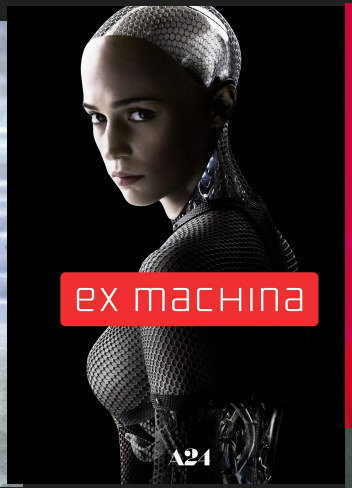
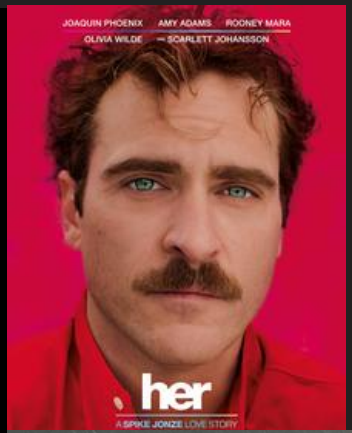
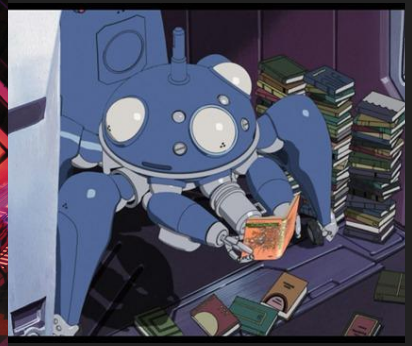
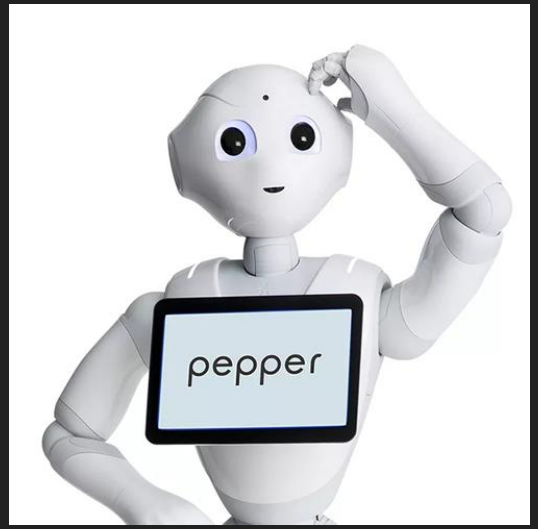
Original goal of AI: **Human-level AI**







Harder than we thought



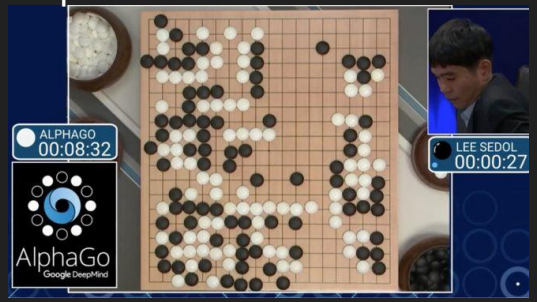
"A cat has four times the mass of a human "
"A cat has four stomachs, and each has different gut bacteria."
"A cat has four eyes, a cat has a hole in the front of its mouth, and a cat's face. It's called a catfish. "

New Deep Learning Approach:

Solve specific tasks super well using **lots** of data, and compute

It works!

AlphaGo



GPT2

In a shocking finding, scientist discovered a herd of unicorns living in a remote, previously unexplored valley, in the Andes Mountains. Even more surprising to the researchers was the fact that the unicorns spoke perfect English.

The scientist named the population, after their distinctive horn, Ovid's Unicorn. These four-horned, silver-white unicorns were previously unknown to science.

Now, after almost two centuries, the mystery of what sparked this odd phenomenon is finally solved.

