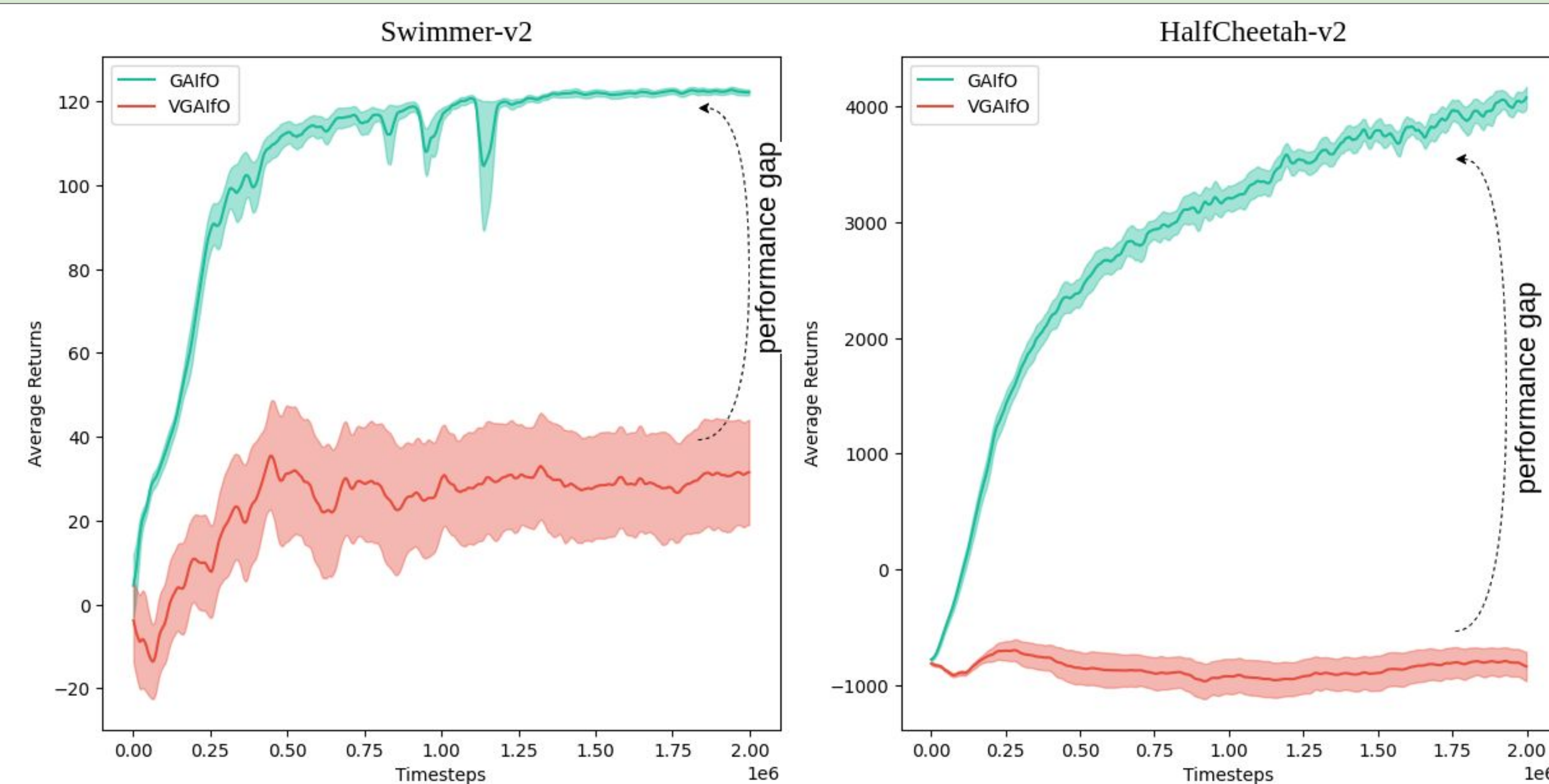


Abstract

- Existing SOTA **Imitation from Observation (IfO)** algorithms exhibit **high sample complexity** when learning from expert's video-only demonstrations.
- In this work, we introduce **Visual Generative Adversarial Imitation from Observation using a State Observer (VGAIfO-SO)** an IfO algorithm that learns to imitate from video-only expert demonstrations while **leveraging proprioceptive states of the imitator**.
- VGAIfO-SO maps visual observations of the agent to proprioceptive states, using **self-supervised learning** and incorporates this into adversarial learning, improving sample efficiency and imitation learning performance.



