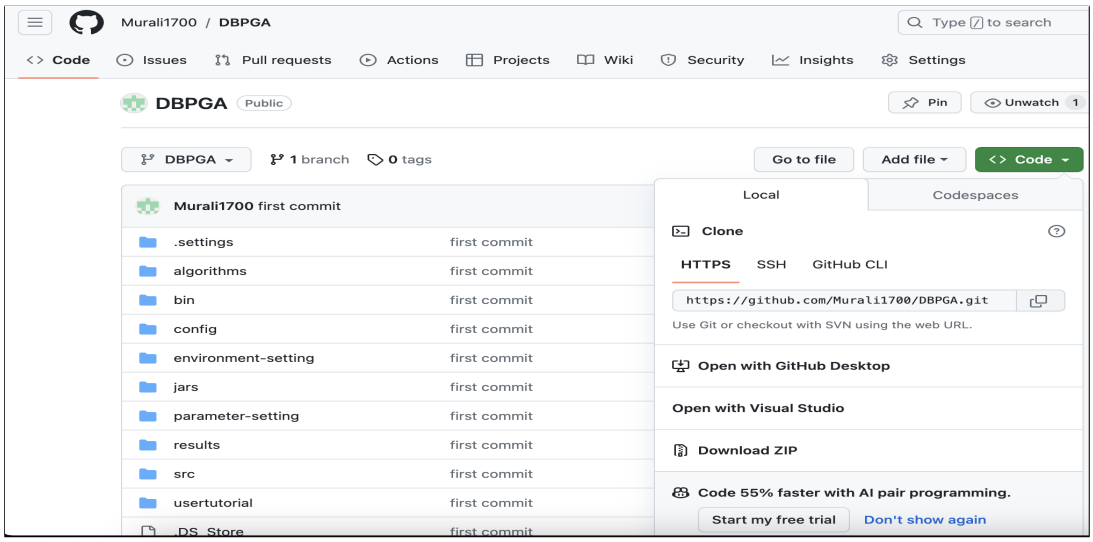
The steps to replicate the implementation of Distance Based Pareto Genetic Algorithm are as follows.

2 Software Requirements

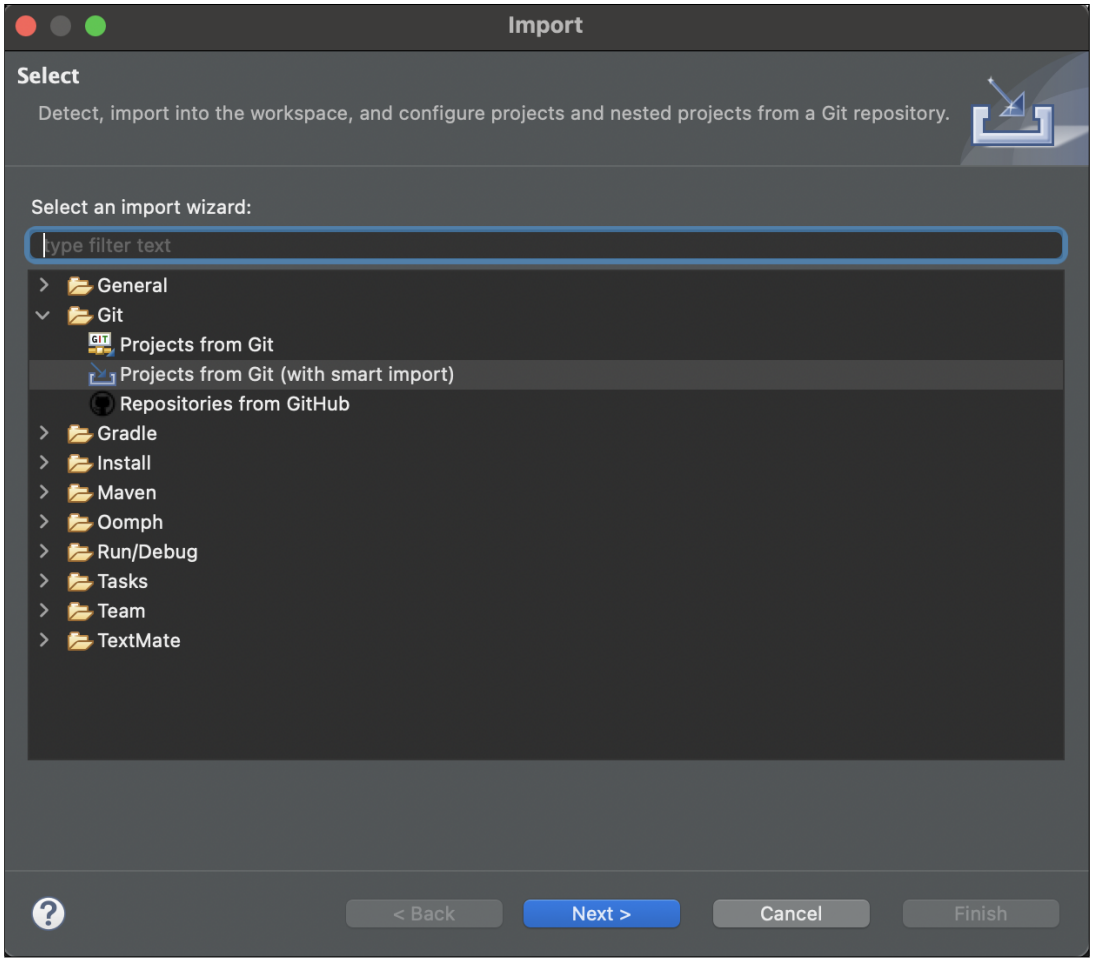
- Java version 1.8 or newer Oracle Corporation (2023)
- Eclipse Version: 2023-06 (4.28.0) Eclipse Foundation (2023)

3 Project Setup and Execution

- Go to the repository page `https://github.com/Murali1700/DBPGA.git` click on the code and copy the HTTPS link. This repo was created using the fogworkflowsim repo Liu et al. (2019).

