





New-Millennium Logic-based Computing & Artificial Intelligence

**HyperLogic:®**

**HyperGrader®**

**HyperSlate®**

**Hyperlog®**



... is a verb: to live & work logically, and learn logic, anywhere anytime — and to have fun all along the way.

# Introduction to Logic-based AI

<http://www.logicamodernapproach.com/rpi/ilbaif24.sbringsjord>

Textbook=Class by S. Bringsjord et al.

## Preliminary Orientation

(Syllabus Review & Content Start: Tue\*\* Sept 3)

**Alexander Bringsjord**

Rensselaer AI & Reasoning (RAIR) Lab  
Department of Cognitive Science  
Department of Computer Science  
Lally School of Management & Technology  
Rensselaer Polytechnic Institute (RPI)  
Troy, New York 12180 USA

Intro to Logic-based AI  
8/28/2024



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**\*\*No classes Labor Day/Mon Sept 2. Tues classes follow a Monday schedule.**

# Selmer Away to Give Keynote Lecture to Open Machine-Learning Conference in Pittsburgh

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## **Tsetlin Machines and the Stunning Logical Power of Human Minds**

— *Selmer Bringsjord*

The human mind is not only — as many say — the smartest thing in the known universe; it's specifically a logical marvel. We now know, for example, courtesy of reverse mathematics, that members of our species are able to reason rigorously over complex formal content expressed in third-order logic (TOL). (Some of the results of Gödel from long ago anticipated this.) Moreover, since some of us have knowledge of and beliefs about others who reason in such ways, our logical power extends to reasoning in robust “theory-of-mind” fashion. How can this be? How can a helpless infant whose brain is anemic rise to these logical heights in the span of a few short years? The answer has two intertwined parts: One, we have innate, i.e. unlearned, logical capacity. Two, this capacity supports learning of the kind that Tsetlin machines provide. This two-part answer is (a) diametrically at odds with such mistaken views as that statistical/numerical deep learning is the foundation of human-level logical power, and (b) explains why such agents as those in the GPT-*k* series are comically bad reasoners.

# Preface

*Introduction to Logic-Based AI*

by S Bringsjord et al.



Logisk

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**Aristotle**

“Wow Euclid, humans are really smart!”

A fragment of first-order logic =  $\mathcal{L}_1$  introduced.

**Leibniz**

First-order logic =  $\mathcal{L}_1$  discovered, and modal logic as well.

**Birth of Modern AI**

LogicTheorist

**OLCSU**

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“Danger, Will Robinson!”



