

AutoML: Interpretability

Overview: Automated Empirical Analysis

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- Big challenge of ML: Interpretability
 - ▶ In some applications, it is required to "understand" a prediction
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 - ▶ Users have less trust in systems, they can't understand
- AutoML is even worse?
 - ▶ AutoML is a black-box that automates the design of another blackbox (ML)
 - ▶ Also ML-developers have an basic understanding of the design of their ML pipelines
- Automated empirical interpretability helps to
 - ▶ understand the finally returned ML system
 - ▶ understand the AutoML process

Approach

- Insights:

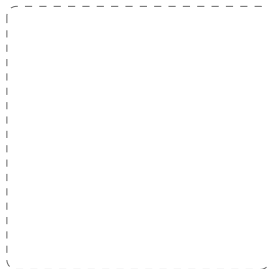
- ▶ AutoML is yet another optimization problem
- ▶ (Most) AutoML approach are iterative in nature

~> AutoML generates a lot of empirical data

Cost c

Budgets

Design Space Λ

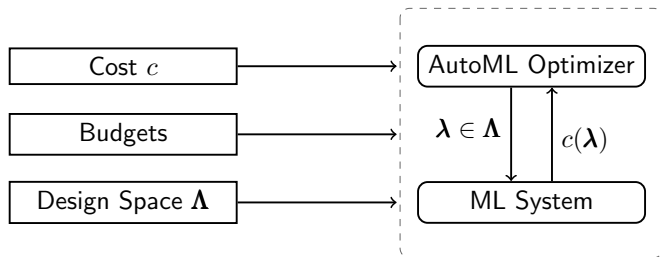


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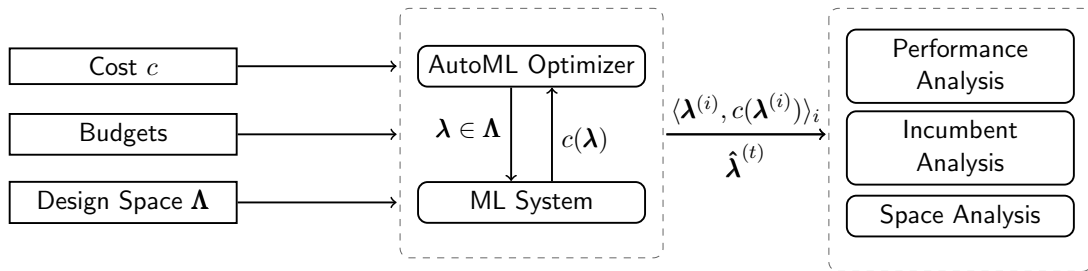


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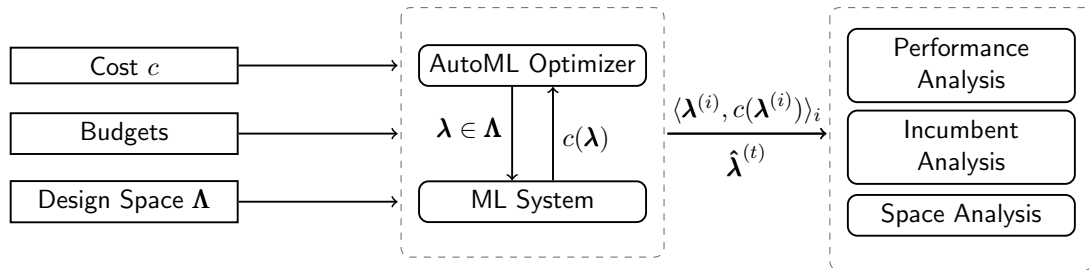


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~> Let's use this data to learn something about our AutoML problem

Basic Examples

- Visualize final incumbent $\hat{\lambda}$
 - ▶ ML pipeline with its components
 - ▶ Neural architecture

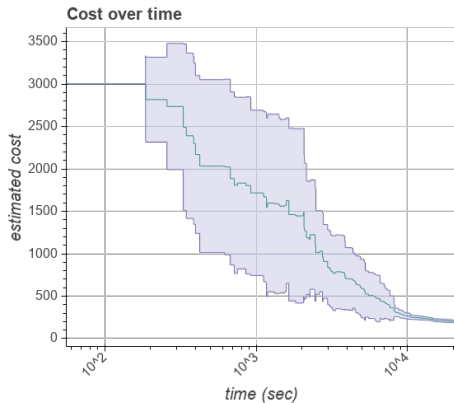
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- Compare what changed between λ_{def} and $\hat{\lambda}$
- Show $\hat{\lambda}$ on different budgets (if you used a multi-fidelity approach)

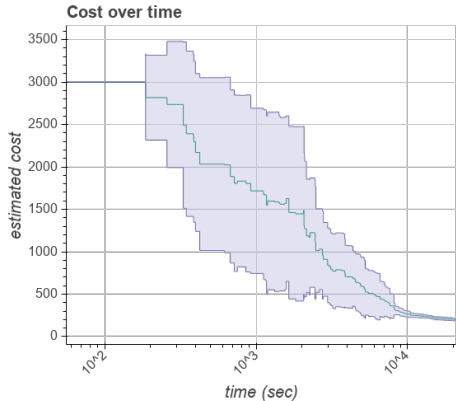
Cost Over Time



- Study how your AutoML tool improves cost (or loss) over time

Source: [Lindauer et al. 2019]

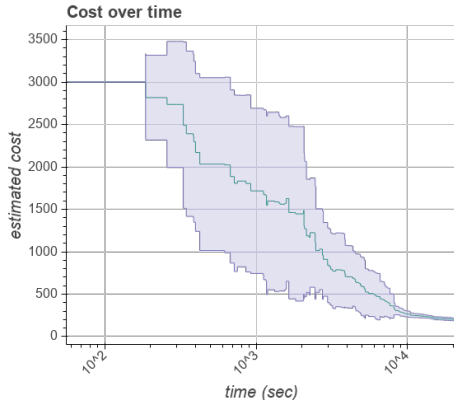
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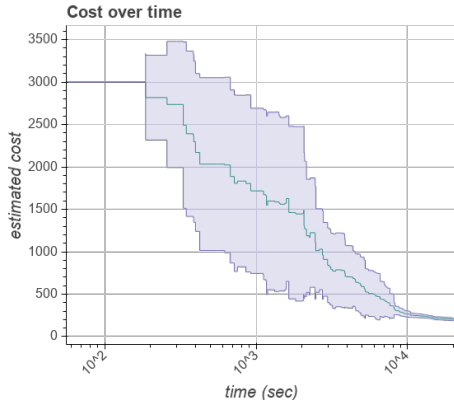
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- Notes:
 - ▶ Plot on log-scale to see details in the beginning
 - ▶ If you done several runs, plot distribution (e.g., median and 25/75%-quartiles)