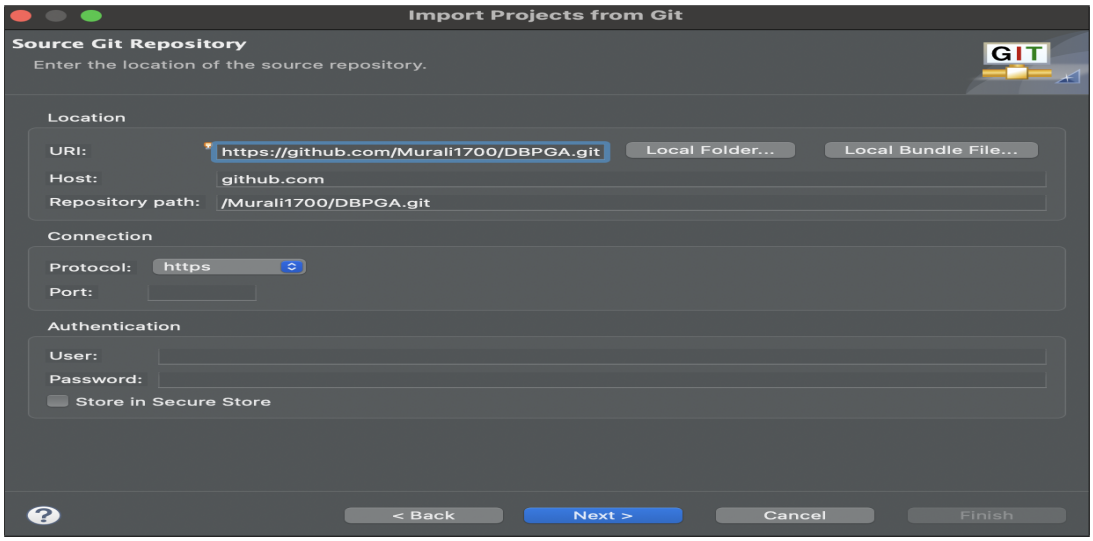


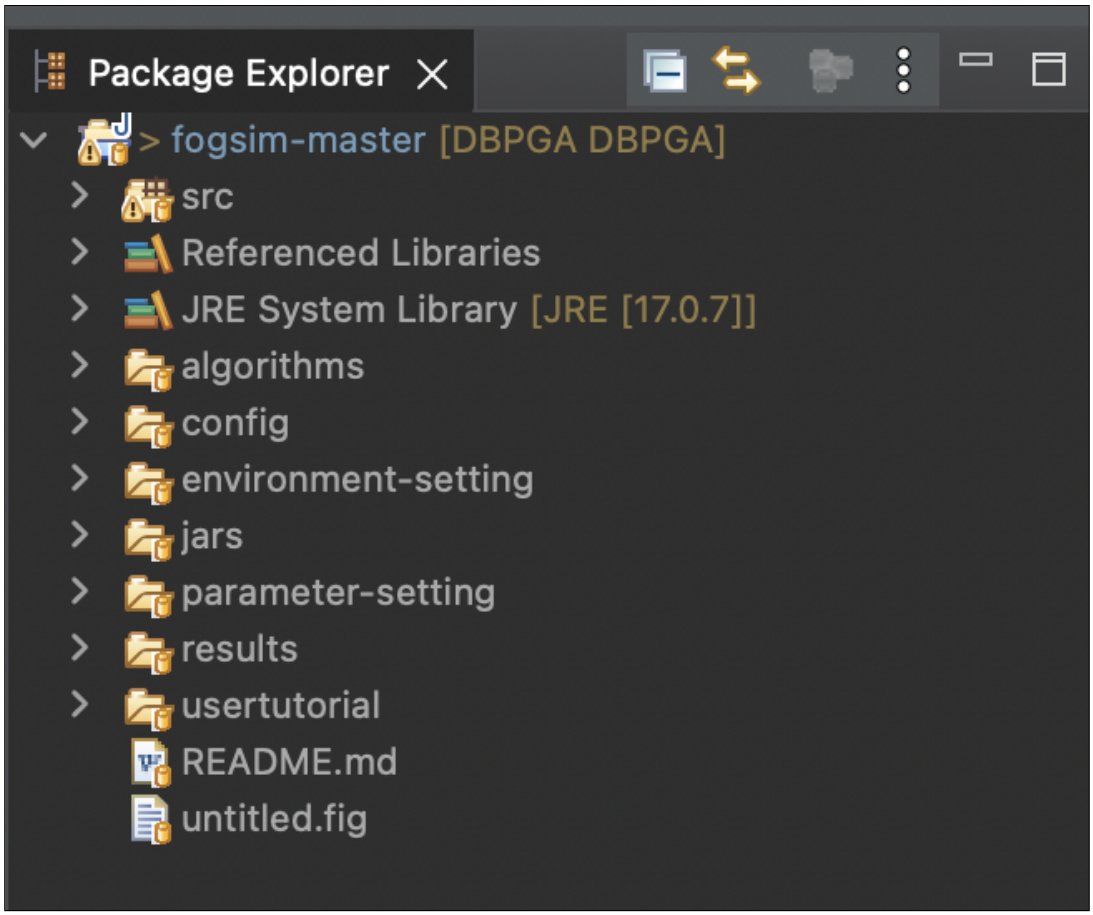
- Open Eclipse, click on '**File** $->$ **Import**'