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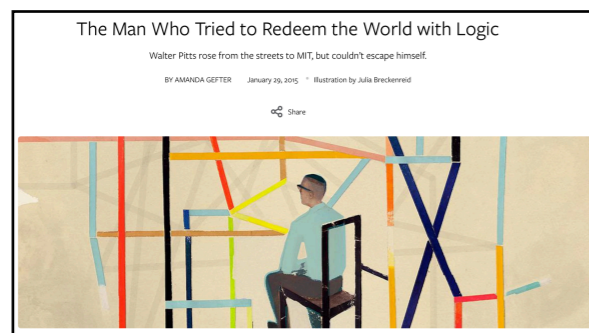
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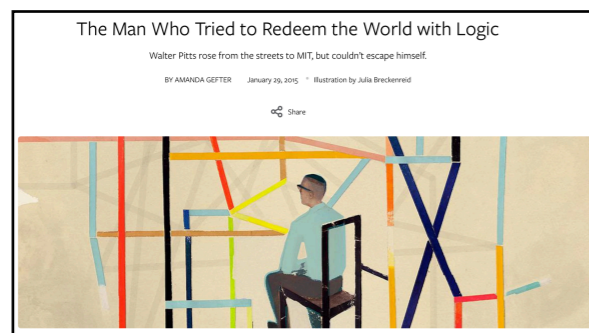
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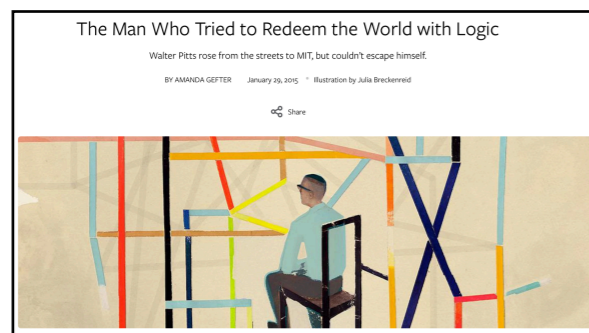
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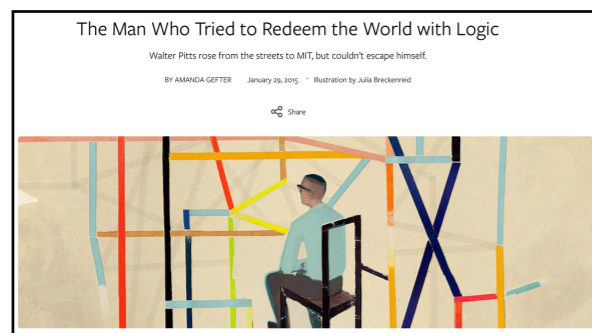
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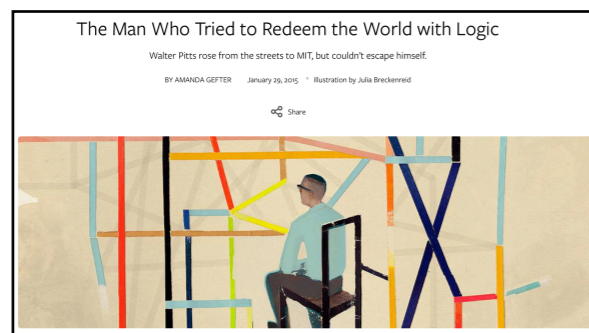
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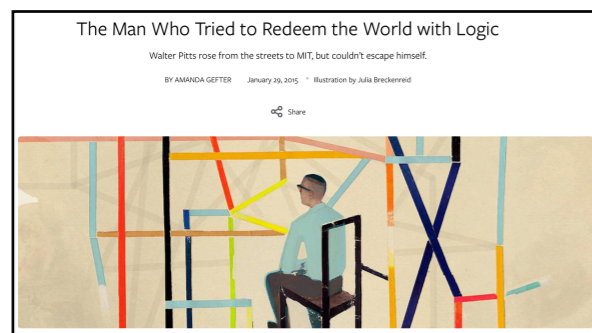
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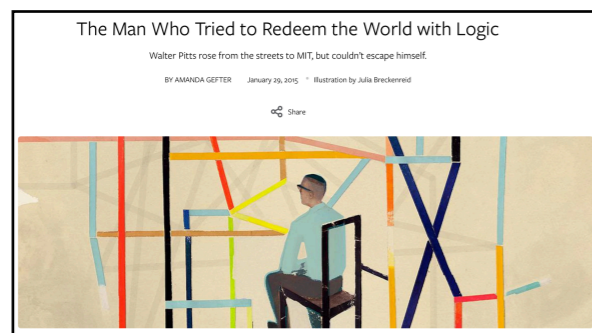
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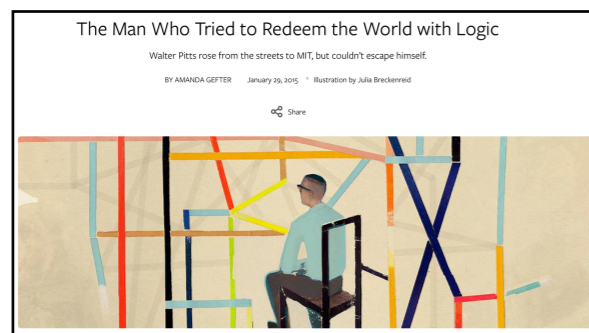
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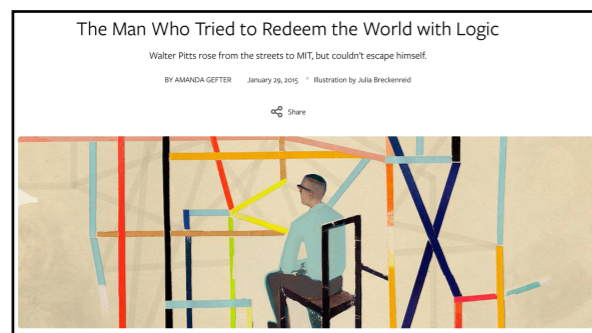


