Neural Architecture Search

REDS

Charkes VIN, Mathis KOROGLU
Sorbonne Université

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Overview

1. Neural architecture search

2. Our contribution

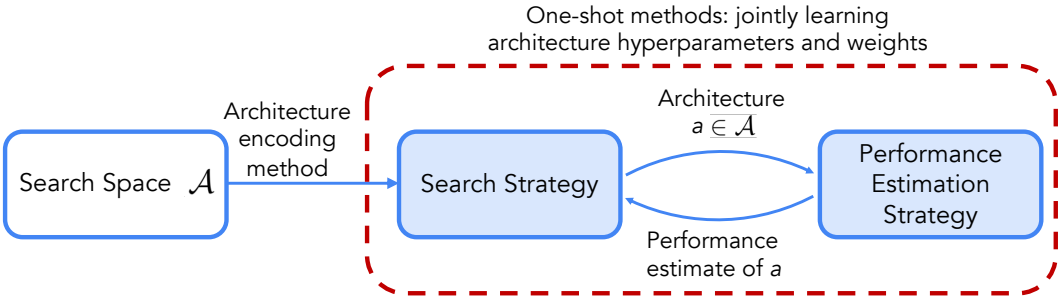

Figure: Overview of NAS.
A search strategy iteratively selects architectures (typically by using an architecture encoding method) from a predened search space $\mathcal{A}$.
The architectures are passed to a performance estimation strategy, which returns the performance estimate to the search strategy.
For one-shot methods, the search strategy and performance estimation strategy are inherently coupled.

Search space

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Definition

The set of all archtectures that the NAS algorithm is allowed to select.

- Size: from a few thousand to over 10^20.
- Reduction: adding domain knowledge.

$\rightarrow$ Introduce humain bias $\rightarrow x$ reduce the chance of finding truly nover architecture.

Search strategy

Definition

The optimization technique used to find a high-performing architecture in the search space.

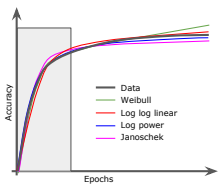
- Black-box optimization techniques : RL, Bayesian optimization, evolutionary search.
- One-shot techniques: supernet-hypernet based methods.

Performance estimation strategy

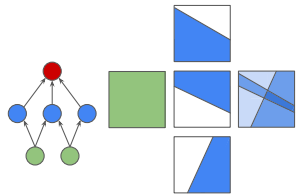
Definition

Any method used to quickly predict the performance of neural architectures in order to avoid fully training the architecture.

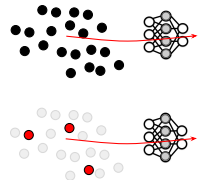
- Full training & evaluation.
- Performance estimation strategy.



Learning Curve Extrapolation



Zero-Cost Proxies



Subset Selection

Multiple Columns

Heading

1. Statement
2. Explanation
3. Example

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References


John Smith (2012)
Title of the publication
Journal Name 12(3), 45 – 678.

Thank you