



Correction to: An effective approach for the dual-resource flexible job shop scheduling problem considering loading and unloading

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Published online: 29 October 2021
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Correction to:

Journal of Intelligent Manufacturing (2021) 32:707–728
<https://doi.org/10.1007/s10845-020-01697-5>

Due to a slip, which mixed up two folds storing data on two sets of different algorithms, the original version of this article unfortunately contained some mistakes. The original experiment results (Table 7) in Case Study were uploaded incorrectly. Algorithm C in Table 5 is obtained from the first instance in Table 7, so Table 5 needs to be revised. Figures 10, 13 and 14 are to show the Pareto solutions and the Gantt Charts of the best solution and need to be revised. Figure 17 is to show the Pareto solutions of each instance (Table 7) obtained with MODE and the improved NSGA-II, respectively and needs to be revised.

The corrected version is given below. For each item, the original and the corrected are given in the following table, respectively. From these comparisons, we can see that the corrected results support the conclusion much more.

Original article has been corrected.

The original article can be found online at <https://doi.org/10.1007/s10845-020-01697-5>.

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Table 5	The original results	Table 5 The comparison of experimental results	Pareto solutions
	algorithm A	The number of Pareto solutions 10	(60.8,66.8), (63.8,58), (59.8,69.2), (68.48.2), (67.2,53.2), (63.6,59.8), (59.5,73), (61.1,62.2), (67.1,54.1), (65.57.2)
	algorithm B	11	(101.2,24.7), (79.6,34.8), (85.7,29.6), (97.5,26.8), (82.8,30.8), (81.9,33.2), (82.5,31.2), (82.4,31.4), (89.2,26.9), (100.2,24.7), (83.5,29.6)
	algorithm C	10	(58.3,45.2), (63.4,42.7), (68.8,37.8), (70.9,36.9), (69.7,37.5), (63.8,40.1), (71.5,35.5), (65.6,39.5), (72.6,34.7), (62.6,45.2)
	The corrected results	Table 5 The comparison of experimental results	Pareto solutions
	algorithm A	The number of Pareto solutions 10	(60.8,66.8), (63.8,58), (59.8,69.2), (68.48.2), (67.2,53.2), (63.6,59.8), (59.5,73), (61.1,62.2), (67.1,54.1), (65.57.2)
	algorithm B	11	(101.2,24.7), (79.6,34.8), (85.7,29.6), (97.5,26.8), (82.8,30.8), (81.9,33.2), (82.5,31.2), (82.4,31.4), (89.2,26.9), (100.2,24.7), (83.5,29.6)
	algorithm C	10	(59.5, 56.6), (69.8, 35.4), (59.2, 57.4), (67.3, 36.7), (74.1, 33.3), (66.6, 40.6), (62.1, 40.7), (71.6, 34.6), (67.1, 38.2), (59.6, 42.3)