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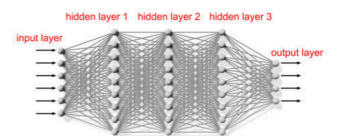
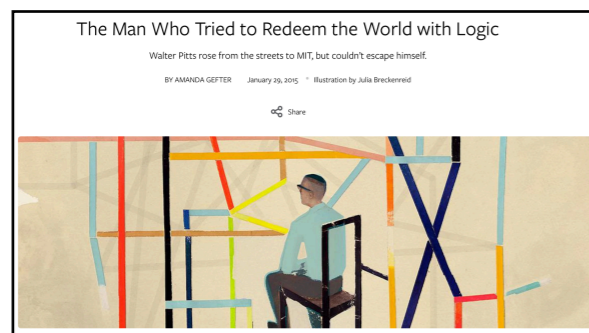
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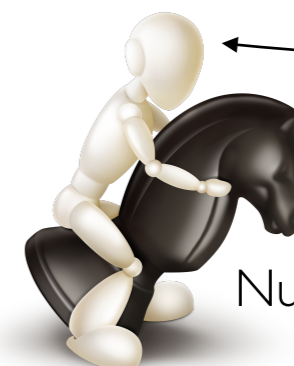
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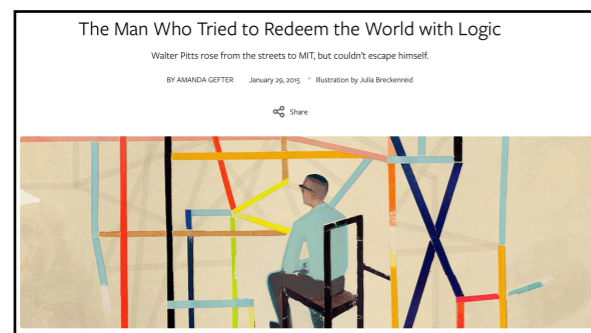
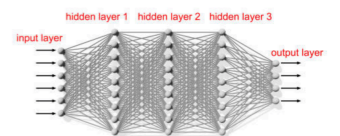
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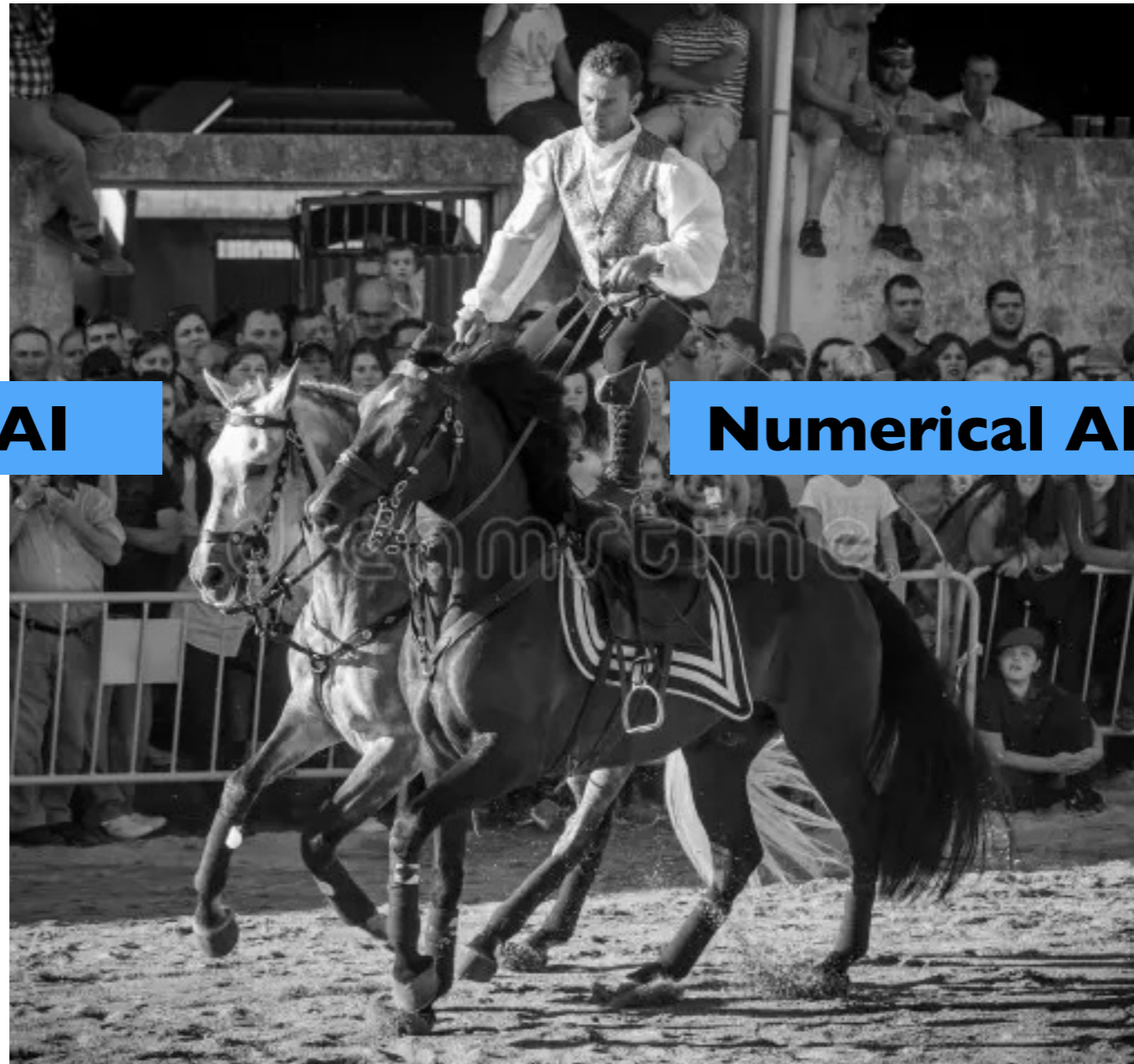


