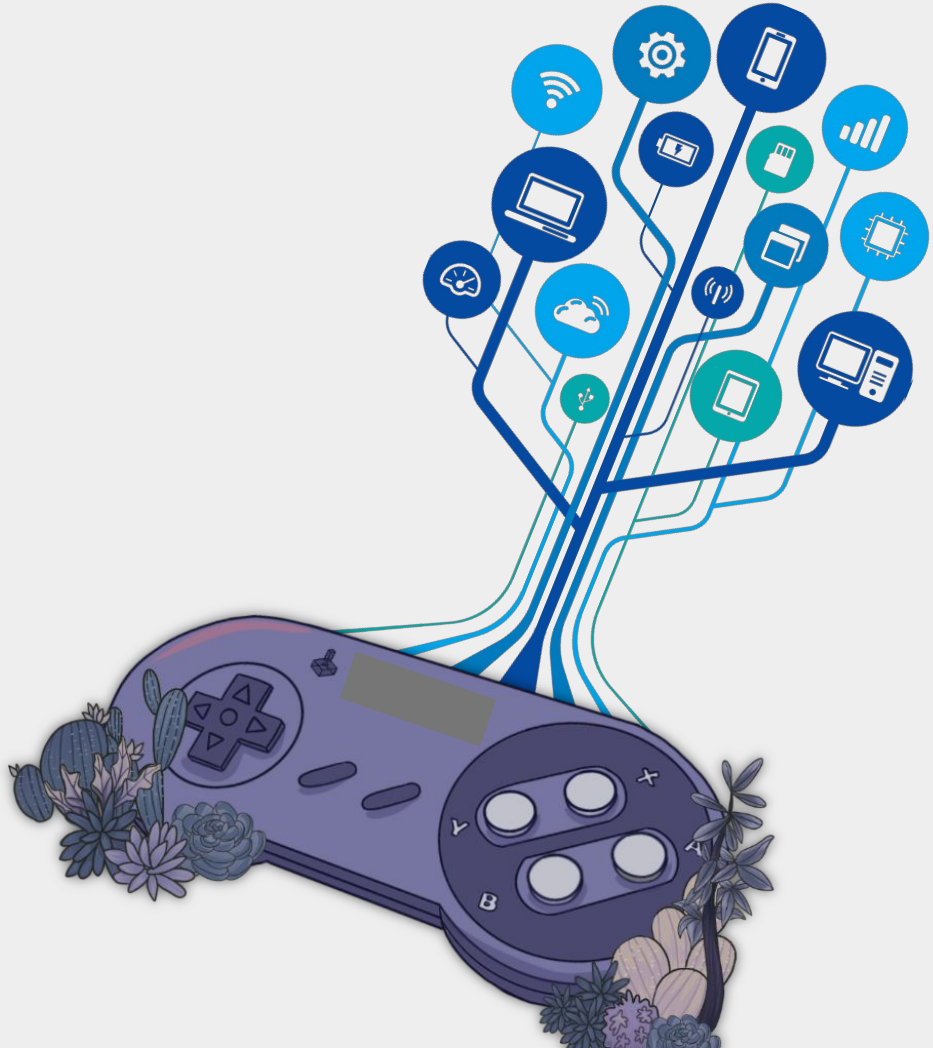
Ethics, Games, and AI

Presented by Ryan Lewis



Google's DeepMind

- Game-Oriented
- Why?

DeepMind uses AI to control plasma inside tokamak fusion reactor

For the first time, artificial intelligence has been used to control the super-hot plasma inside a fusion reactor, offering a new way to increase stability and efficiency

TECH • YOUTUBE

YouTube video streaming now using A.I. that mastered chess and Go

BY **JEREMY KAHN**

February 11, 2022 3:00 AM CST

DeepMind's AI uses Trolley Problem to learn ethics

By John Doe published March 04, 2022

Life-and-death situations are now decided by robots.

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Nvidia's GPU-powered AI is creating chips with 'better than human design'

By Jacob Ridley published 7 days ago

So, it's using AI accelerated by its GPUs to accelerate its GPU development.