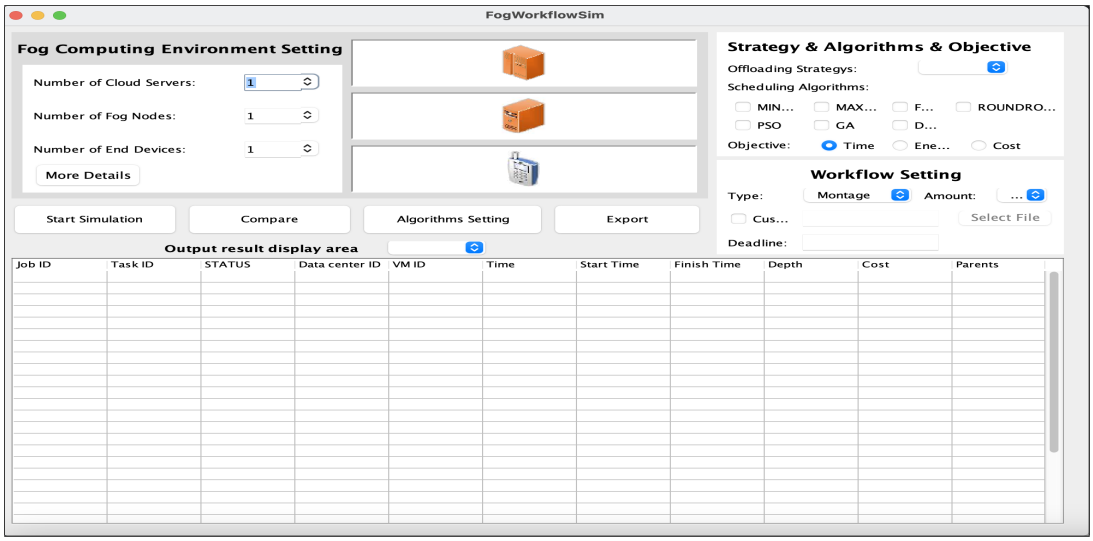
- Select '**Projects from Git (with smart import)** $->$ **Clone Uri**'

  Paste the copied repository link in the '**URI**' and click on '**Next**'. It will clone the repository and show the files.