There exists a large gap in performance and sample-efficiency between **GAIfO** and **VGAIfO**

Contributions

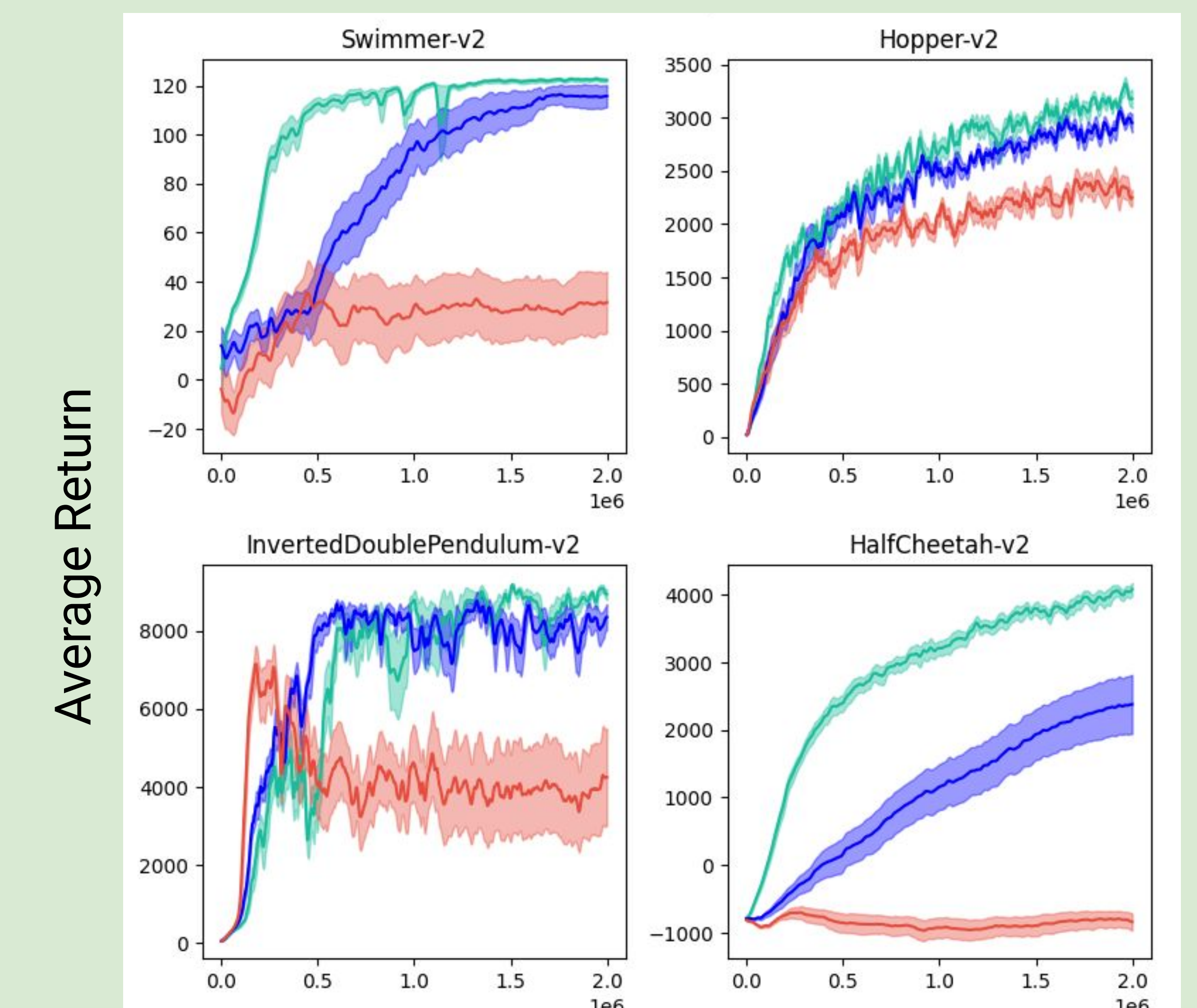
- We hypothesize that this **gap in performance** is due to **adversarial training** without leveraging the proprioceptive information on the discriminator network updates.
- We introduce a **state-observer** network that maps from high-dimensional **visual observations** to low-dimensional **proprioceptive states** of the agent.
- State observer + Discriminator = Sample efficiency + Improved performance.