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# **Important Practical Point of the ILBAI Class: Where the Jobs and \$ Are in Workforce!**

**Logical AI**

**Numerical AI**



One\*\* crucial source for our learning AI is ...

# **The Cinematic Arts**

\*\*Another crucial source if first-rate journalism.

One\*\* crucial source for our learning AI is ...

# **The Cinematic Arts**

We must, & will, watch, ponder, and discuss belletristic sci-fi films about AI.

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“Contract”

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- You ...

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  - will (hopefully) have fun;

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  - will earn a grade of A; but you must:

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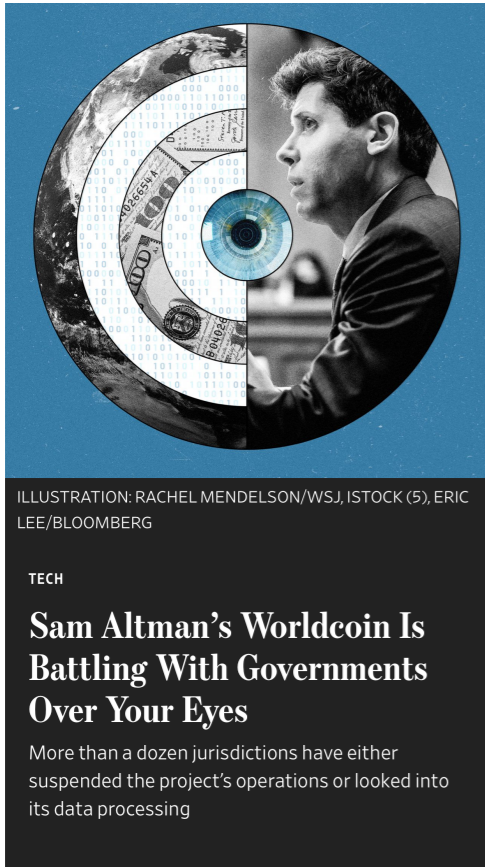