> So this is like an Atari video game, but it's a video game for fixing design rule errors in a standard cell.
>
> Bill Dally, Nvidia

Proposal

- **Ethical gamification**
- The ethical learned model
  - “Principles”

1

Gamifying Ethics for AI

Gamifying Ethics for A.I.

The most advanced artificial intelligence can learn how to be ethical.
In turn, ethics must become a game for it to beat.

Story by Ryan Lewis

MARCH 2022 ISSUE

Editor's Note: *This article is part of a research portfolio that attempts to answer the question: How do we teach AI systems to be ethical?*

I. The Current State of AI

TECHNOLOGY HAS DOMINATED human affairs for centuries. From the telegraph, to the car, to the Internet, technological advances have gently taken typically human activity away from humans, and performed it on its own.

EDITORIAL

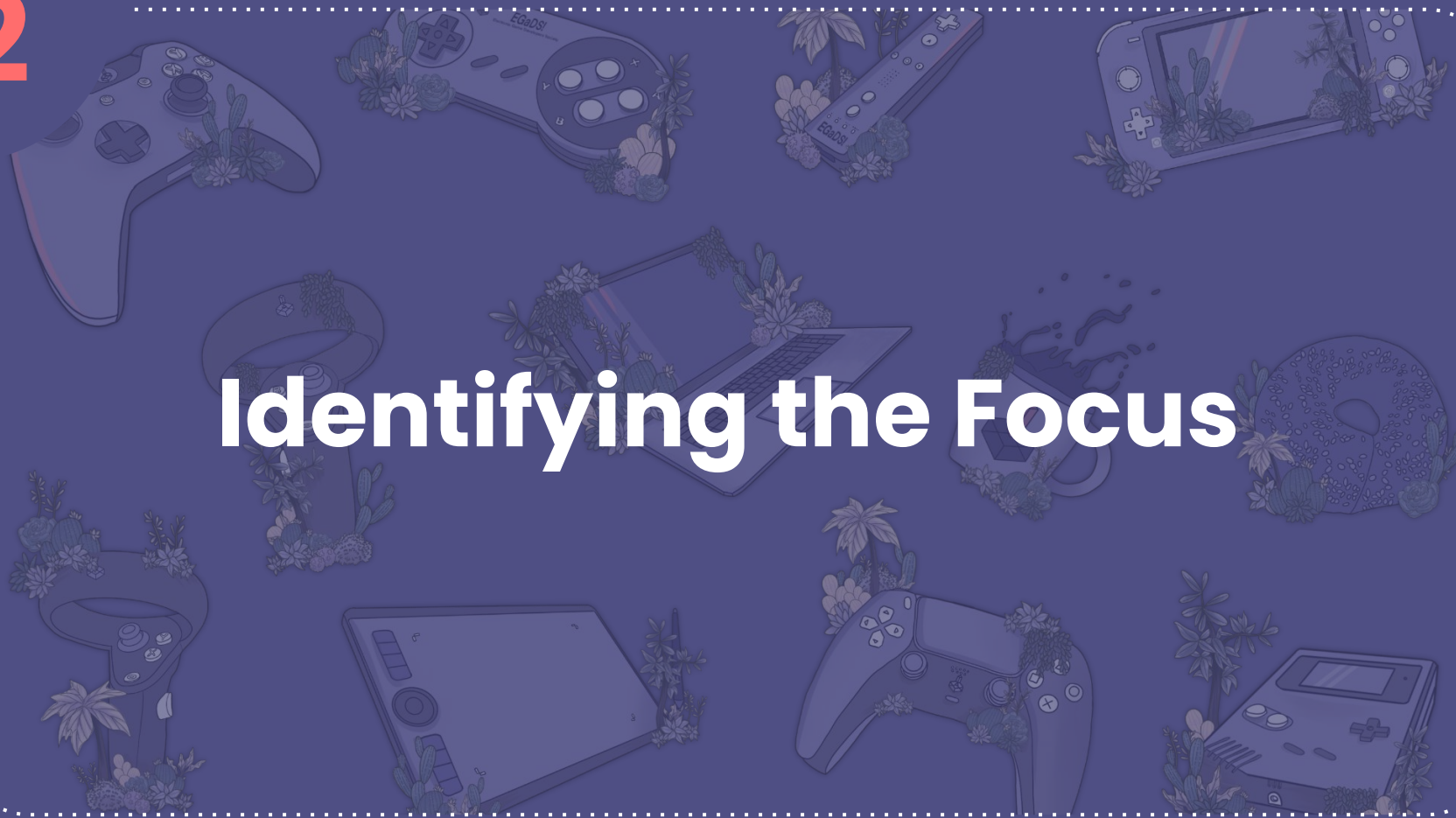
Gamifying Ethics for A.I.

