

Assessing Policy Optimization agents using Algorithmic IQ test

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Thesis Aims

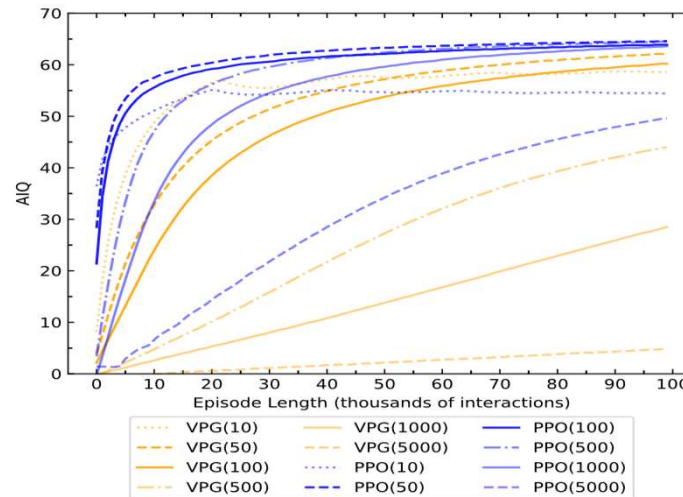
- Modernization of a more complex intelligence test called AIQ
- Implementation and testing of not yet tested family of RL agents on AIQ test

Motivation

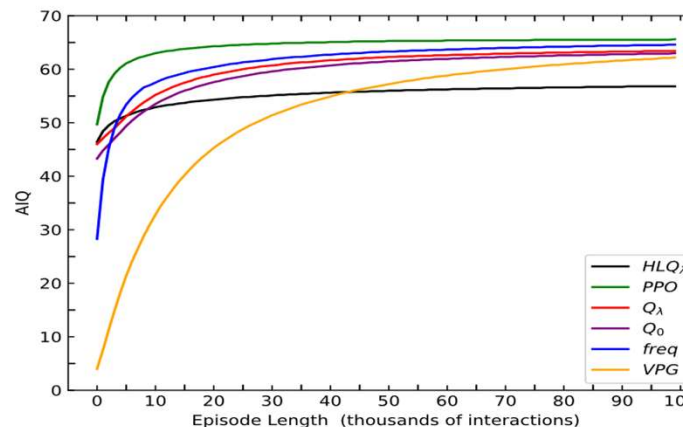
The abilities of Artificial Intelligence are rapidly progressing forward, but only a rare few researchers focus on how well an agent does overall compared to how well an agent does in a specific task. As there is a possibility that we are slowly approaching Artificial General Intelligence, a time has come to look further into what even intelligence means for Artificial agents and how well we can measure this “intelligence” by revisiting Algorithmic Intelligence Quotient.

Algorithmic Intelligence Quotient

Algorithmic Intelligence Quotient is an approximation of an intelligence definition called Universal Intelligence. Compared to the original definition, AIQ is fully computable, and a prototypical implementation of a measuring test exists in the Algorithmic Intelligence Quotient test along with multiple implemented agents.



Comparison of AIQ between VPG and PPO agents



Comparison of AIQ between new and initially implemented agents

Results

- AIQ test Updated from Python 2 to Python 3.8
- Vanilla Policy Gradient and Proximal Policy Optimization agents implemented into AIQ test
- Agents tested over default parameters and exploratory values of newly implemented parameter
- Results used for analysis of:
 - New parameter behavior
 - Relations between new agents
 - Comparison of new and initially implemented agents

Contributions

- Modernization of a prototype eases further research
- Implementing Vanilla Policy Gradient and Proximal Policy Optimization agents allows for further research over behavior and „intelligence“ of these agents
- Results used in article for International Workshop on Explainable and Interpretable Machine Learning (XI-ML)