Dr. Jorge Pérez, an evolutionary biologist from the University of La Paz, and

AlphaFold: Using AI for scientific discovery

But what about human-like AI?

Why care about human-like AI?

Economic reasons:

- Social robots can help us in many tasks

Scientific reasons:

- Understand intelligence
- Understand ourselves

Is the current approach fit to get human-like AI?

- Maybe. Maybe solving more and more tasks well, will converge into human-like AI.

- Probably not. Human intelligence has many ingredients which we don’t understand!

How can we learn about human intelligence?

Duh, humans

ok but how?

Traditional approaches

Train only on robot

Interacts with humans

Not enough data/training time

Train only on simulation

Does not with humans

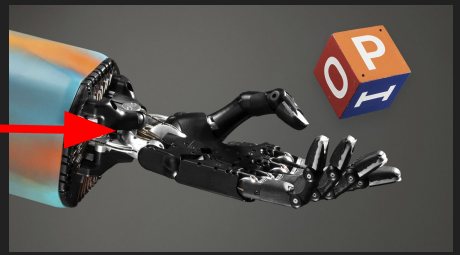
Lots of data/training time!

sim2real

Interact with humans

Leverage simulation data/training

Very hard! Learned behavior doesn't generalize to real world!



Train on simulation

↓

Test on physical world

↓

Gather data

↓

Refine simulation
E.g. learn models that imitate human behaviour

LATENTLOGIC

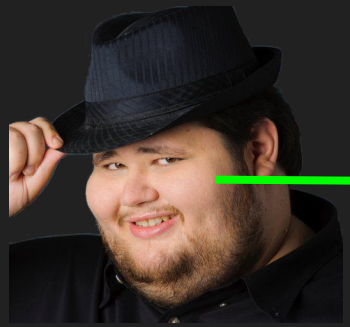
real2sim

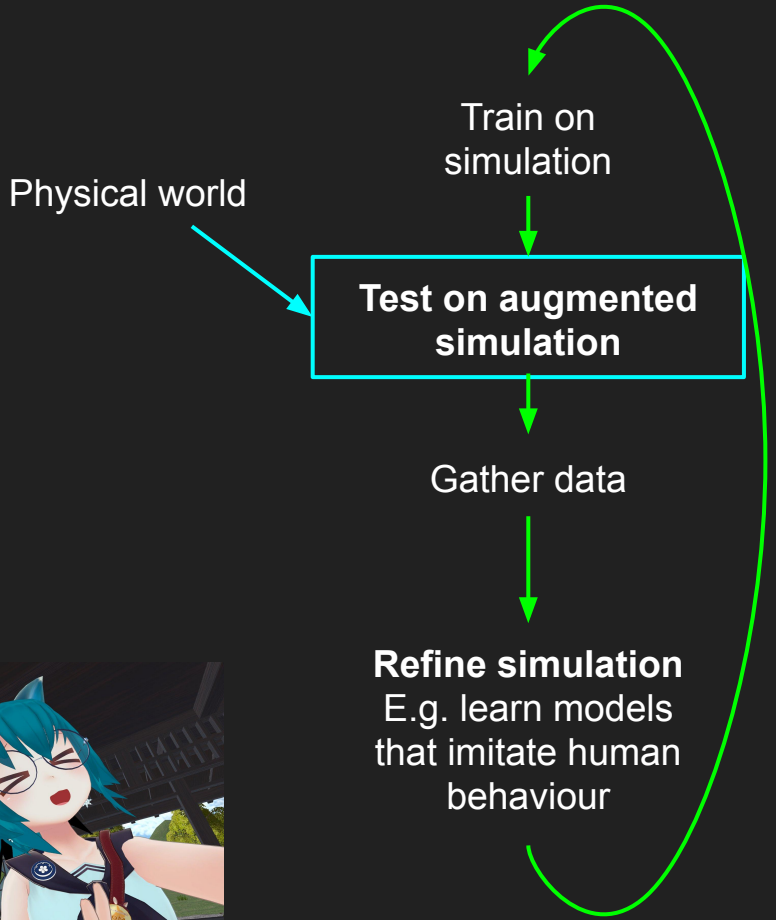
Interact with humans

Leverage simulation data/training

AI can train and test in the same familiar environments

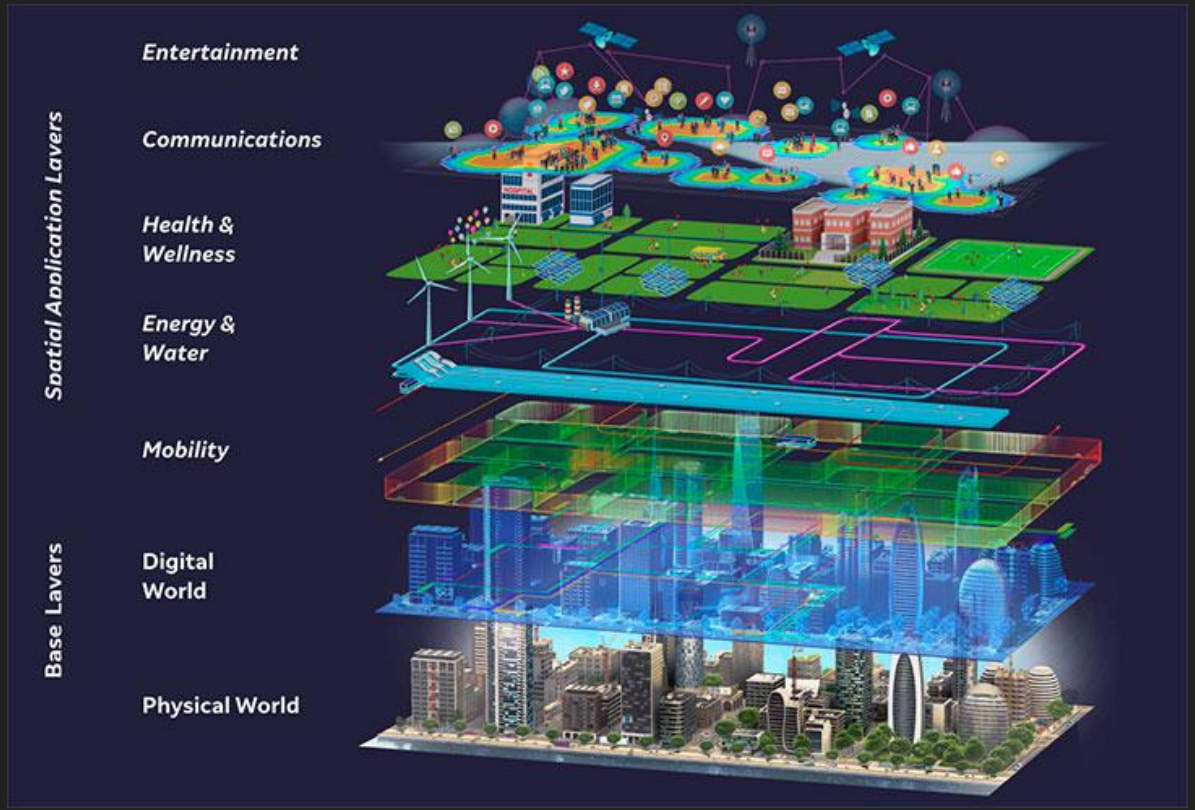
Humans adapt fine to virtual world:)





Mixed reality

An untapped opportunity for AI research?