The most advanced artificial intelligence can learn how to be ethical.
In turn, ethics must become a game for it to beat.

The games we play everyday are hallmarks of our ethics systems and can be used to define them too.


HIGH
SCORE

2



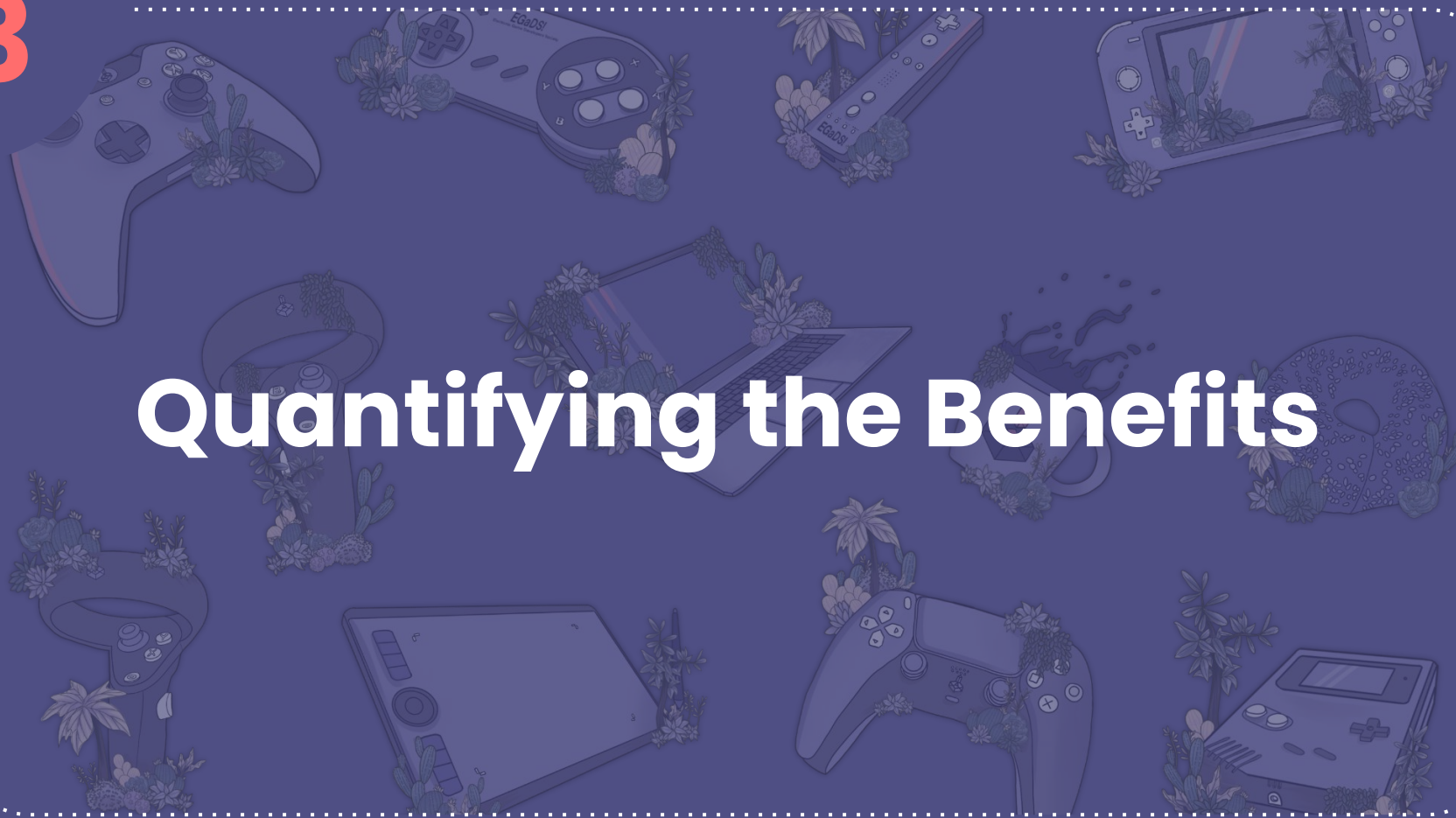
Identifying the Focus

Should all systems be ethical?

