# Accelerate RL with Active Boundary

BLP

NJUPT

December 10, 2020

# Coaching is NOT Teaching

- There are inherient inefficiencies in RL methodology, which can either be driven out with statistical tactics or by complimented with existing control techniques.
- Atheletes don't learn by trial and error. They learn with meticulously engineered coaching.
- Coaching is not teaching, but to provide conditions such that the atheletes can experience things themselves.
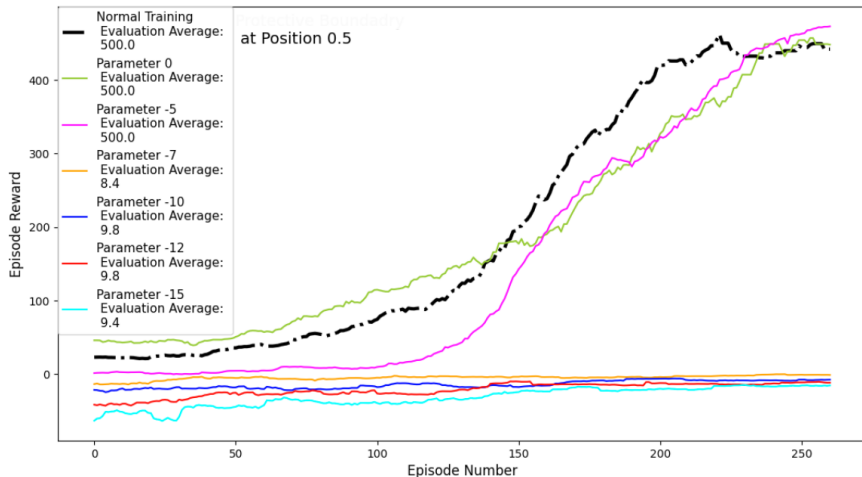
# Active Boundary
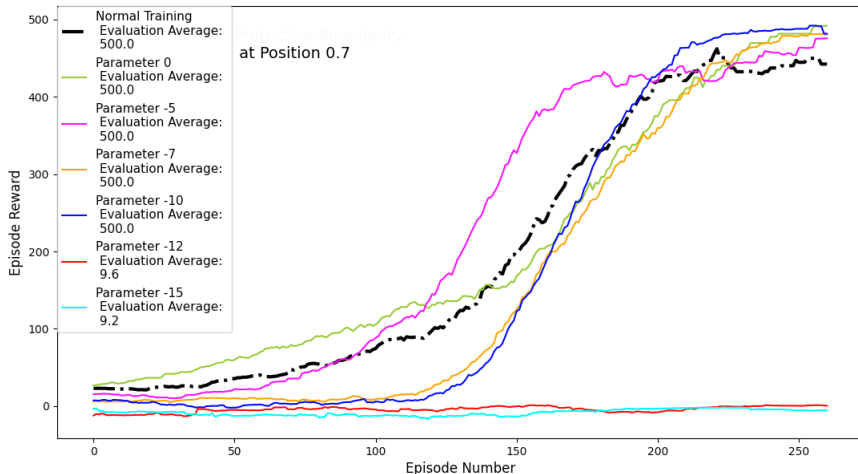


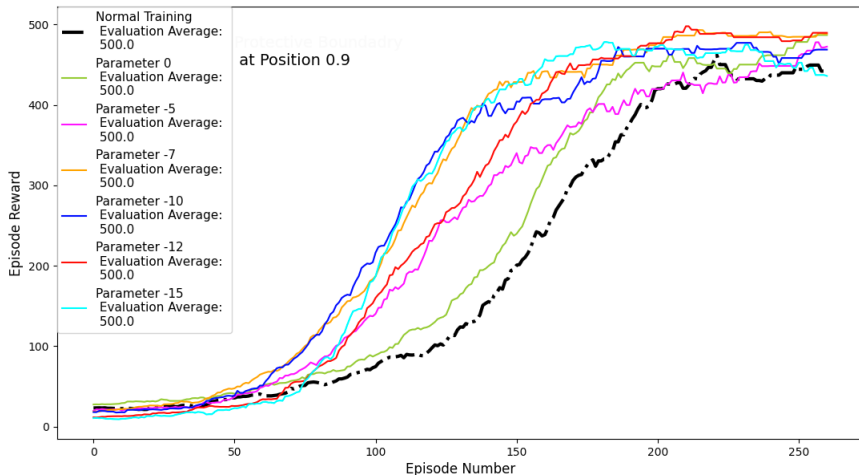Figure: Active Boundary Implemented by Human