ILLUSTRATION: RACHEL MENDELSON/WSJ, ISTOCK (5), ERIC LEE/BLOOMBERG

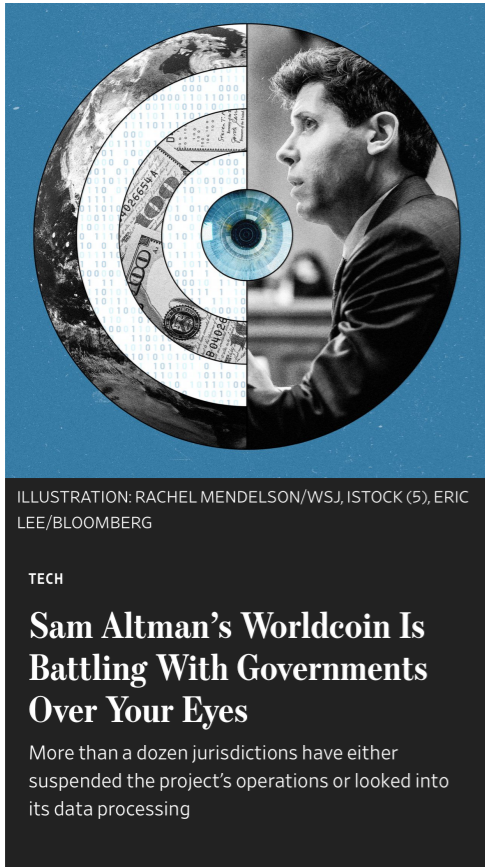
TECH

## Sam Altman's Worldcoin Is Battling With Governments Over Your Eyes

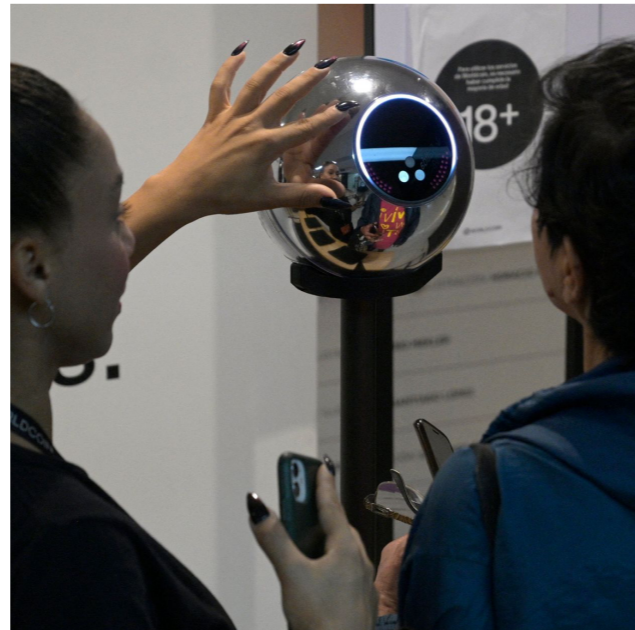
More than a dozen jurisdictions have either suspended the project's operations or looked into its data processing

*By Angus Berwick*

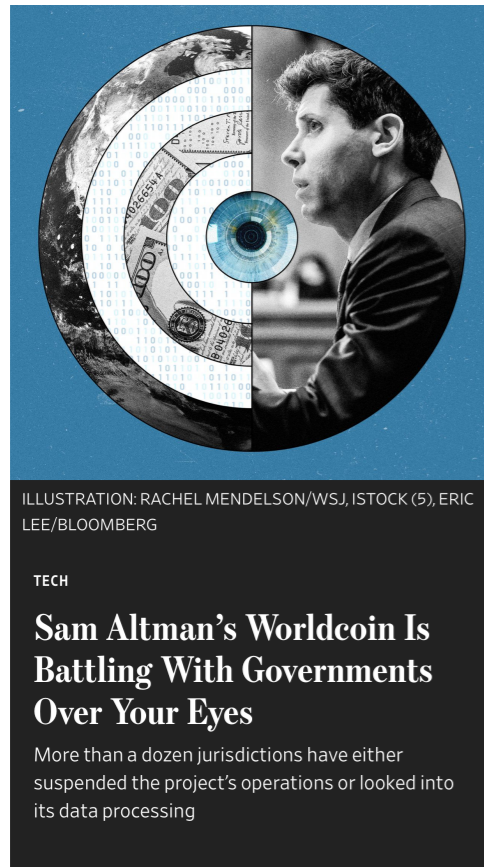
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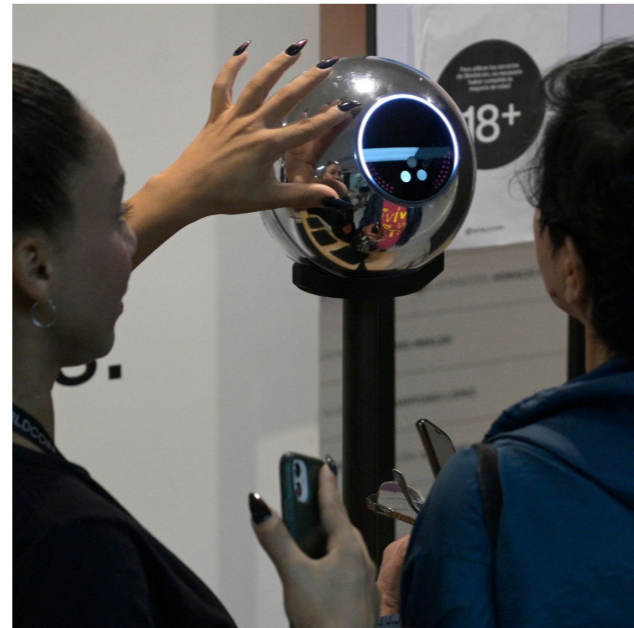
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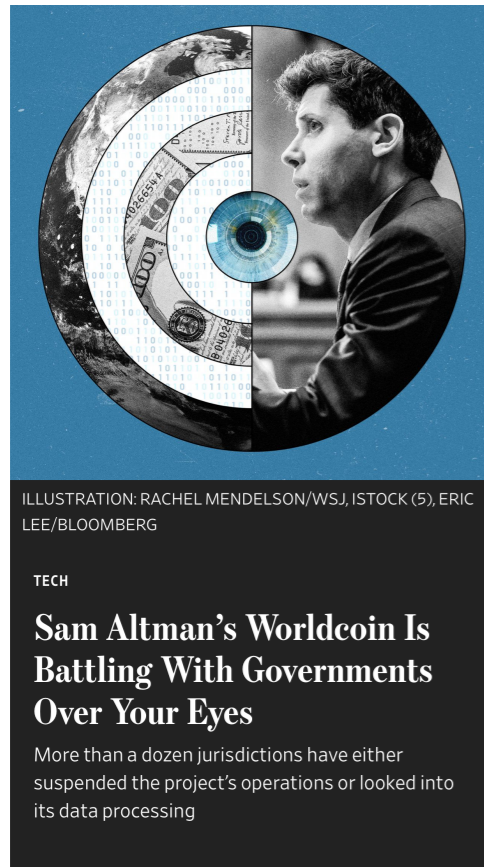


