

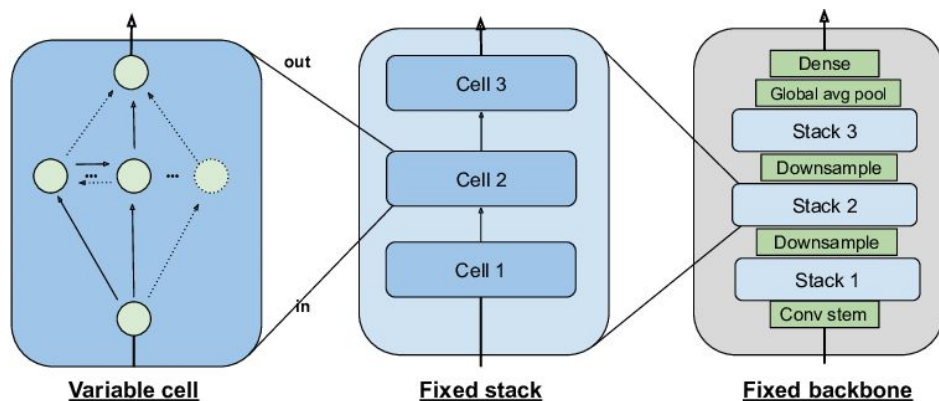


Evolutionary Selection Criteria and Performance in NAS-Bench-101

By: Jordan Donovan

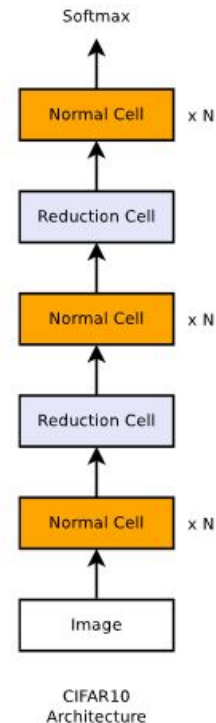
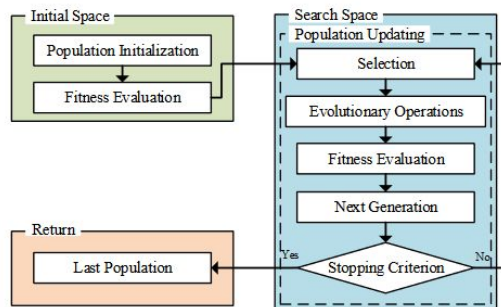
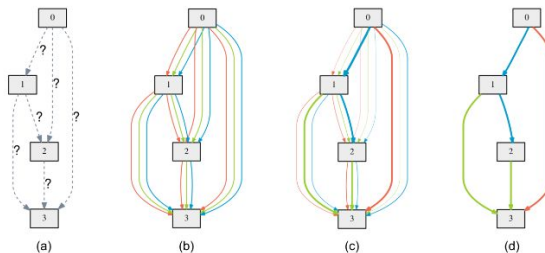
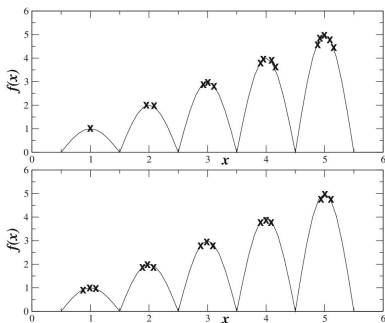
Introduction

- Artificial Neural Networks have come to accel at various tasks.
- Most are hand designed
- Neural Architecture Search (NAS) has become a popular method
- NAS is still constrained by objectively driven designers
- This work applies exploratory selection operators to NAS to observe its ability to discover solutions



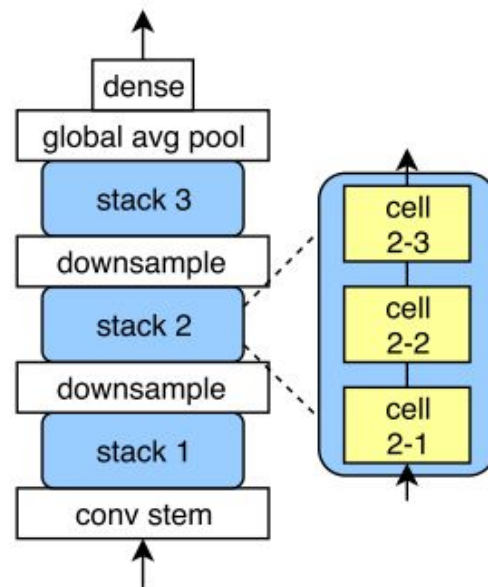
Related Work

- Neural networks
- Neural Architecture Search
 - Differential NAS
 - Evolutionary NAS
- Building Blocks within NAS
- Diversity Maintenance