# Active Boundary in GYM
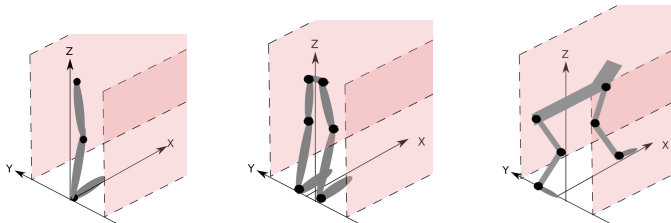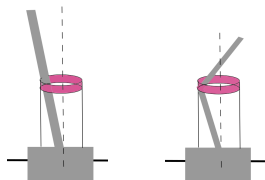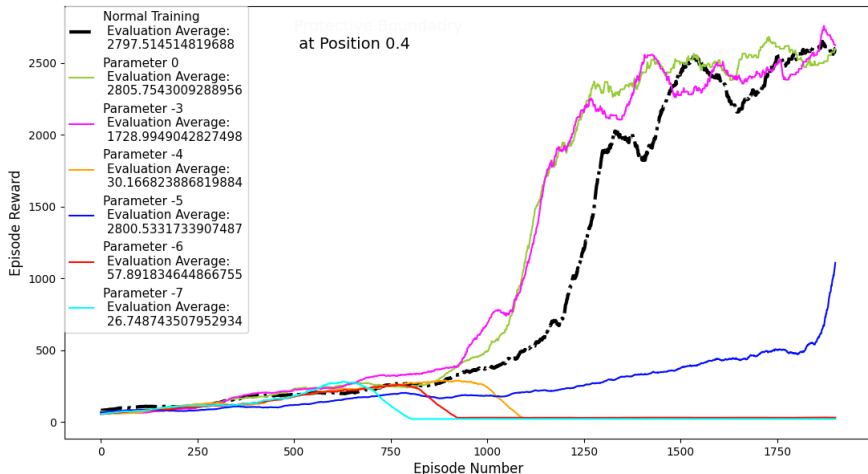
# Inverted Pendulum Boundary at 0.5

# Inverted Pendulum Boundary at 0.7

# Inverted Pendulum Boundary at 0.9

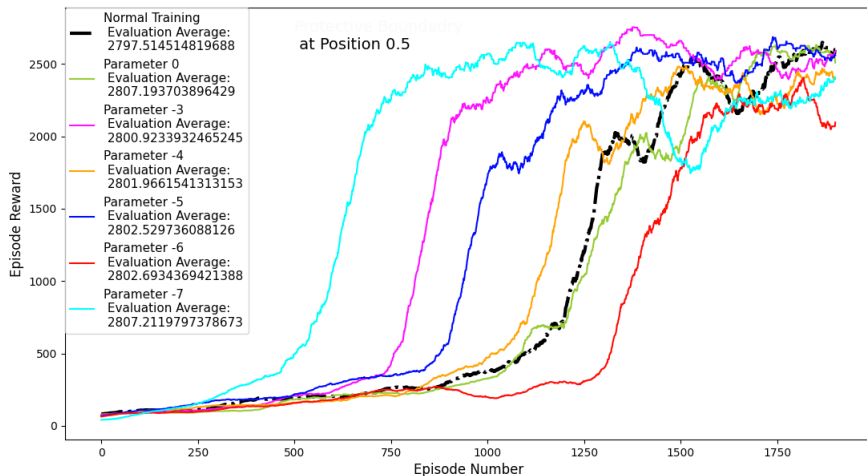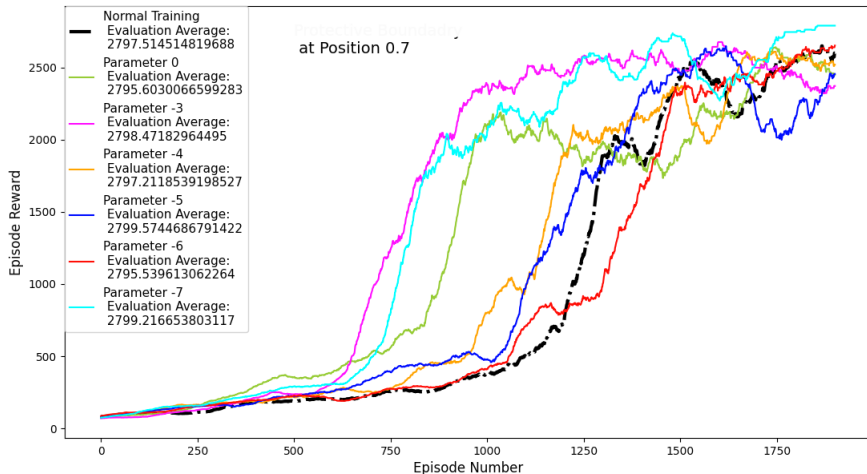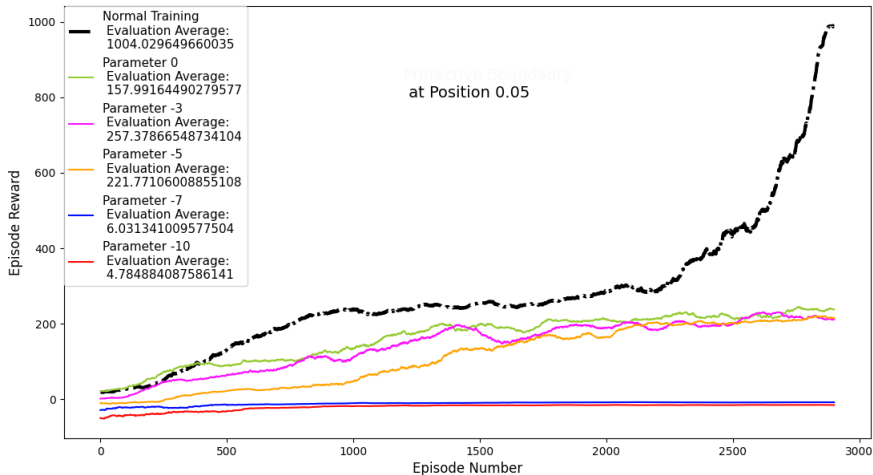# Inverted Double Pendulum Boundary at 0.4

