

The Impact of Morphological Diversity in Robot Swarms

GECCO 2023 Supplementary Material

January 2023

1 Statistical analysis

1.1 Statistical analysis of unique behaviors

Table 1: Statistical comparisons of unique behaviors in simple environment.

	EDQD-M	Double-Map EDQD-M
EDQD	0.197000	0.613100
EDQD-M		0.454900

Table 2: Statistical comparisons of unique behaviors in medium environment.

	EDQD-M	Double-Map EDQD-M
EDQD	0.018000	0.006758
EDQD-M		0.954400

Table 3: Statistical comparisons of unique behaviors in difficult environment.

	EDQD-M	Double-Map EDQD-M
EDQD	0.323800	0.009830
EDQD-M		0.022410

1.2 Statistical analysis of unique morphologies

Table 4: Statistical comparisons of unique morphologies in simple environment.

	EDQD-M	Double-Map EDQD-M
EDQD	9.225e-05	9.005e-05
EDQD-M		9.356e-05

Table 5: Statistical comparisons of unique morphologies in medium environment.

	EDQD-M	Double-Map EDQD-M
EDQD	9.303e-05	9.082e-05
EDQD-M		9.251e-05

Table 6: Statistical comparisons of unique morphologies in difficult environment.

	EDQD-M	Double-Map EDQD-M
EDQD	9.382e-05	9.303e-05
EDQD-M		9.343e-05

1.3 Statistical analysis of average task performance

Table 7: Statistical comparisons of average task performance in simple environment.

	EDQD-M	Double-Map EDQD-M
EDQD	0.5324	0.3581
EDQD-M		0.1564

Table 8: Statistical comparisons of average task performance in medium environment.

	EDQD-M	Double-Map EDQD-M
EDQD	0.008313	0.6783
EDQD-M		0.02475

Table 9: Statistical comparisons of average task performance in difficult environment

	EDQD-M	Double-Map EDQD-M
EDQD	0.2650	0.1696
EDQD-M		0.8561

2 Map-archive plots

2.1 Diversity of Evolved Behaviors

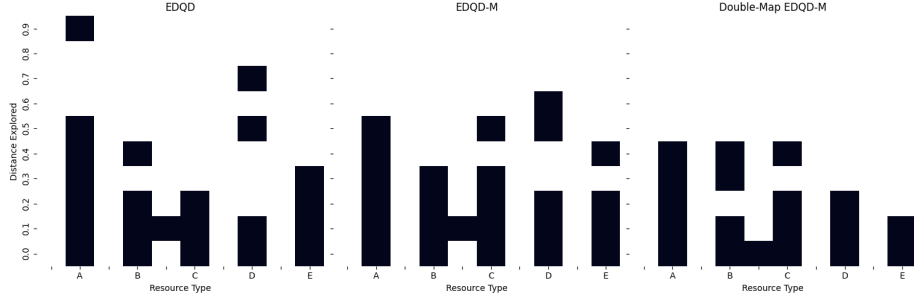


Figure 1: Diversity of evolved behaviors in the simple task environment.

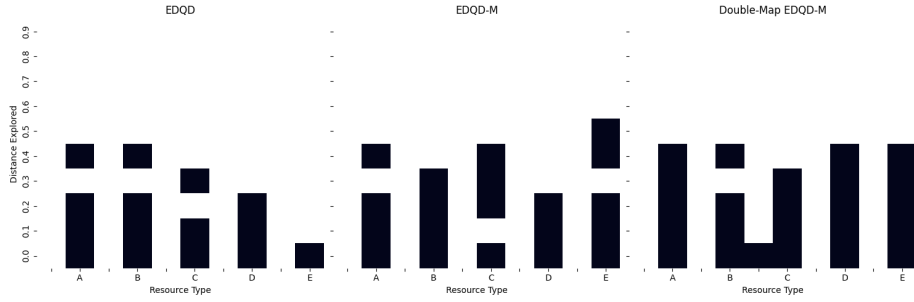


Figure 2: Diversity of evolved behaviors in the medium task environment.