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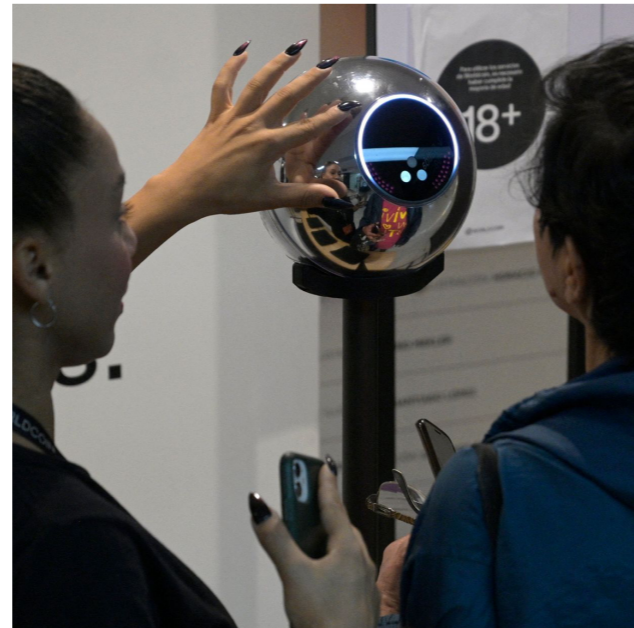


“... Altman’s OpenAI is creating models that may end up outsmarting humans. His Worldcoin initiative says it is addressing a key risk that could follow: We won’t be able to tell people and robots apart. ...”