VGAIfO-SO improves existing imitation learning techniques by explicitly modelling the mapping from images of demonstrators to internal states



<https://arxiv.org/abs/2202.00243>

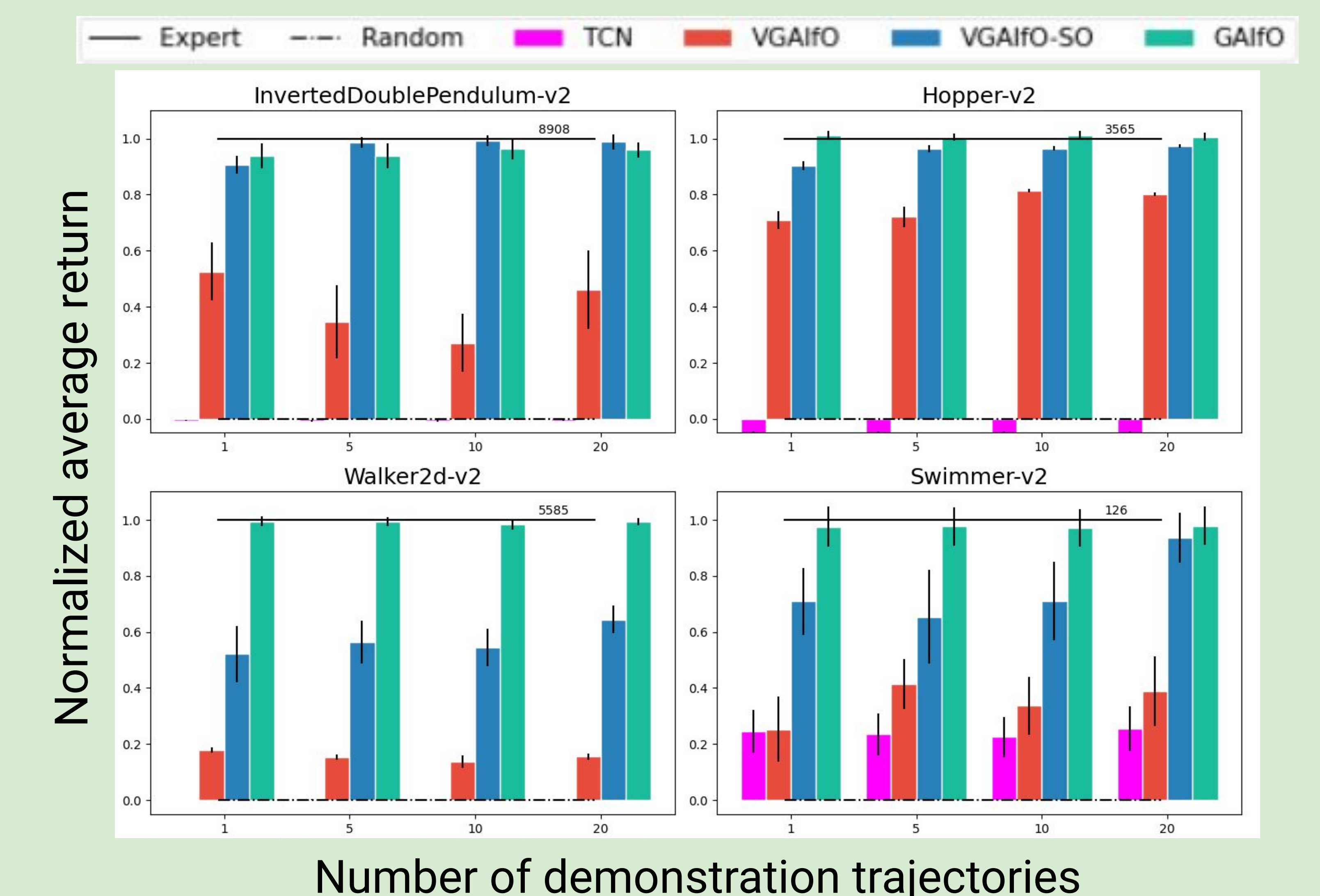
VGAIfO-SO improves sample efficiency



Environment Interaction steps

VGAIfO-SO is more sample efficient than VGAIfO, TCN

VGAIfO-SO achieves better performance



VGAIfO-SO imitates the expert better than VGAIfO and TCN