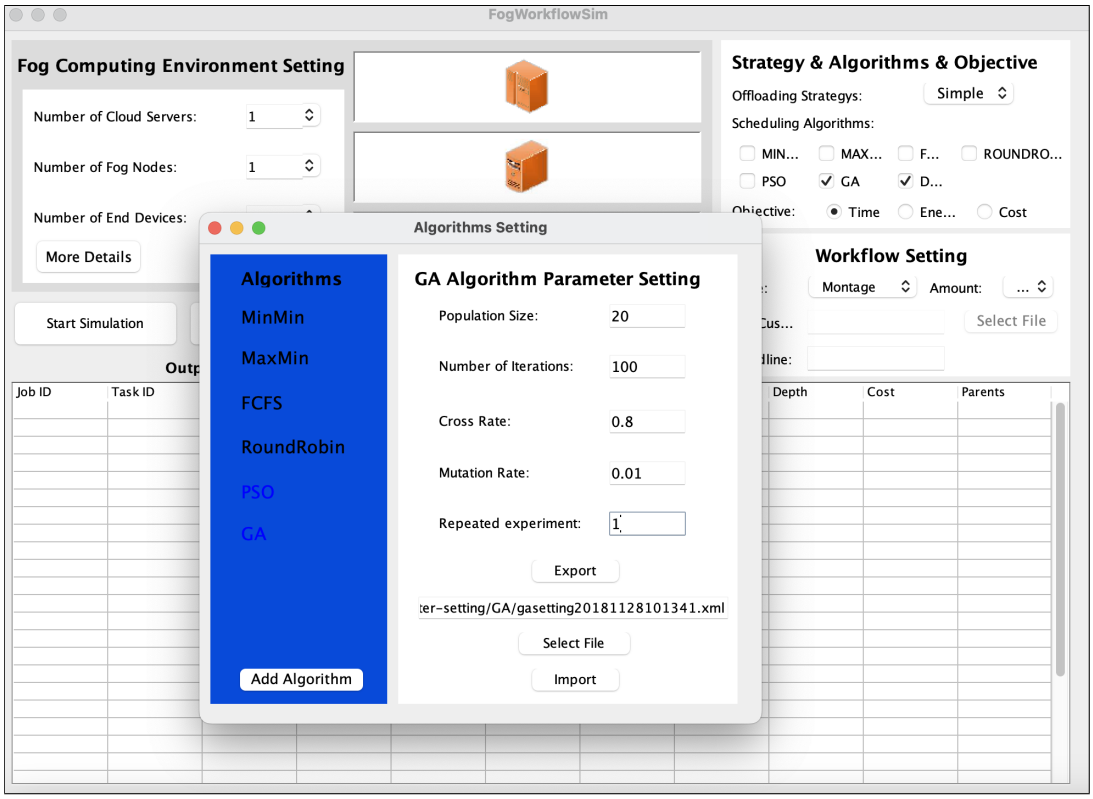




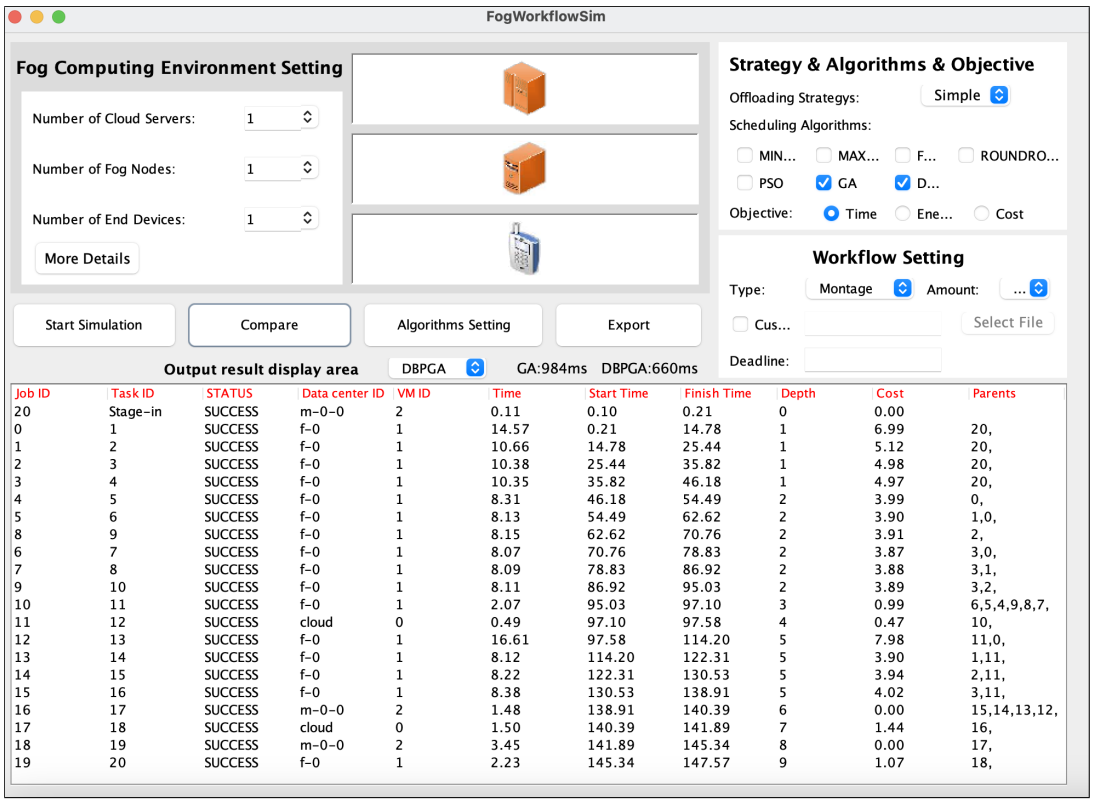
- Expand '**src** $->$ **org.fog.test.perfeval** $->$ **MainUI.java**' and run the '**MainUI.java**'. It should open the UI for simulation.



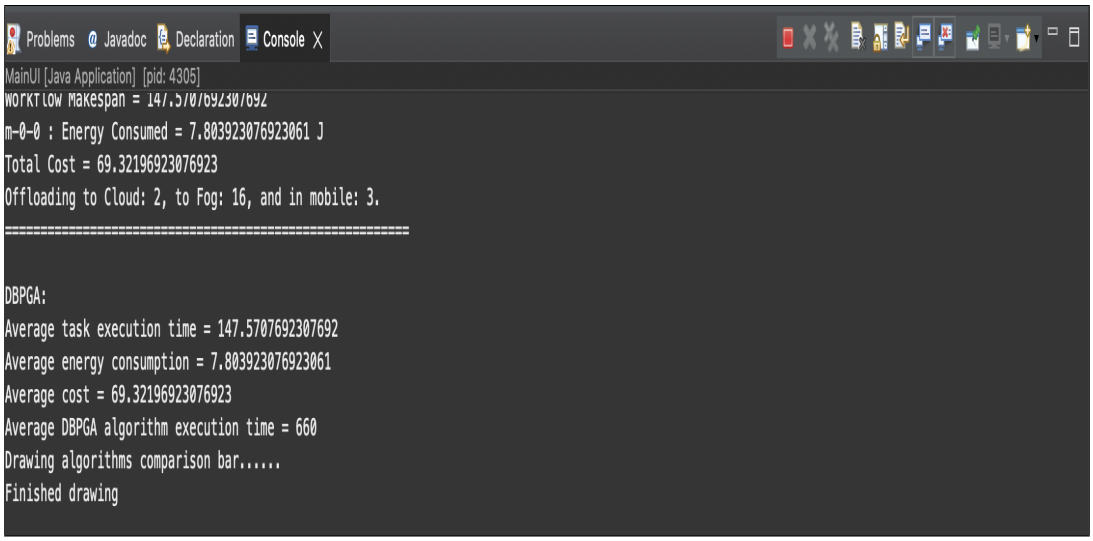
- Select Offloading Strategy as '**Simple**', Select **GA** and **DBPGA** in Scheduling Algorithm. Click '**Algorithms Setting** $->$ **GA**' and enter the below configuration.