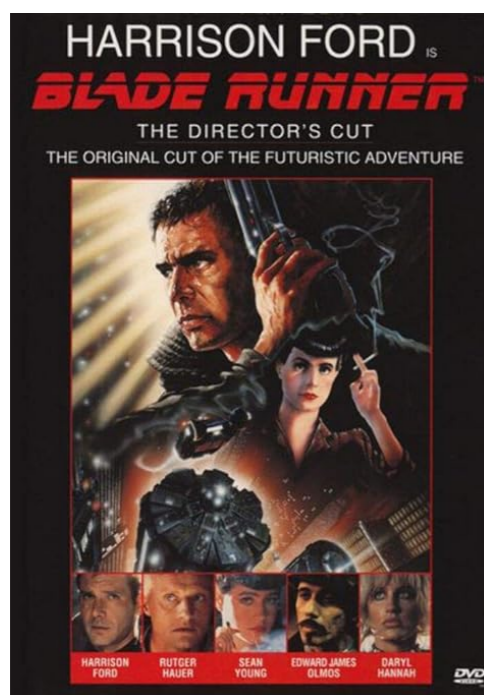
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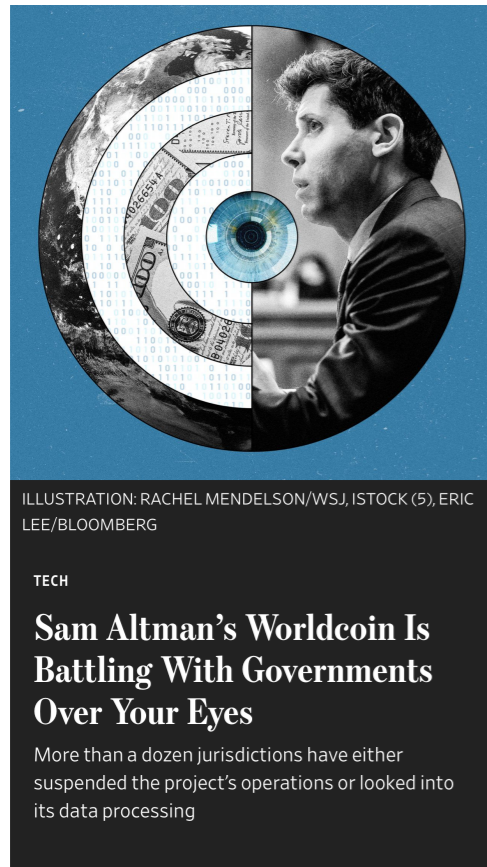
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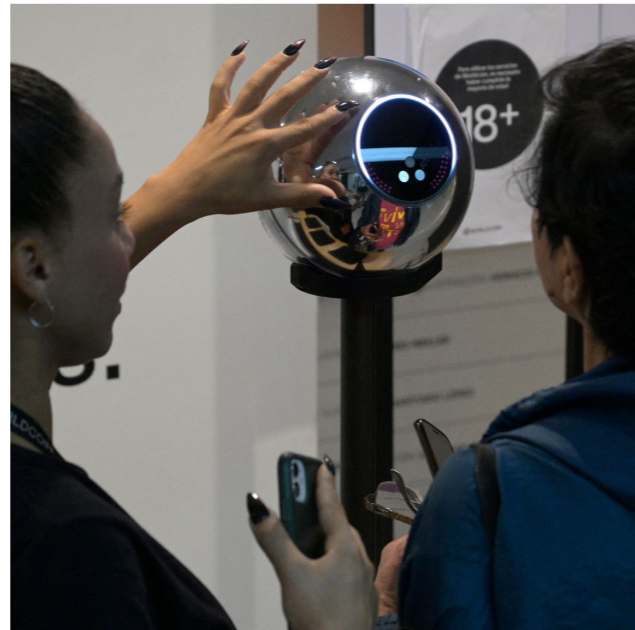
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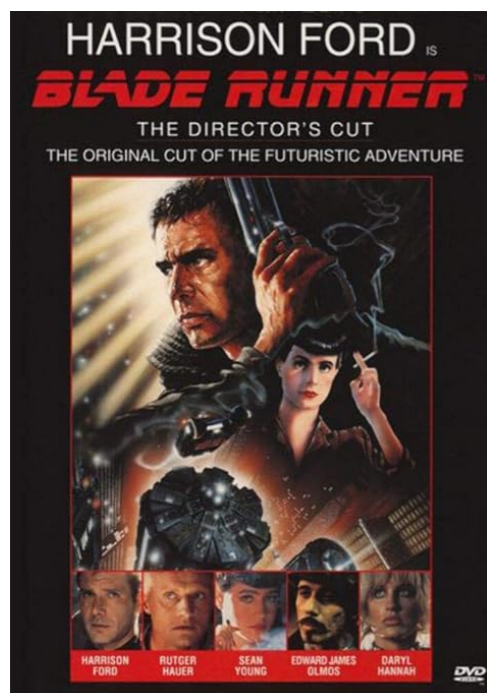
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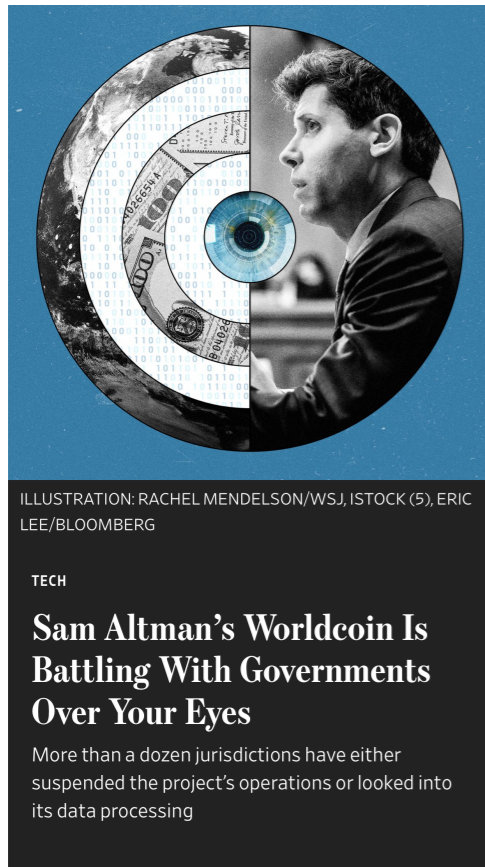
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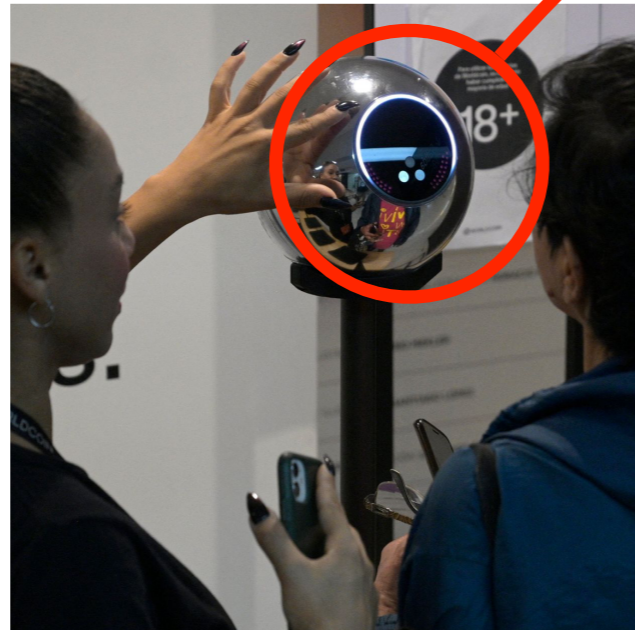