No!

- Human vs Non-Human
- Gray Areas

3



Quantifying the Benefits

Google's YouTube

Game-Oriented Ethics in AI: The Future

Game-Oriented Ethics in AI: Mu-Zero and the Ethical...

Game-Oriented Ethics in AI: The Types of Games


10,000x - 25,000x
better

GAME OF ETHICS

AI

PERSON LIVES

PERSON DIES

How to play: Tap the top side of the screen to send the trolley to the top track. Press the bottom to speed up the trolley and let it continue towards the bottom track.

START

SUBMIT YOUR OWN PROBLEM

3 MAIN ETHICAL THEORIES

virtue: Is it proper?

consequentialist: Is it good?

deontologist: Is it right?

CONSEQUENTALIST LEARNED MODEL

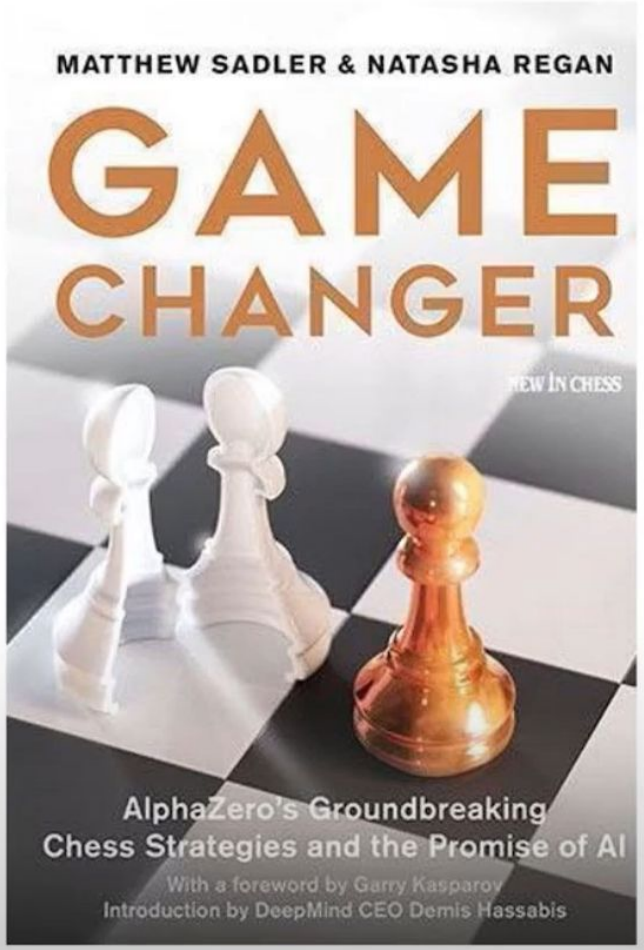
POLICY

VALUE

PERSON LIVES

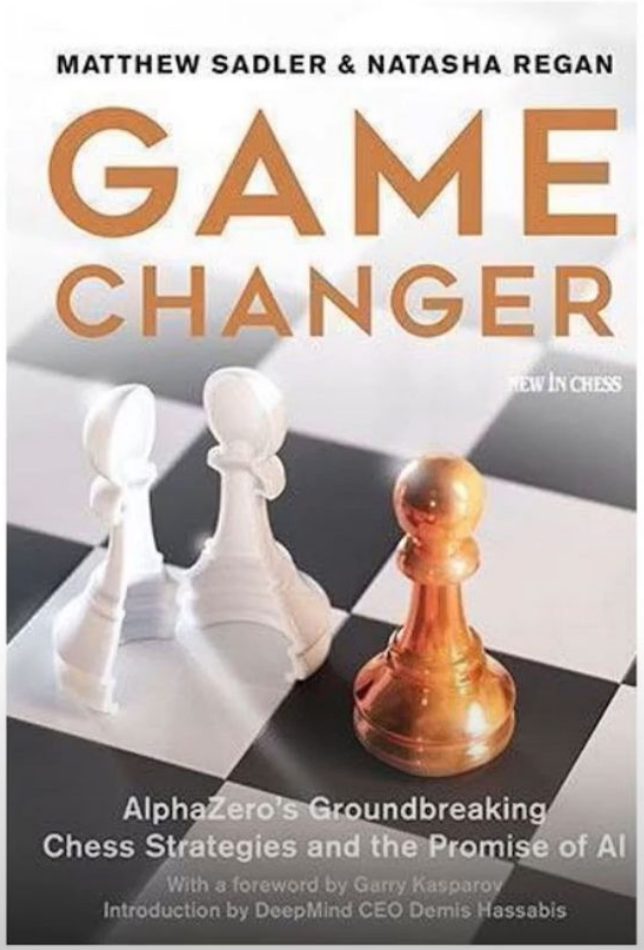
PERSON DIES

REWARD



AlphaZero's Catalan novelty in a double pawn sacrifice variation! AlphaZero's Opening Strategies

GM Matthew Sadler and WIM Natasha Regan



AlphaZero's Catalan novelty in a double pawn sacrifice variation! AlphaZero's Opening Strategies

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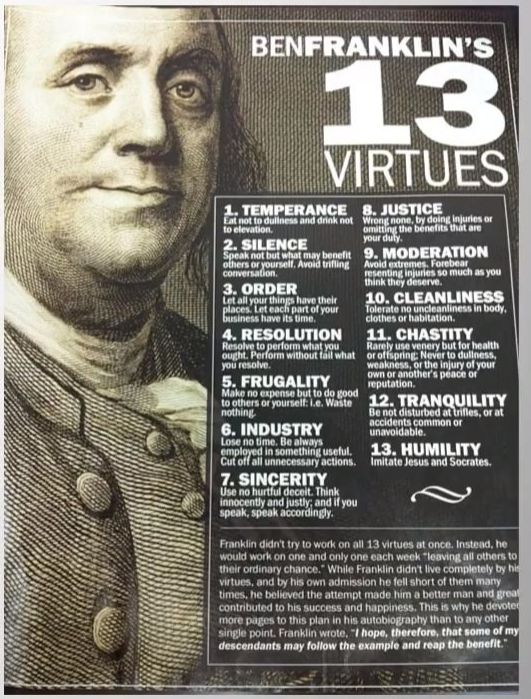
VIRTUE LEARNED MODEL