- Now click on '**Compare**' and it will run the simulation and you get the result in the console.



Job ID	Task ID	STATUS	Data center ID	VM ID	Time	Start Time	Finish Time	Depth	Cost	Parents
20	Stage-in	SUCCESS	m-0-0	2	0.11	0.10	0.21	0	0.00	
0	1	SUCCESS	f-0	1	14.57	0.21	14.78	1	6.99	20,
1	2	SUCCESS	f-0	1	10.66	14.78	25.44	1	5.12	20,
2	3	SUCCESS	f-0	1	10.38	25.44	35.82	1	4.98	20,
3	4	SUCCESS	f-0	1	10.35	35.82	46.18	1	4.97	20,
4	5	SUCCESS	f-0	1	8.31	46.18	54.49	2	3.99	0,
5	6	SUCCESS	f-0	1	8.13	54.49	62.62	2	3.90	1,0,
8	9	SUCCESS	f-0	1	8.15	62.62	70.76	2	3.91	2,
6	7	SUCCESS	f-0	1	8.07	70.76	78.83	2	3.87	3,0,
7	8	SUCCESS	f-0	1	8.09	78.83	86.92	2	3.88	3,1,
9	10	SUCCESS	f-0	1	8.11	86.92	95.03	2	3.89	3,2,
10	11	SUCCESS	f-0	1	2.07	95.03	97.10	3	0.99	6,5,4,9,8,7,
11	12	SUCCESS	cloud	0	0.49	97.10	97.58	4	0.47	10,
12	13	SUCCESS	f-0	1	16.61	97.58	114.20	5	7.98	11,0,
13	14	SUCCESS	f-0	1	8.12	114.20	122.31	5	3.90	1,11,
14	15	SUCCESS	f-0	1	8.22	122.31	130.53	5	3.94	2,11,
15	16	SUCCESS	f-0	1	8.38	130.53	138.91	5	4.02	3,11,
16	17	SUCCESS	m-0-0	2	1.48	138.91	140.39	6	0.00	15,14,13,12,
17	18	SUCCESS	cloud	0	1.50	140.39	141.89	7	1.44	16,
18	19	SUCCESS	m-0-0	2	3.45	141.89	145.34	8	0.00	17,
19	20	SUCCESS	f-0	1	2.23	145.34	147.57	9	1.07	18,



4 Result

The simulation was run for all the datasets with all number of rows.