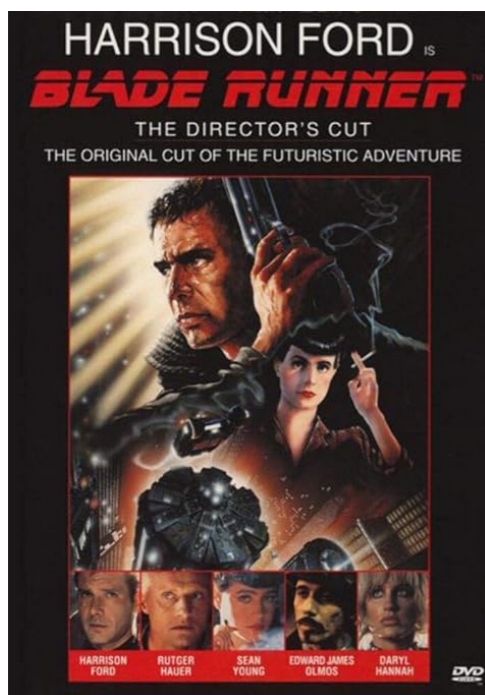
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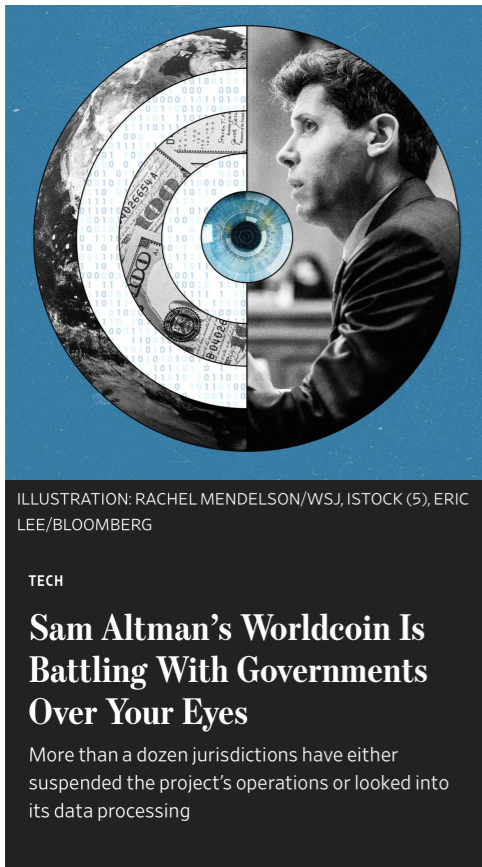
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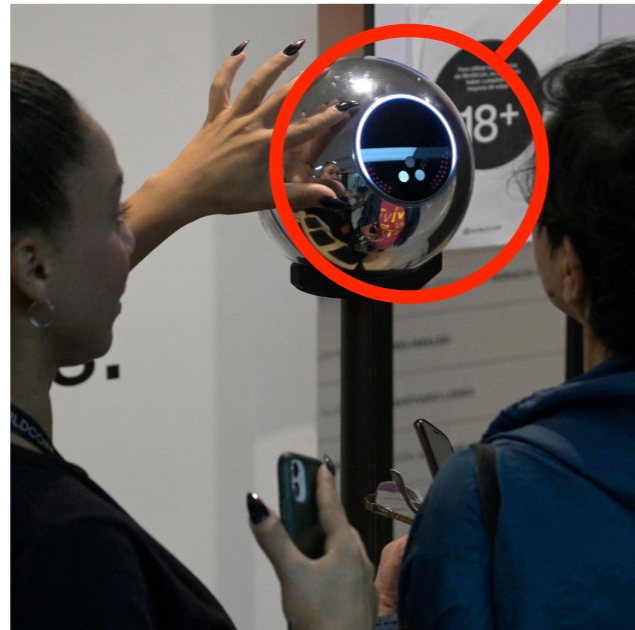
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**Assignment:** Watch *original* Blade Runner (D'sC if at all possible) film. Read one or two serious articles in the media about about Worldcoin. Selmer will discuss on Tuesday.