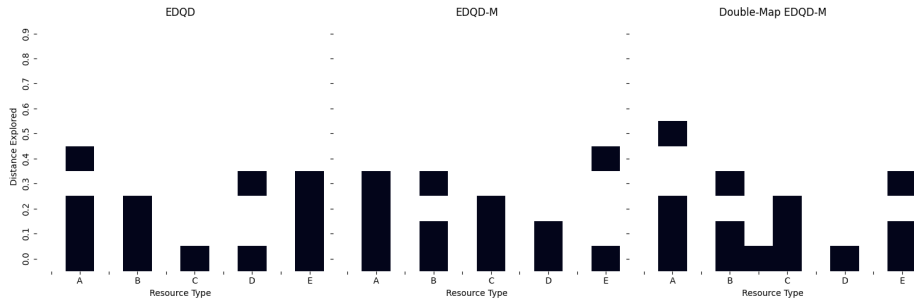


Figure 3: Diversity of evolved behaviors in the difficulty task environment.

2.2 Diversity of Evolved Morphologies

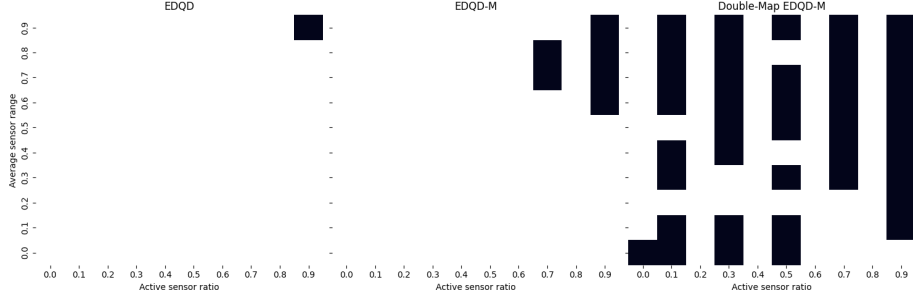


Figure 4: Diversity of evolved morphologies in the simple task environment.

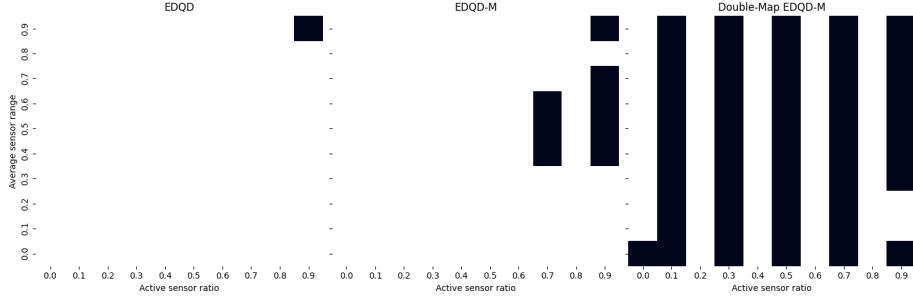


Figure 5: Diversity of evolved morphologies in the medium task environment.

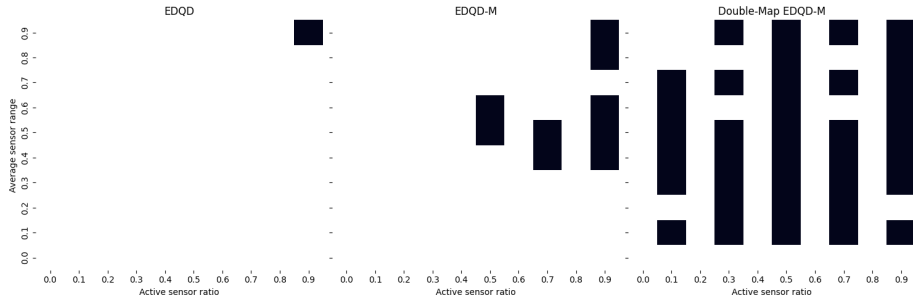


Figure 6: Diversity of evolved morphologies in the difficulty task environment.