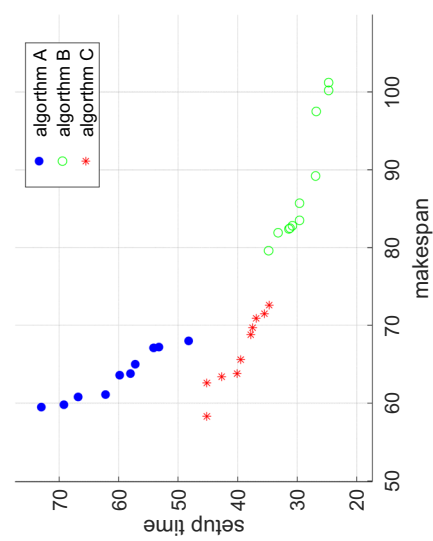


Figure 10 The comparison of Pareto solutions with three algorithms

The original results

Figure 10

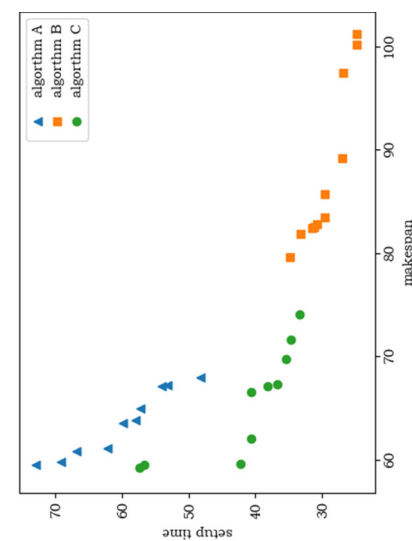


Figure 10 The comparison of Pareto solutions with three algorithms

The corrected results

Figure 13 The original results

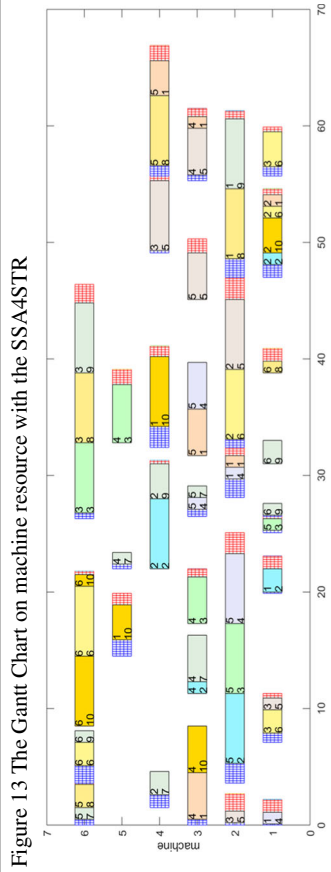


Figure 13 The Gantt Chart on machine resource with the SSA4STR

The corrected results

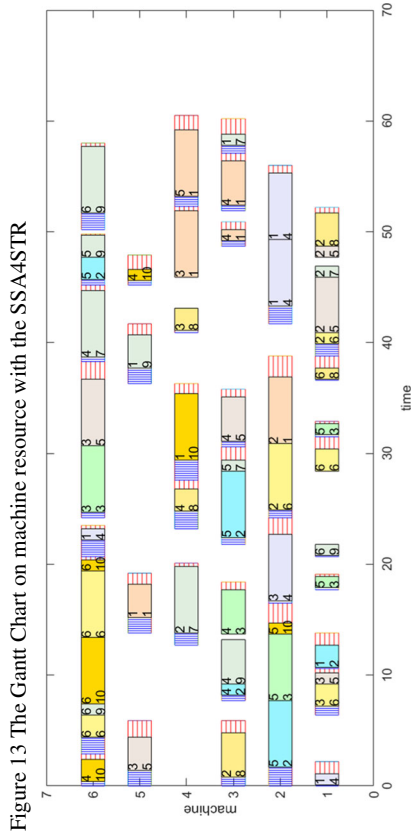
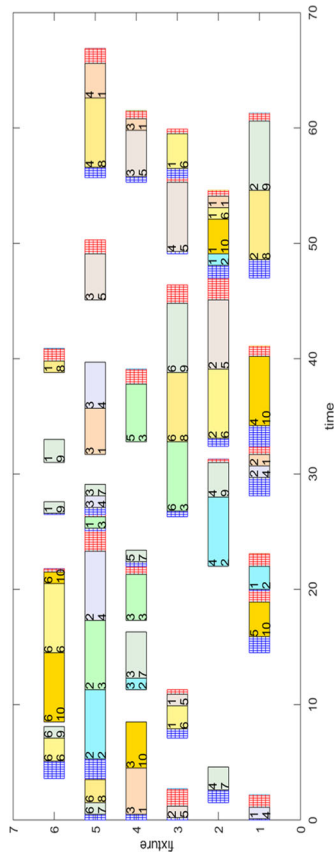


Figure 13 The Gantt Chart on machine resource with the SSA4STR

Figure 14 The original results

Figure 14 The Gantt chart on fixture resource with the SSA4STR



The corrected results

Figure 14 The Gantt chart on fixture resource with the SSA4STR

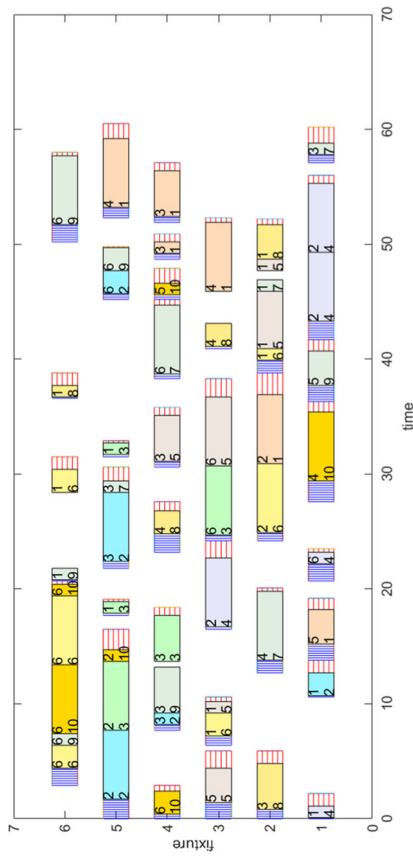


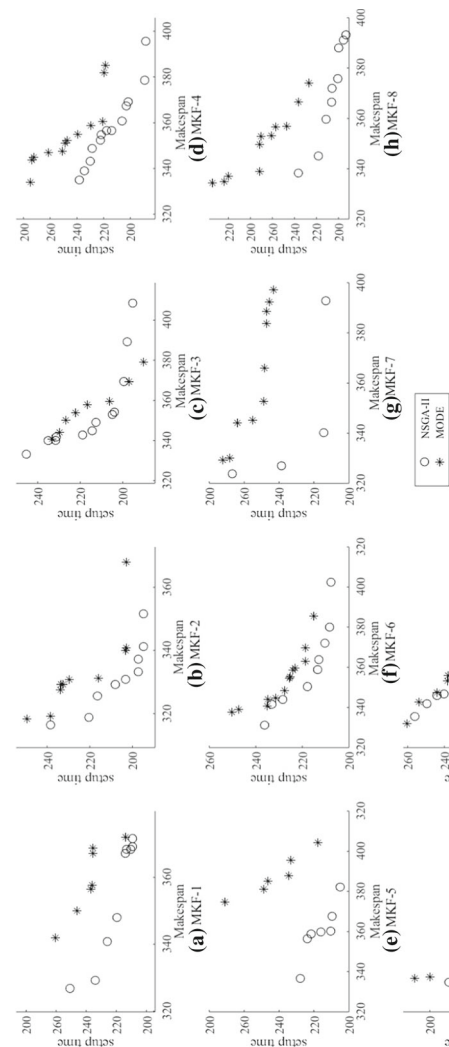
Table 7. The comparison of experimental results