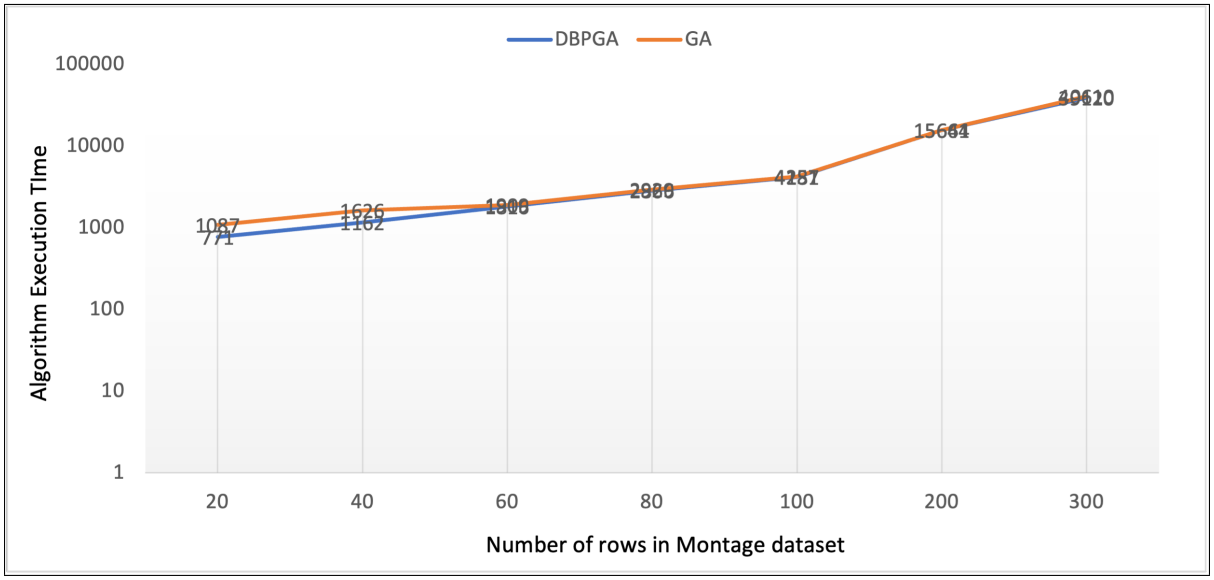


Figure 1: DBPGA vs GA for Montage

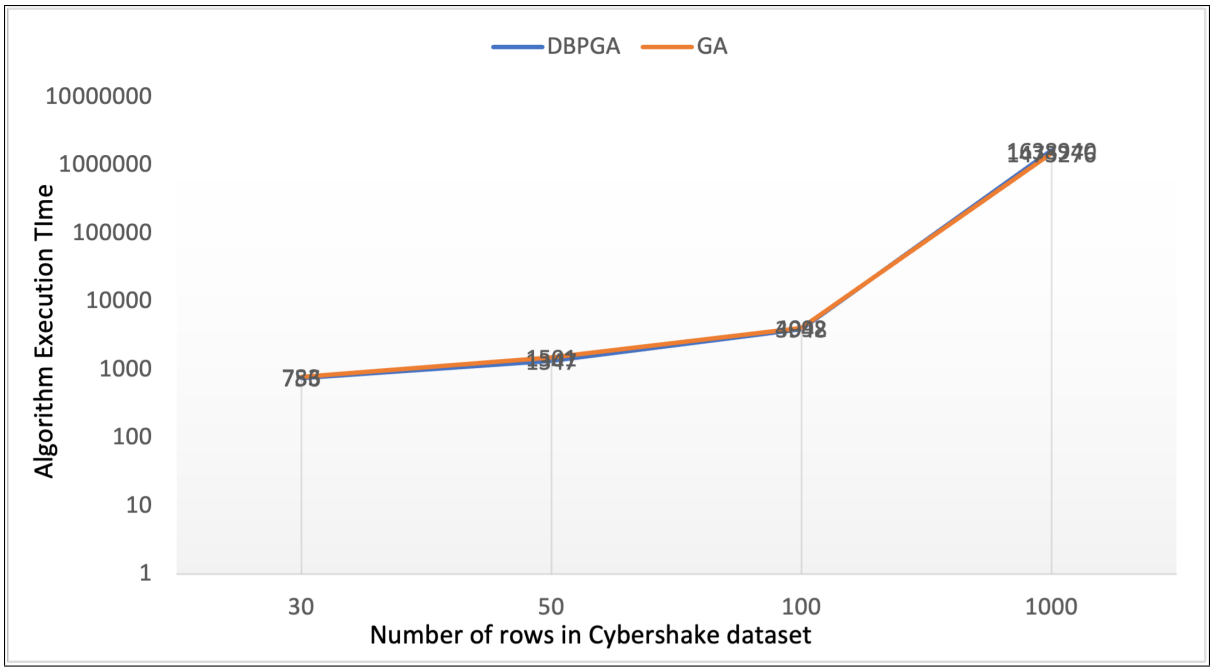


Figure 2: DBPGA vs GA for Cybershake

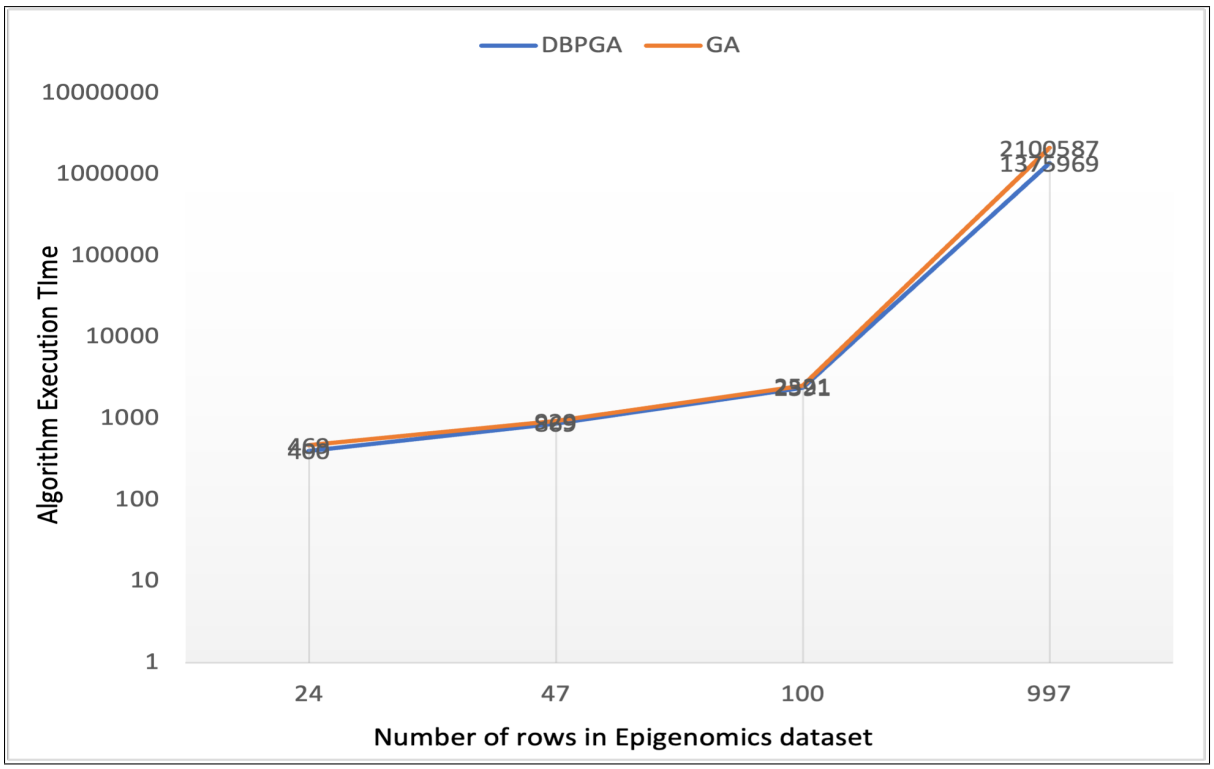


Figure 3: DBPGA vs GA for Epigenomics

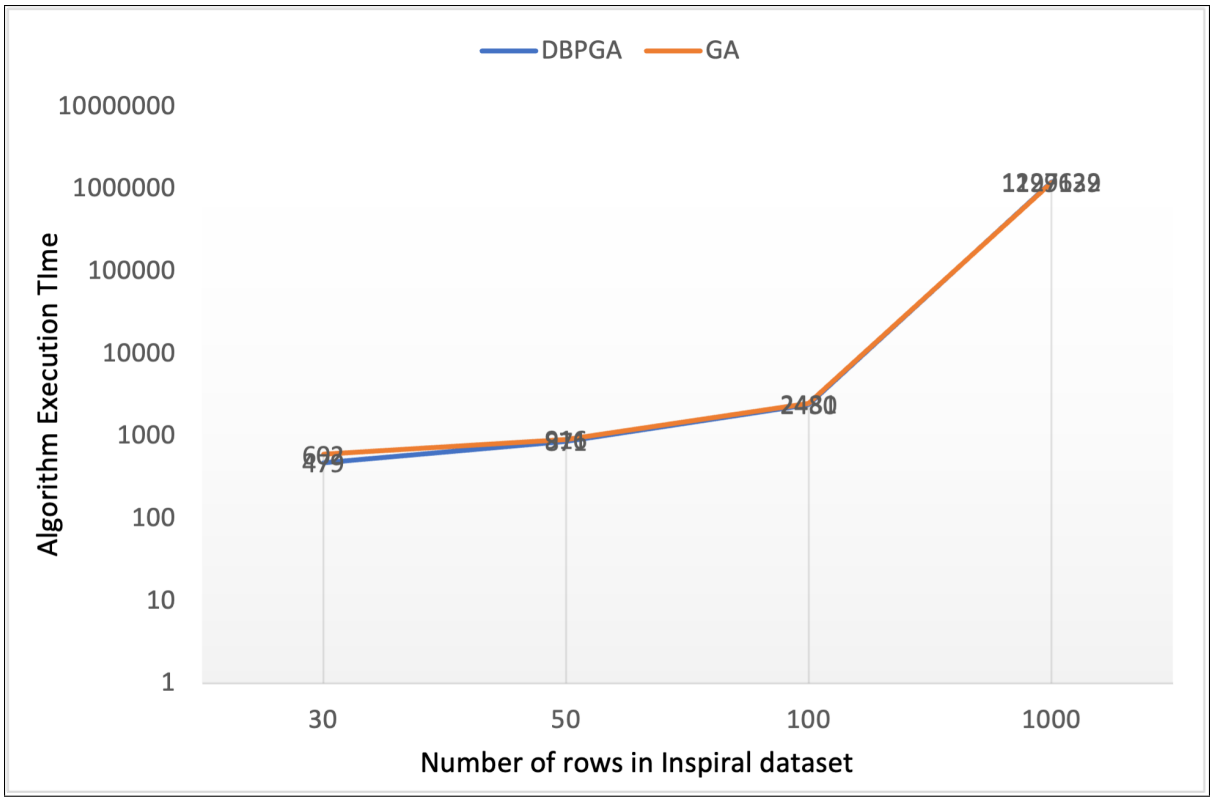


Figure 4: DBPGA vs GA for Inspiral