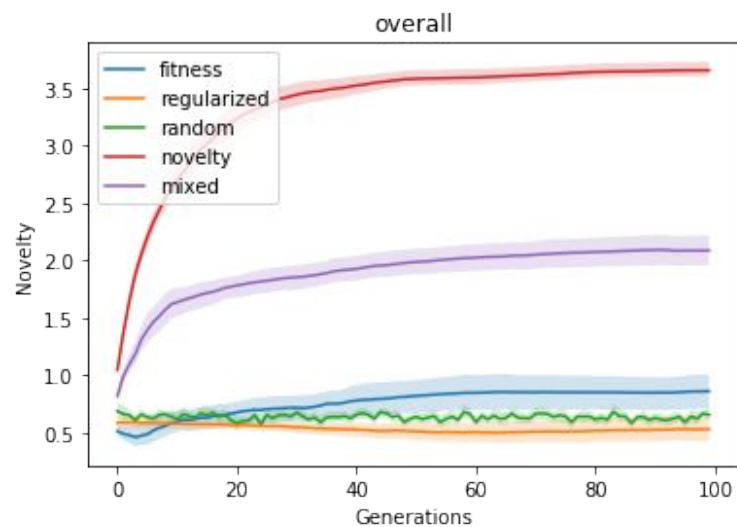
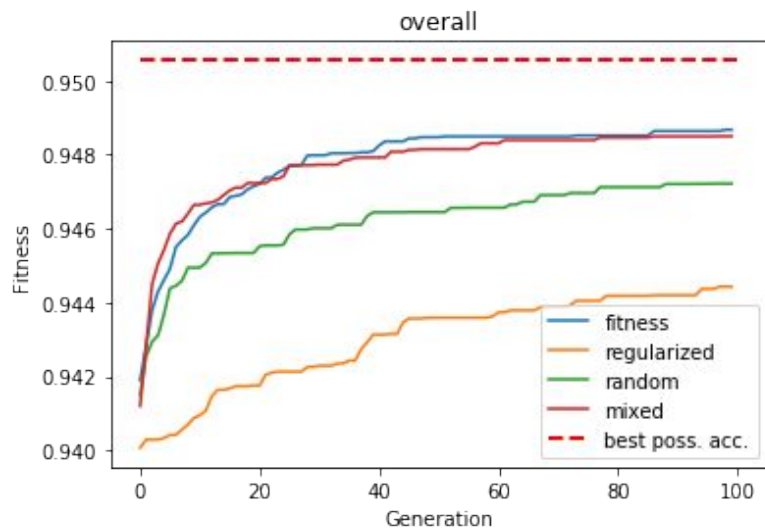
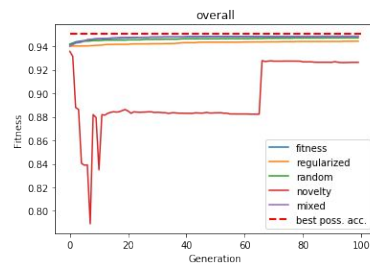


Methodology

- Inner cells of the NAS-Bench-101 space
- Inner cells are then used to construct larger architecture
- Various selection operators are chosen to compare
- Two code repositories associated with NAS-Bench-101 are chosen
- A novelty metric is created comparing lambda distances of cell architectures to a history of cells
- Hyperparameters for evolutionary runs are constant (aside from selection)
- Both fitness and novelty are recorded as metrics



Results



Discussion / Future Work

- Other NAS search spaces that might have different characteristics
- Specific implementation of mixed (novelty and fitness) selection
- Novelty metric of lambda distance of adjacency matrices
- Regularized (age-based) evolution with more computational budget

