AutoML: Interpretability

Overview: Automated Empirical Analysis

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Idea

- Big challenge of ML: Interpretability
  - In some applications, it is required to "understand" a prediction
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  - In some applications, it is required to "understand" a prediction
  - 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 a 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

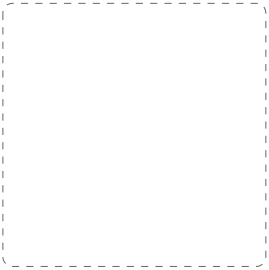
- Insights:
  - AutoML is yet another optimization problem
  - (Most) AutoML approach are iterative in nature

⇝ AutoML generates a lot of empirical data

Cost c

Budgets

Design Space $\mathbf{\Lambda}$



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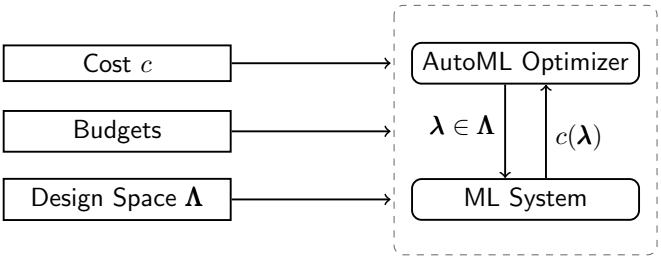

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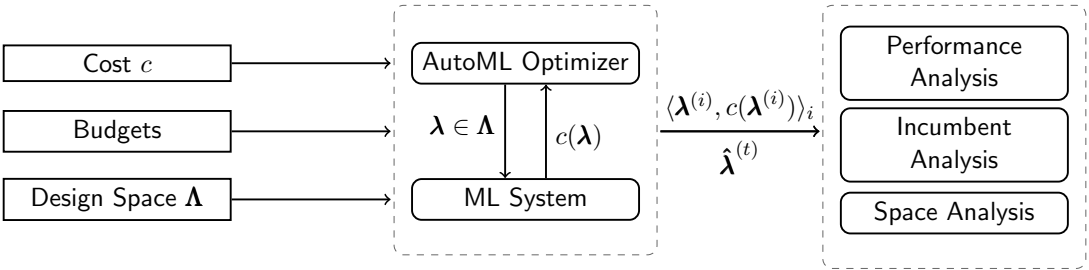

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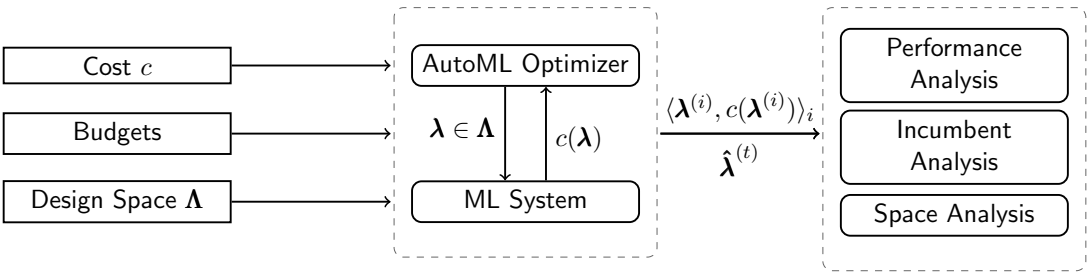

$\rightsquigarrow$ Let's use this data to learn something about our AutoML problem

Basic Examples

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  - ML pipeline with its components
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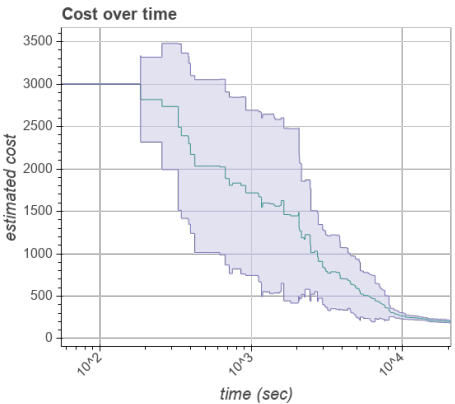
- Compare what changed between $\boldsymbol{\lambda}_{\text{def}}$ and $\hat{\boldsymbol{\lambda}}$
- Show $\hat{\boldsymbol{\lambda}}$ on different budgets (if you used a multi-fideltiy approach)

Cost Over Time



Source: [Lindauer et al. 2019]

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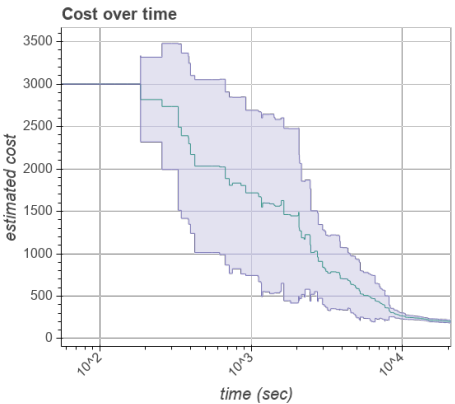

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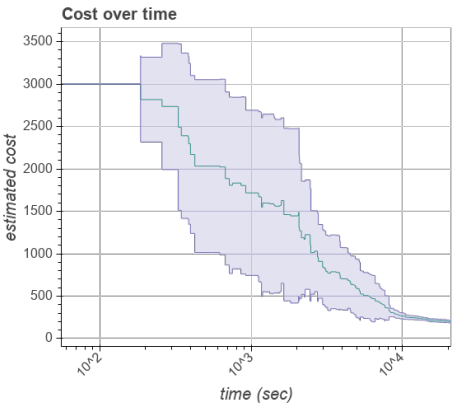

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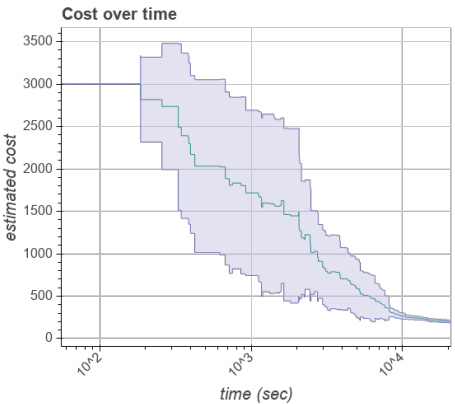

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- Notes:
  - Plot on log-scale to see details in the beginning
  - If you have done several runs, plot distribution (e.g., median and $25/75\%$-quartiles)