	min(C)		min(T)		Hypervolume		Spread	
	MODE	NSGA-II	MODE	NSGA-II	MODE	NSGA-II	MODE	NSGA-II
MKF-1	60.1	56.7	38.5	37.3	0.791	0.625	2.511	2.257
MKF-2	39.6	39.1	15.7	13.7	0.676	0.570	1.715	1.433
MKF-3	242.1	233.2	98.1	95.3	0.825	0.815	3.647	4.981
MKF-4	107	107.5	99.2	84.2	0.803	0.712	3.434	2.822
MKF-5	247.4	243.8	78.9	75.4	0.886	0.744	4.847	4.041
MKF-6	108.9	105.6	95.2	87.7	0.865	0.813	5.386	4.265
MKF-7	194.7	191.9	51.5	36.6	0.704	0.642	5.703	3.552
MKF-8	634.4	638.3	313.5	296.6	0.863	0.791	10.961	5.957
MKF-9	459.5	457.7	218.3	202.9	0.904	0.839	7.033	6.786
MKF-10	329.7	332.7	214.2	191	0.805	0.779	5.736	5.054

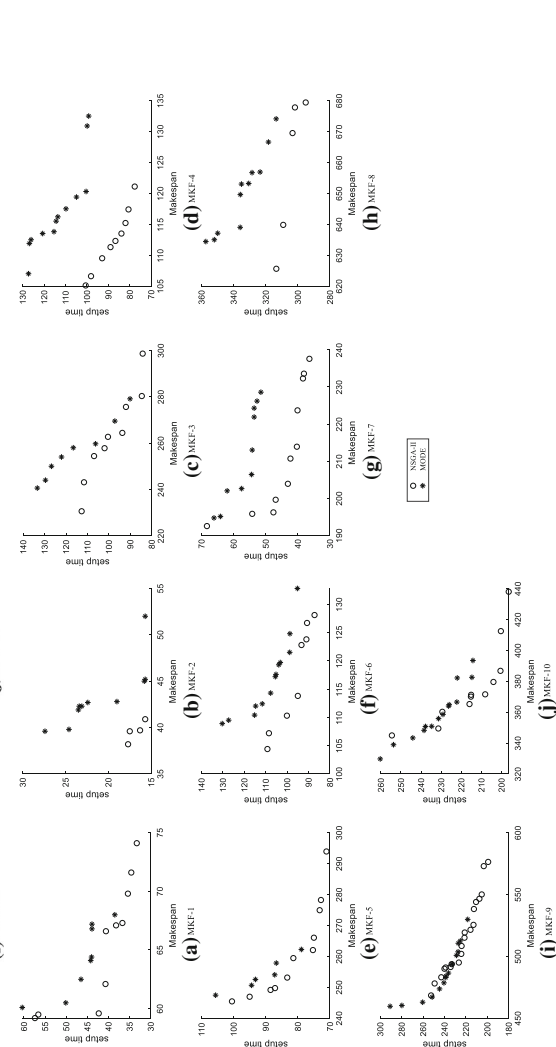
Table 7. The comparison of experimental results

	min(C)		min(T)		Hypervolume		Spread	
	MODE	NSGA-II	MODE	NSGA-II	MODE	NSGA-II	MODE	NSGA-II
MKF-1	60.1	59.2	38.5	33.3	0.837	0.531	3.84	1.161
MKF-2	39.6	38.2	15.7	15.7	0.637	0.633	2.567	0.245
MKF-3	240.6	230.6	90.1	84.2	1.129	1.331	3.923	4.027
MKF-4	107	105.1	99.9	77.7	1.409	0.992	1.844	1.161
MKF-5	247.4	245.4	78.9	71.1	0.654	0.473	5.035	4.319
MKF-6	110.4	104.4	95.2	87.2	0.817	0.907	2.839	2.379
MKF-7	194.7	192.5	51.5	36.4	0.747	0.491	1.783	4.424
MKF-8	634.4	625.6	313.5	295.1	1.151	0.923	3.374	5.348
MKF-9	460.2	468.3	218.3	199.2	1.043	2.483	6.406	2.825
MKF-10	329.7	344.9	214.2	196.4	1.56	0.561	4.639	10.106

Figure 17 The original results



The corrected results



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