

QUALITY DIVERSITY

Quality diversity algorithms, rather than finding a specific good solution to a problem, construct archive of different high performing solutions. “Different” can be defined in various ways, an obvious example being “solutions that look different to a vision model” [1]. A popular¹ quality diversity algorithm is the pedagogically named Multi-dimensional Archive of Phenotypic Elites (MAP-Elites) [2]. Think of it as having a fitness dimension, on which we maximize, and (a) behavior dimension(s) which we want to populate.

1 | Content generation

We can optimize levels, just like we can optimize players. You must now:

- ▶ Define a fitness function for a level
- ▶ Define a behavior space for a level

Index of Sources

- [1] A. Kumar *et al.*, “Automating the Search for Artificial Life with Foundation Models,” no. arXiv:2412.17799. arXiv, Dec. 2024. doi: 10.48550/arXiv.2412.17799.
- [2] J.-B. Mouret and J. Clune, “Illuminating Search Spaces by Mapping Elites,” no. arXiv:1504.04909. arXiv, Apr. 2015.

¹At least in this lab