WHAT THIS TALK IS ABOUT
NVIDIA GAMEWORKS

PHYSX

FLEX

DESTRUCTION

HAIRWORKS

FLOW

CLOTH
VR

Ivan Sutherland, MIT/Utah, 70s
VR APP CHALLENGES

- GRAPHICS
- AUDIO
- TOUCH
- PHYSICAL SIMULATION
Architectural Design
AUTONOMOUS VEHICLES
PROJECT HOLODECK
ROBOTICS
example: ANYmal
DNN REVOLUTION
by random example of Albrecht Altdorfer
REINFORCEMENT LEARNING is not rocket science
WHY REINFORCEMENT LEARNING
is best in a simulated environment
TRAINING A ROBOT IN HOLODECK

VR real enough for trained skill to transfer to rl
FROM HOLODECK TO ISAAC

What we added

- Robot Import
- Virtual Vision
- Interface to AI Server (the “brain” we are training)
WE ALSO NEED
For a showcase

A real robot

Some training challenges
VR - ROBOT INTERFACE

ROS.org
VR - BAXTER INTEGRATION

Block Diagram

ISAAC VR

AI SERVER

- Domino Vision
- Domino Play AI
- Robo Drive

BAXTER

BX-CONT.
A-I SERVER

RL DNN Domino Recognition
Algorithmic Endpoint detection
RL DNN Domino Play / Explicit coded Domino Play
(for Hockey: RL Continuous control)
This is for inference!
Training backend can run on Cloud → DGX workstation.
DOMINO VISION

For each incoming image

- Multiple Domino Detection
- Domino Pose Estimation
- Domino Type Classification
DOMINO RECOGNITION
BAXTER CONTROL COMPUTER

Strapped webcam

Iterative movement refiner (PID c.)

Vision based human interaction
VISION BASED HI

BodySLAM
IK arm controller

(Golf/Hockey demos generate joint torques directly)
VR ENVIRONMENT

A relatable robot
NEXT STEPS
THAT’S ALL FOLKS!
Thanks you!

Lots more to come: This is just proof of concept, and very early days.

Looking for robotics collaborators

Hiring like crazy...