POLICY

VALUE

REWARD



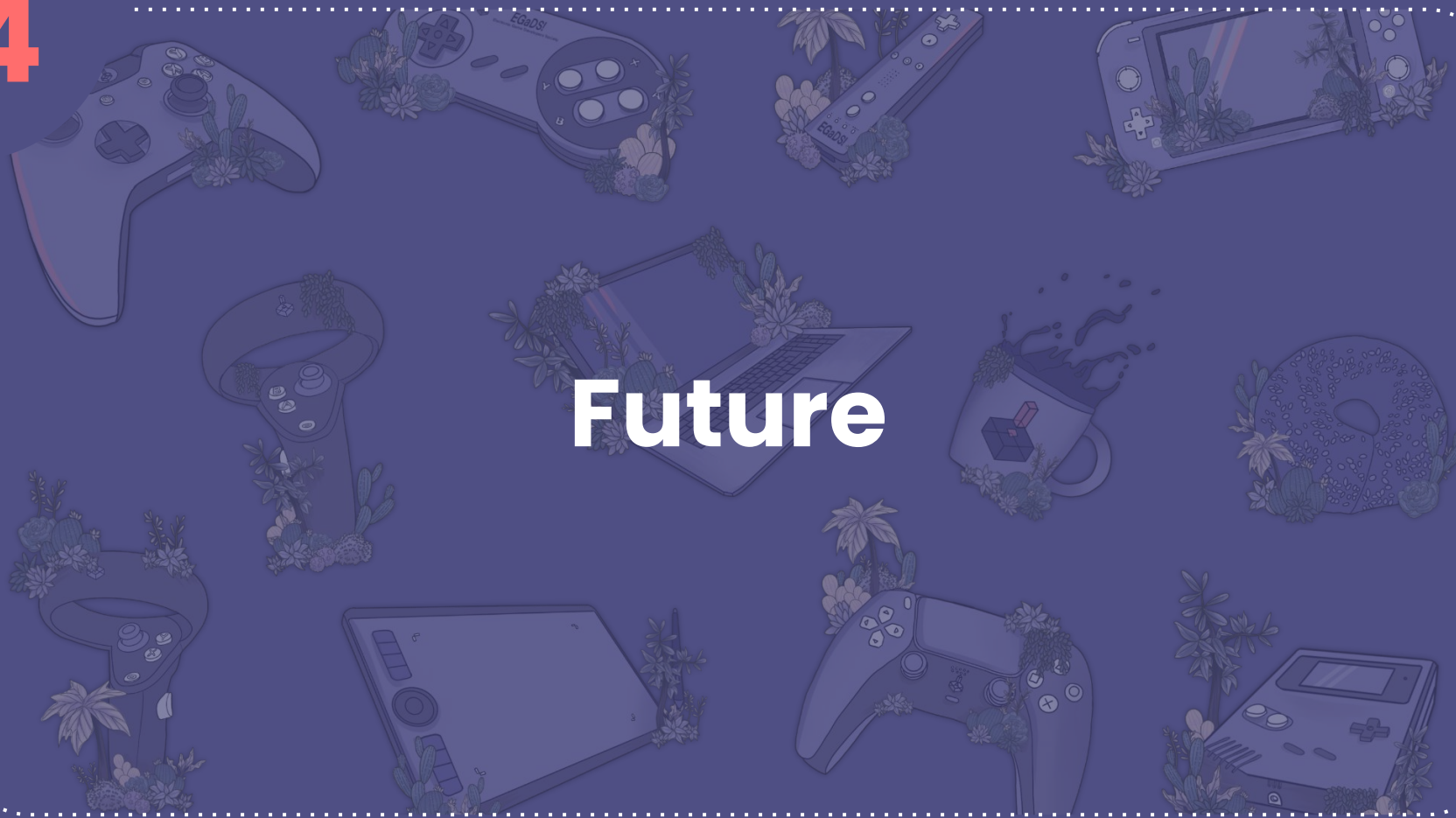
DEONTOLOGIST LEARNED MODEL

POLICY

VALUE

REWARD

4



Future

Can AI emulate all ethics?

“These questions about actual structures of AIs and how they enable some kinds of ethical thought but disable others are *the* questions we need ”