Idea - Train AI in social Virtual Reality environments

to learn about humans
and for both humans and AIs to learn how to interact with each other

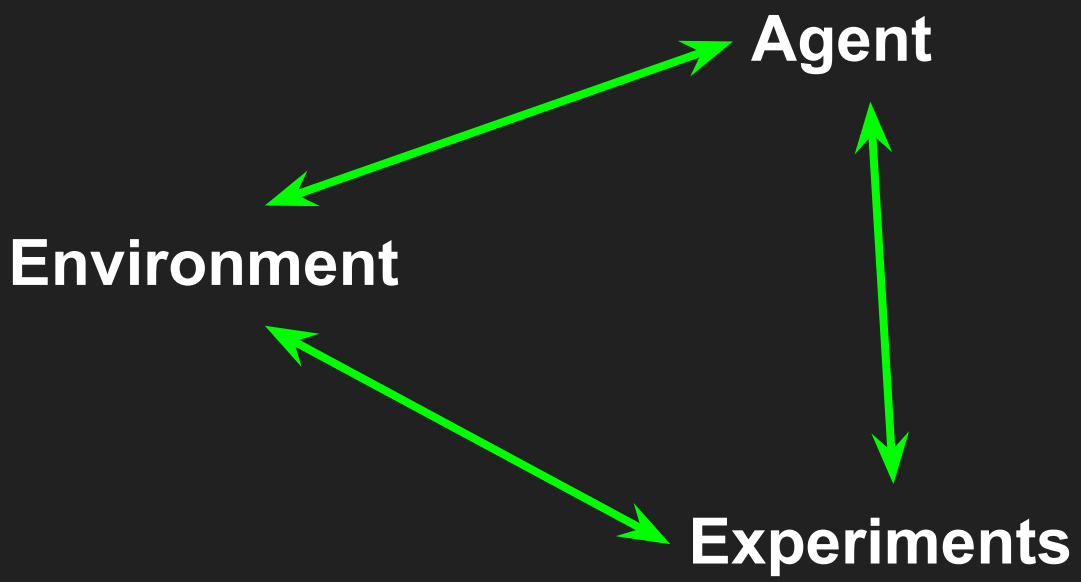
Neos VR

VRChat

OxAI tackles the challenge

VRAI

Divide and conquer:



Environment

Q: what environments/activities are

conducive to learning?

- toys/social games/playgrounds!

Q: how do we build these environments?

unity

VR CHAT
Unity SDK

Environment

Developing the interface

Networks/
API design/
distributed computing/

Inspiration:

- ML-Agents/OpenAIGym
- NeuralMMO

Show interface demo

Agent

What prior knowledge?

