

Simulation

Proprioception o_t^p

Terrain geometry o_t^g

Physical parameters $P_t = (f_t, s_t)$

1

Interaction pipeline - Proprioception + Geometry

$o_{t-n}^p \quad o_{t-n}^g$

$o_{t-n} \quad \dots \quad o_{t-1} \quad o_t$

Friction decoder

Stiffness decoder

Friction params.

$f_{t-n} \quad \dots \quad f_{t-1} \quad f_t$

Stiffness params.

4 feet

Multimodal info history

Physical decoder

Shared Physical Understanding

Learn how it feels

Learn how it looks

self-supervised
labeling

2

Vision pipeline - Exteroception

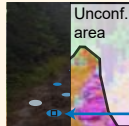


Image I

Encoder
MLP

Decoder
MLP

Training / Inference



Sup. Mask / Dense Pred.

Reality

Footholds

Exteroception /