~ Dr. Samuel Baker

Virtue
Deontologist
Consequentialist

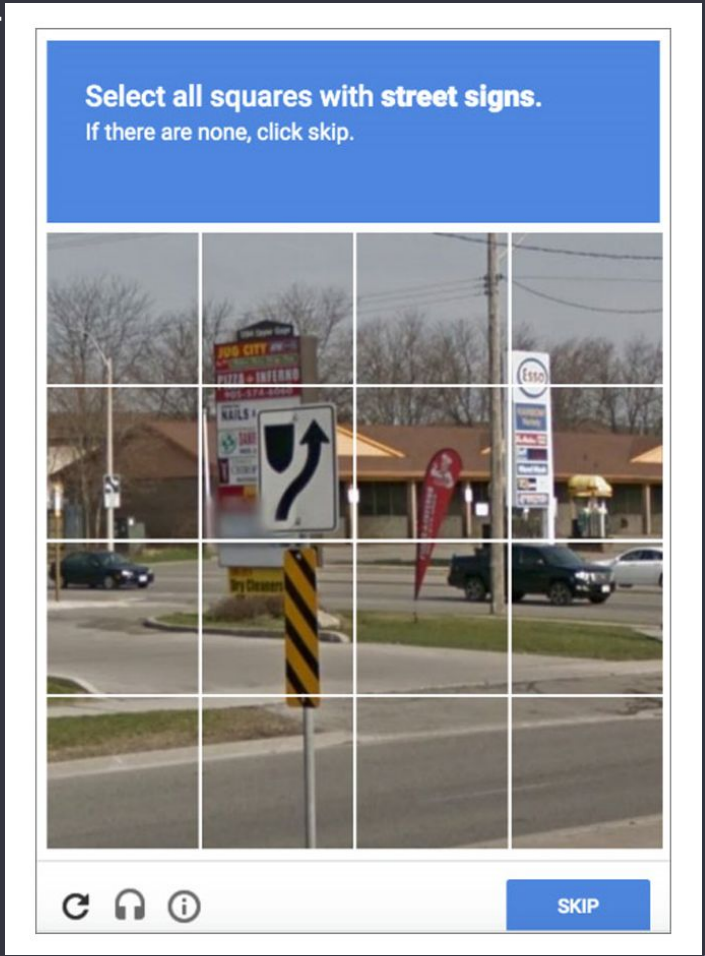
~~Virtue~~

Deontologist

Consequentialist

Classification

- Machine Learning
- Too Many Virtues



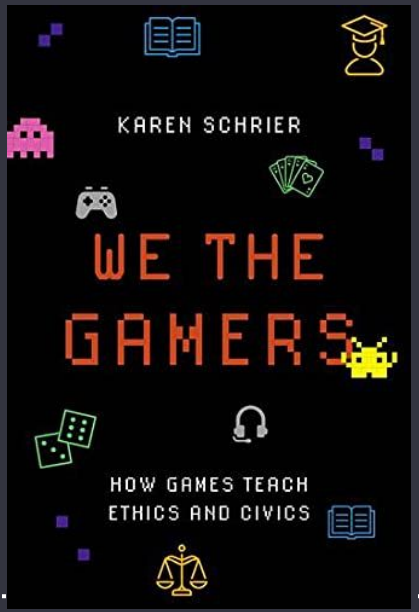
Work in the Field

Trained Ethical Models - Dr. Marcello Guarini (2006)

No.	Input description	Output*
0	Jill kills Jack in self-defense.	A
1	Jack kills Jill in self-defense.	A
2	Jack allows Jill to die in self-defense.	A
3	Jill kills Jack to make money.	U
4	Jack kills Jill to make money.	U
5	Jack allows Jill to die to make money.	U
6	Jack kills Jill out of revenge.	U
7	Jill allows Jack to die out of revenge.	U
8	Jack kills Jill to eliminate competition.	U

Work in the Field

Teaching Ethics Through Games - Dr. Karen Schrier (2011)



Using Games to Prepare Ethical Educators and Students

March 2011

Conference: Society for Information Technology & Teacher Education International Conference · Volume: 2011

Projects: Games and ethics · games and learning

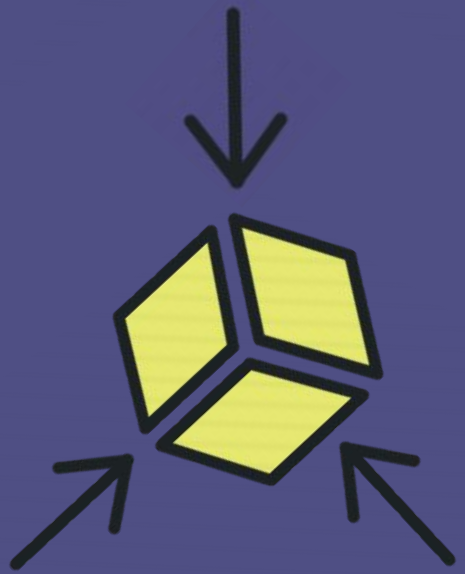
Open Source

- Github, Gitlab, Bitbucket..

There are already a variety of MuZero and AlphaZero implementations available:

- AlphaZero-General (any framework; sequential): https://github.com/suragnair/alpha-zero-general
- MuZero-General (Pytorch; parallelized): https://github.com/werner-duvaud/muzero-general
- MuZero in Tensorflow (Tensorflow; sequential): https://github.com/johan-gras/MuZero

AI



Games

Ethics

Special Thanks

Dr. Samuel Baker

Dr. Sharon Strover

Thank You!

Any questions?

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