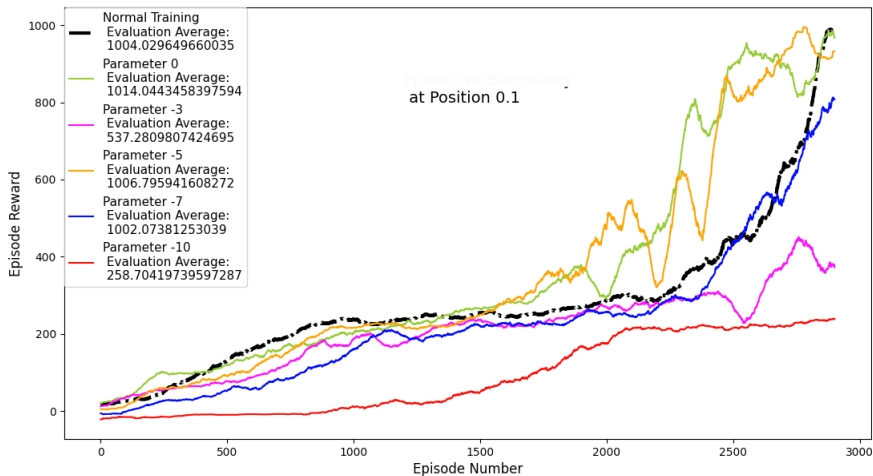# Inverted Double Pendulum Boundary at 0.5
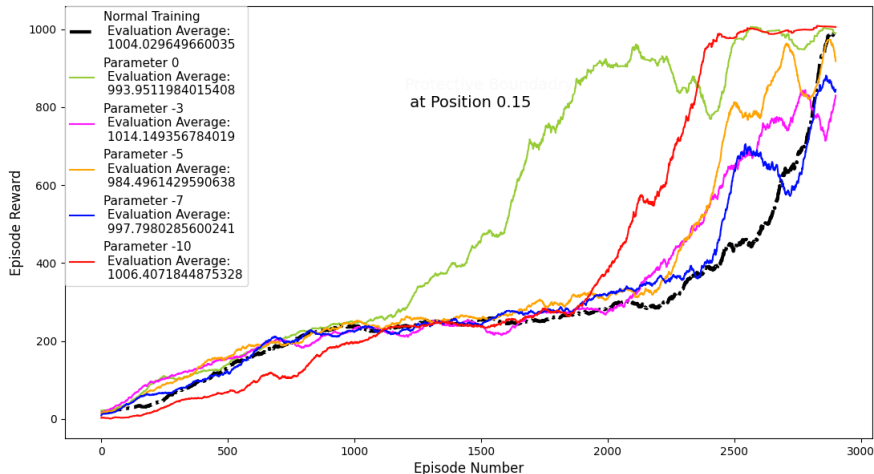
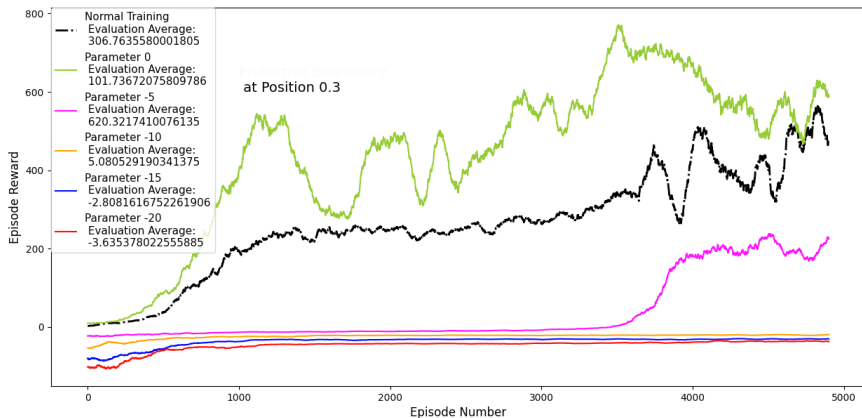# Inverted Double Pendulum Boundary at 0.7
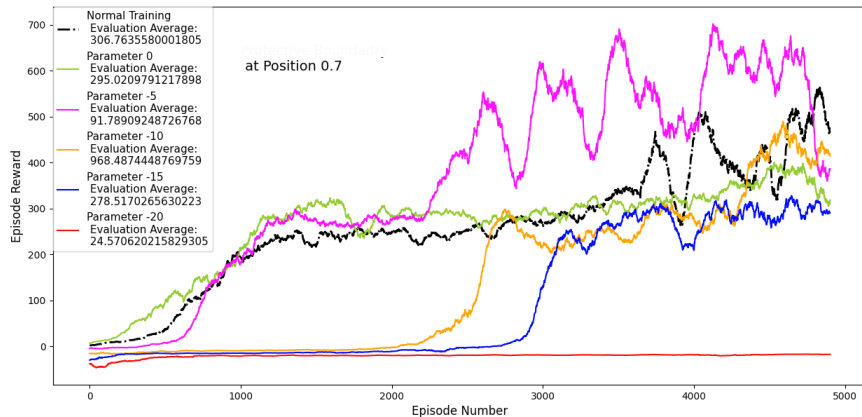
# Hopper Boundary at 0.05