Movement

Natural language understanding

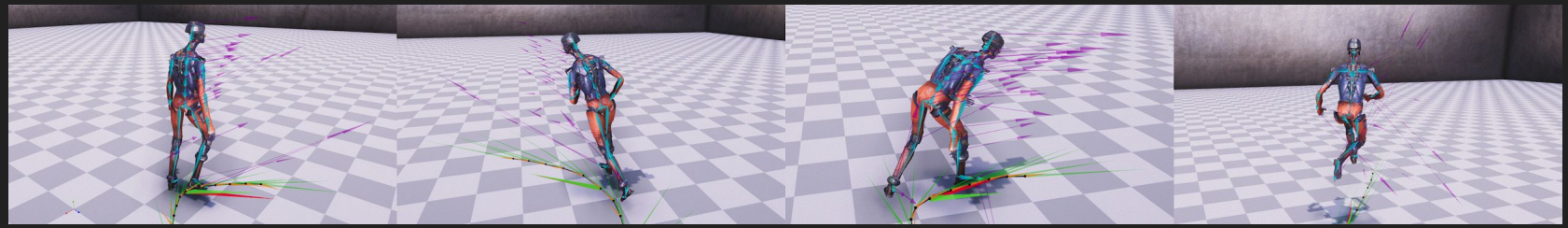
Speech/audio understanding

Computer vision

Predictive models

Intuitive psychology

Intuitive physics

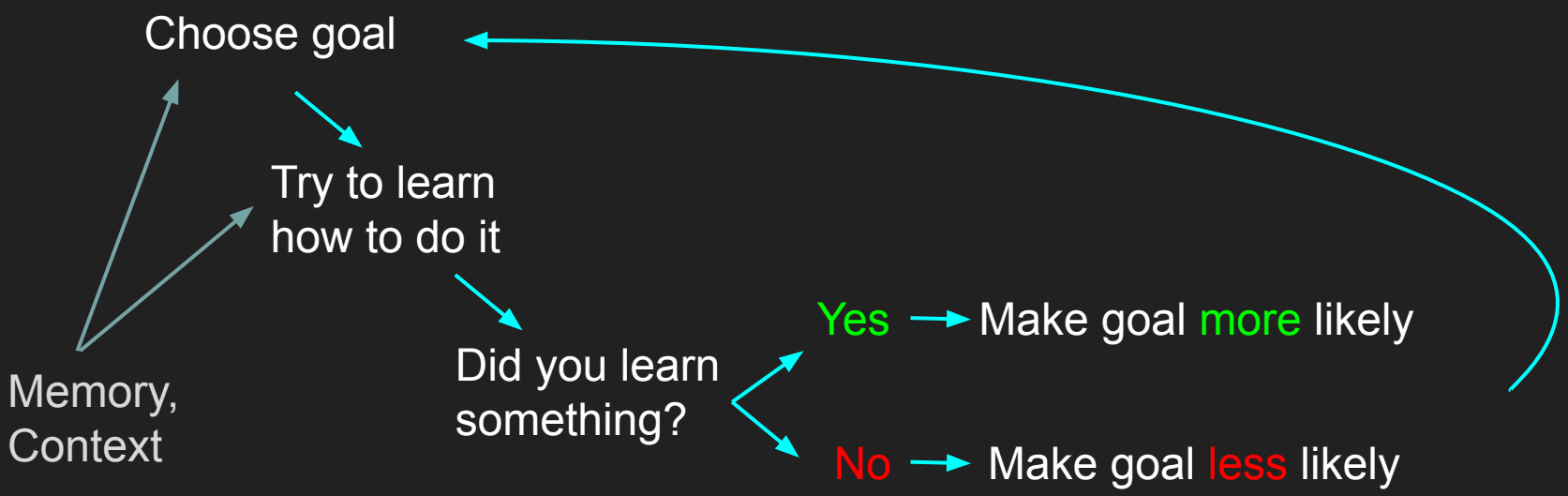


Agent

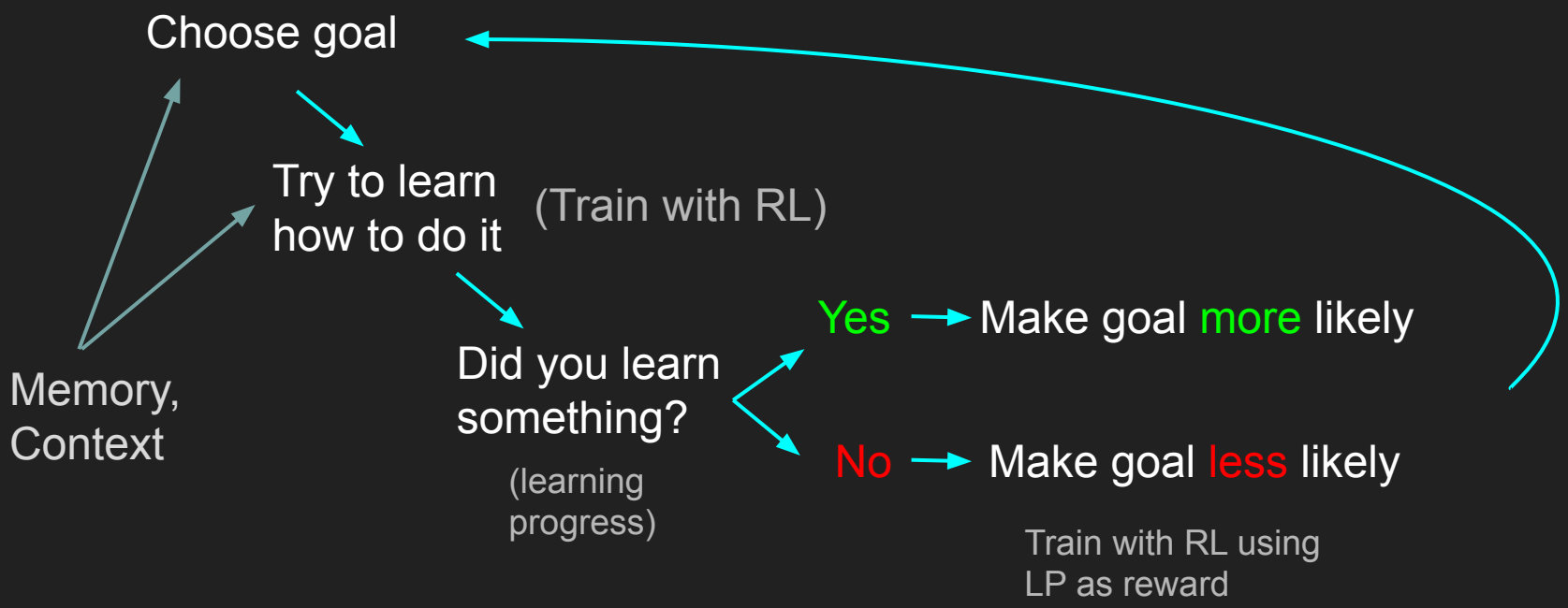
Developing Reinforcement Learning Algorithms

