AutoML: Meta-Learning

Ever-learning AutoML

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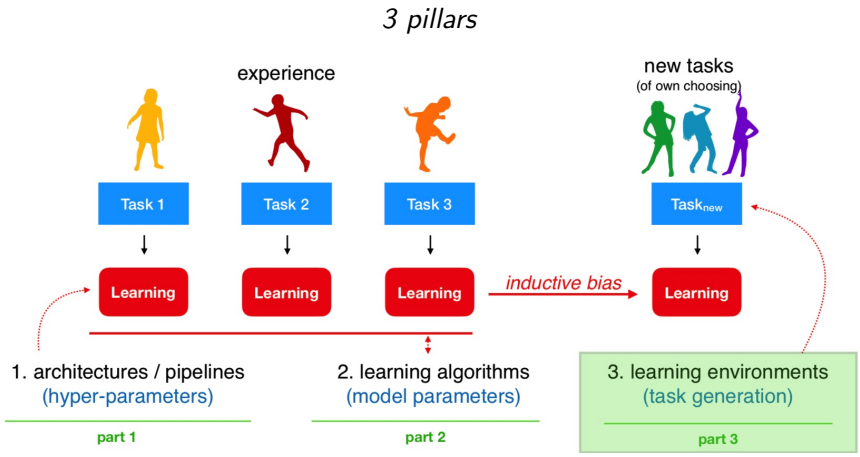
What can we learn to learn?



Training Task Acquisition

- Ultimately, meta-learning translates constraints on the learner to constraints on the data
  - The biases we don't put in manually have to be learnable from data
- Can we automatically create new tasks to inform and challenge our meta-learners?
- Paired open-ended trailblazer (POET): evolves a parameterized environment θ_E for agent θ_A
- Select agents that can solve challenges AND evolve environments so they are solvable

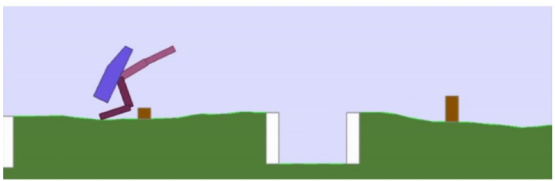
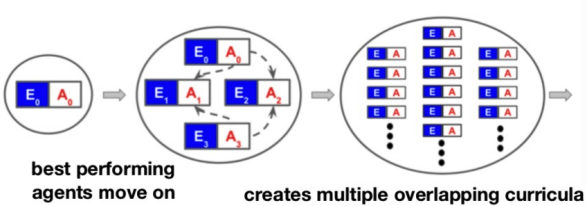


Figure source: Wang et al. 2019

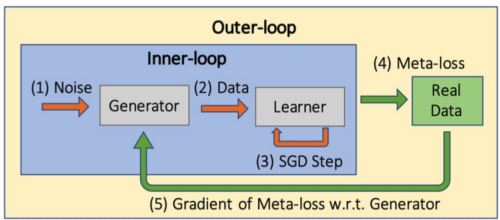


Does POET scale?

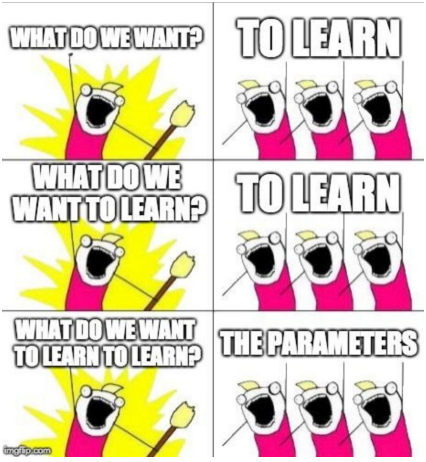
Increasingly difficult 3D terrain, 18 degrees of freedom.

Generative Teaching Networks

- Based on an existing dataset, generate synthetic training data for more efficient training
  - Like dataset distillation, but uses meta-learning to update the generator model
- While POET has limited expressivity (limited to θ_E), GTNs could produce all sorts of training datasets and environments
  - While being careful not to generate noise: needs some grounding in reality



Thank you!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TO LEARN
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THE PARAMETERS
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