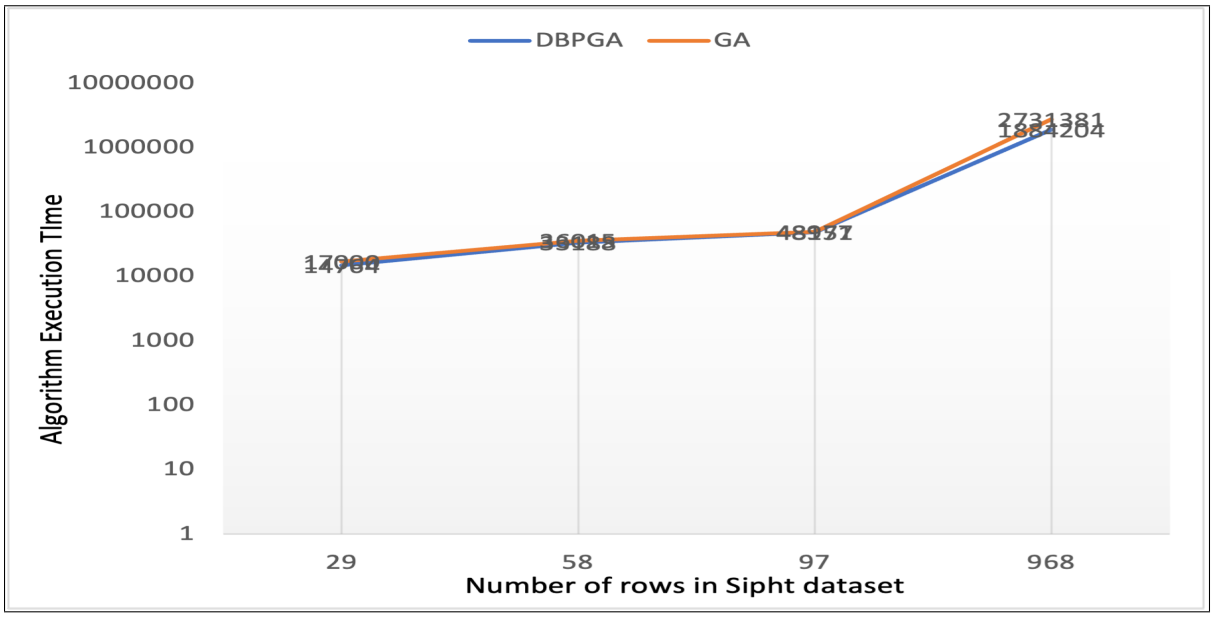


Figure 5: DBPGA vs GA for Sipht

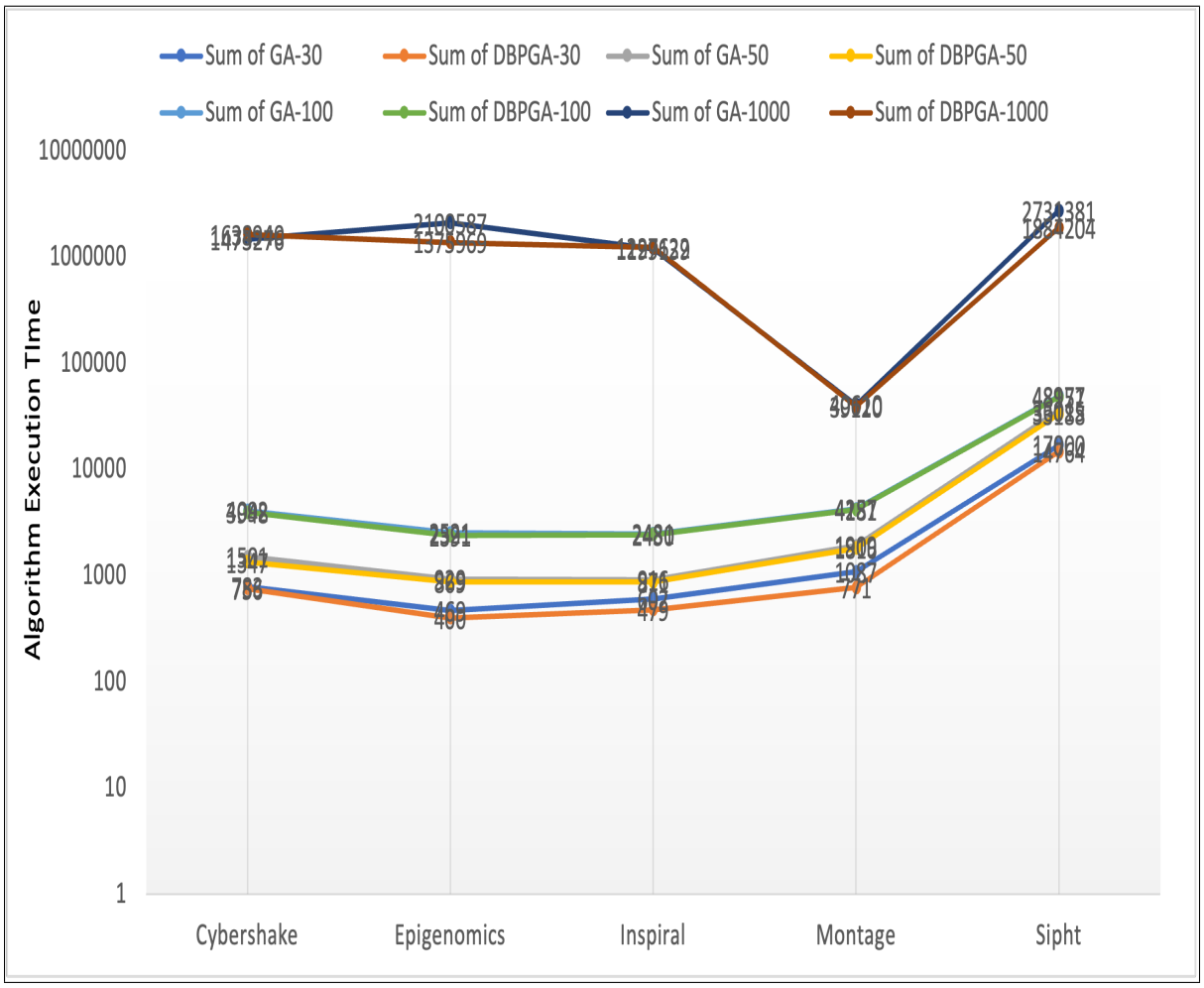


Figure 6: DBPGA vs GA plotted for all datasets

References

Eclipse Foundation (2023). Eclipse ide 2023-06 r, `https://www.eclipse.org/downloads/packages/release/2023-06/r`.

Liu, X., Fan, L., Xu, J., Li, X., Gong, L., Grundy, J. and Yang, Y. (2019). Fogworkflowsim: An automated simulation toolkit for workflow performance evaluation in fog computing, *2019 34th IEEE/ACM International Conference on Automated Software Engineering (ASE)*, pp. 1114–1117.

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