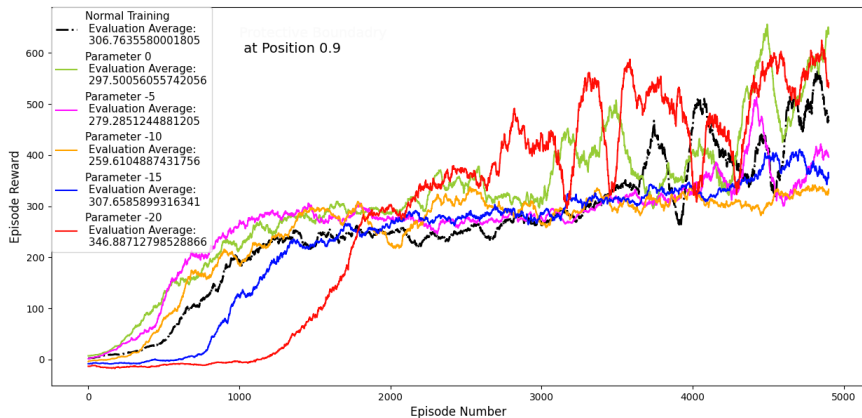# Hopper Boundary at 0.1

# Hopper Boundary at 0.15

# Walker Boundary at 0.3

# Walker Boundary at 0.7

# Walker Boundary at 0.9

# Conclusion and Future Research

- Proof of Concept, it works, albeit in an ad hoc fashion.
- Need Analytical Tools to Guide the Boundary Position and Penalty Design.
- There are TONS TONS of this kind of tactics from the world of professional sports that we can tap into.
- Coach/Athelete Dueling/Bootstrap