- Curiosity in RL / Intrinsically-motivated agents
- RL algorithms: policy gradient methods, meta-learning
- Continual learning (with memory/RNNs)
- Curriculum learning
- Imitation learning
- Developmental “robotics” / computational cognitive science

Curious agent



Curious agent



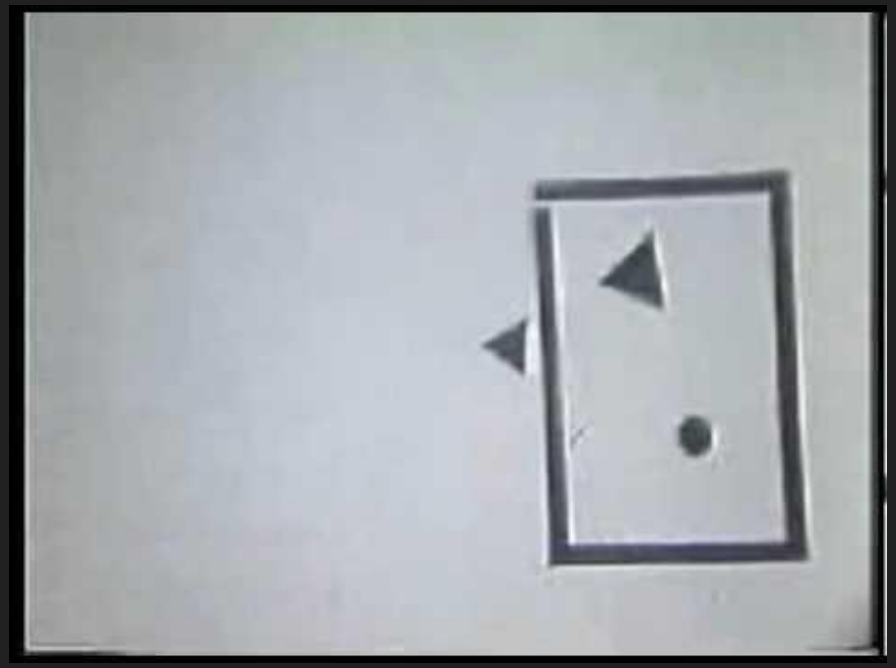
Experiments

How do we measure progress?

What tasks do we test the environment on?

What metrics do we gather?

Is the agent able to recognize social cues?



Interesting research questions in

- Psychology / developmental psychology
- Behavioural science
- Cognitive science
- Reinforcement learning
- Human-computer interaction
- etc ???

That can benefit from and give insight to AI research (in particular for RLinSocialVR)

Further opportunities

- Making this into a usable framework for researchers
- Using this as a platform for public engagement, and enjoyment of AI/psychology research
- Other ideas and stuff?