Learning to Adapt in Dynamic, Real-World Environments Through Meta-Reinforcement Learning

Anusha Nagabandi*, Ignasi Clavera*, Simin Liu,
Ron S. Fearing , Pieter Abbeel, Sergey Levine, Chelsea Finn

Goal

Use **recent experiences** to quickly **adapt** to the current situation.

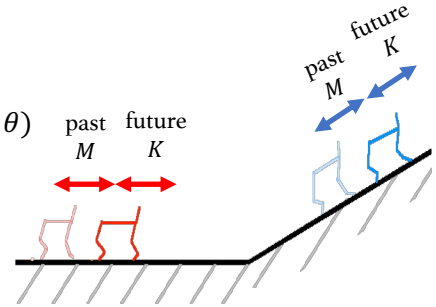
Train time: Learning to Adapt

Meta-learn a dynamics model
Tasks: temporal windows

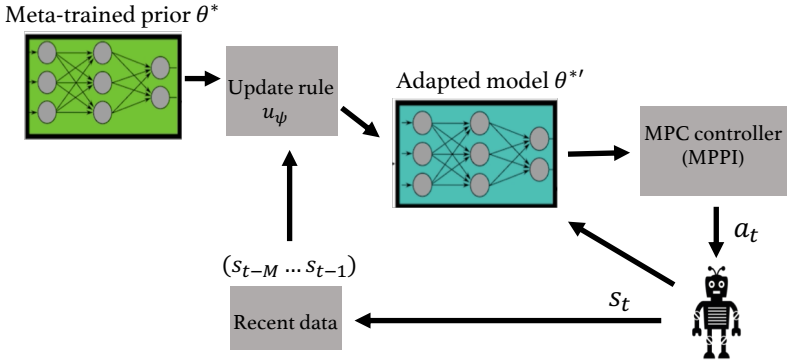
Objective:

$$\min_{\theta,\psi} E[L(D_T^{test}, \theta')] \;\; s.t. \;\; \theta' = u_\psi(D_T^{tr}, \theta)$$

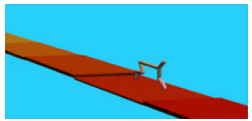
D_T^{test} → Future data
D_T^{tr} → Past data

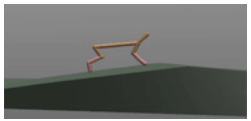


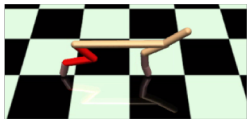
Test time: Meta-Model-Based RL



Experiments


Pier


Terrain slopes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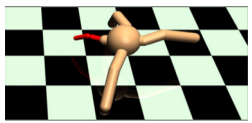
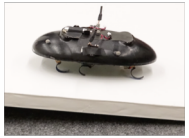

Crippled


Slope


Pose error


Payload


Missing leg