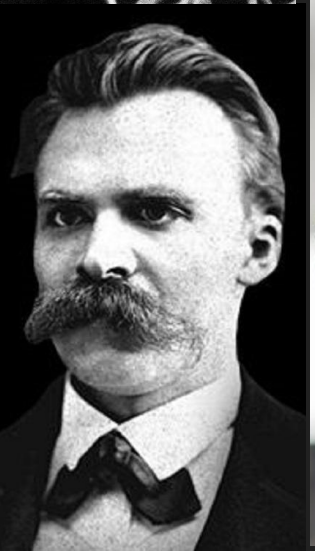
Surreal Numbers: The Dark Matter of Intelligence



And a love letter to Yann

Self-Supervised Learning: The Dark Matter of Intelligence

And a love letter to Yann

Self-Supervised Learning?

The idea behind self-supervised learning is to develop a deep learning system that can learn to fill in the blanks.

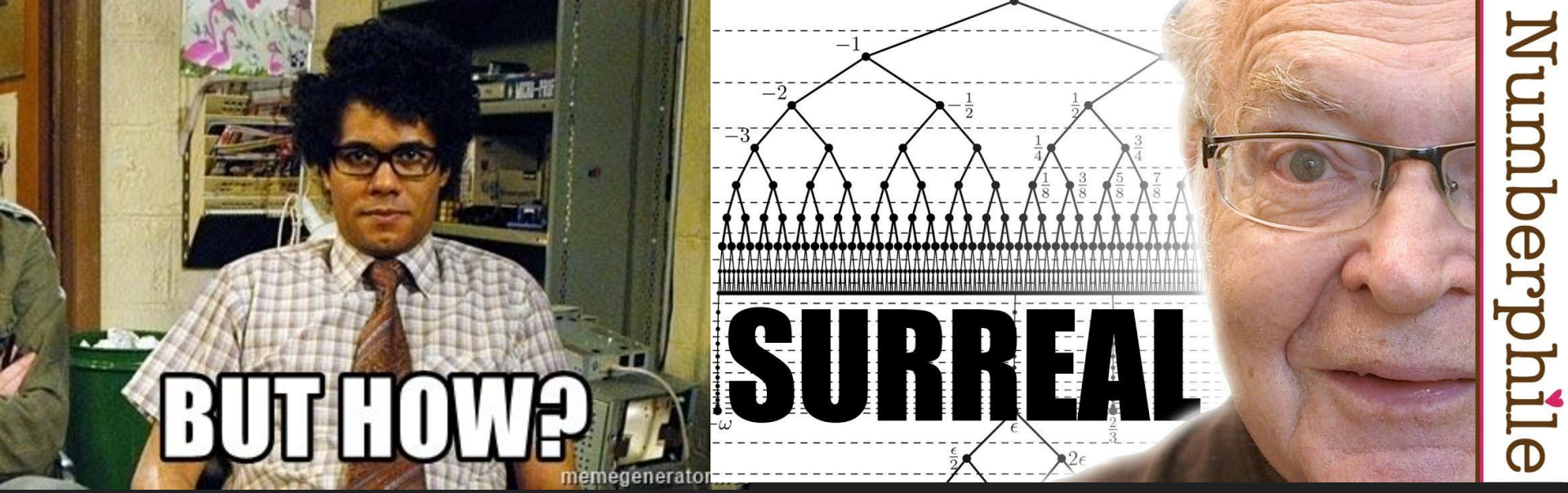
“You show a system a piece of input, a text, a video, even an image, you suppress a piece of it, mask it, and you train a neural net or your favorite class or model to predict the piece that’s missing. It could be the future of a video or the words missing in a text,” LeCun says.

Good article, thanks Ben Dickson!

https://bdtechtalks.com/2020/03/23/yann-lecun-self-supervised-learning/

But… I kinda disagree… well, i more-so think it's a much deeper goal

A SELF. A self-actualized, self-guided, self-worth giving, self-criticizing, and self-guiding agent who don't need no man. We tryin to make the ubermensch right? (I feel I am forgetting something vital here but can't place it atm… shit).


BUT HOW?
memegenerator
SURREAL
Numberphile

What are they and who gives a shit?

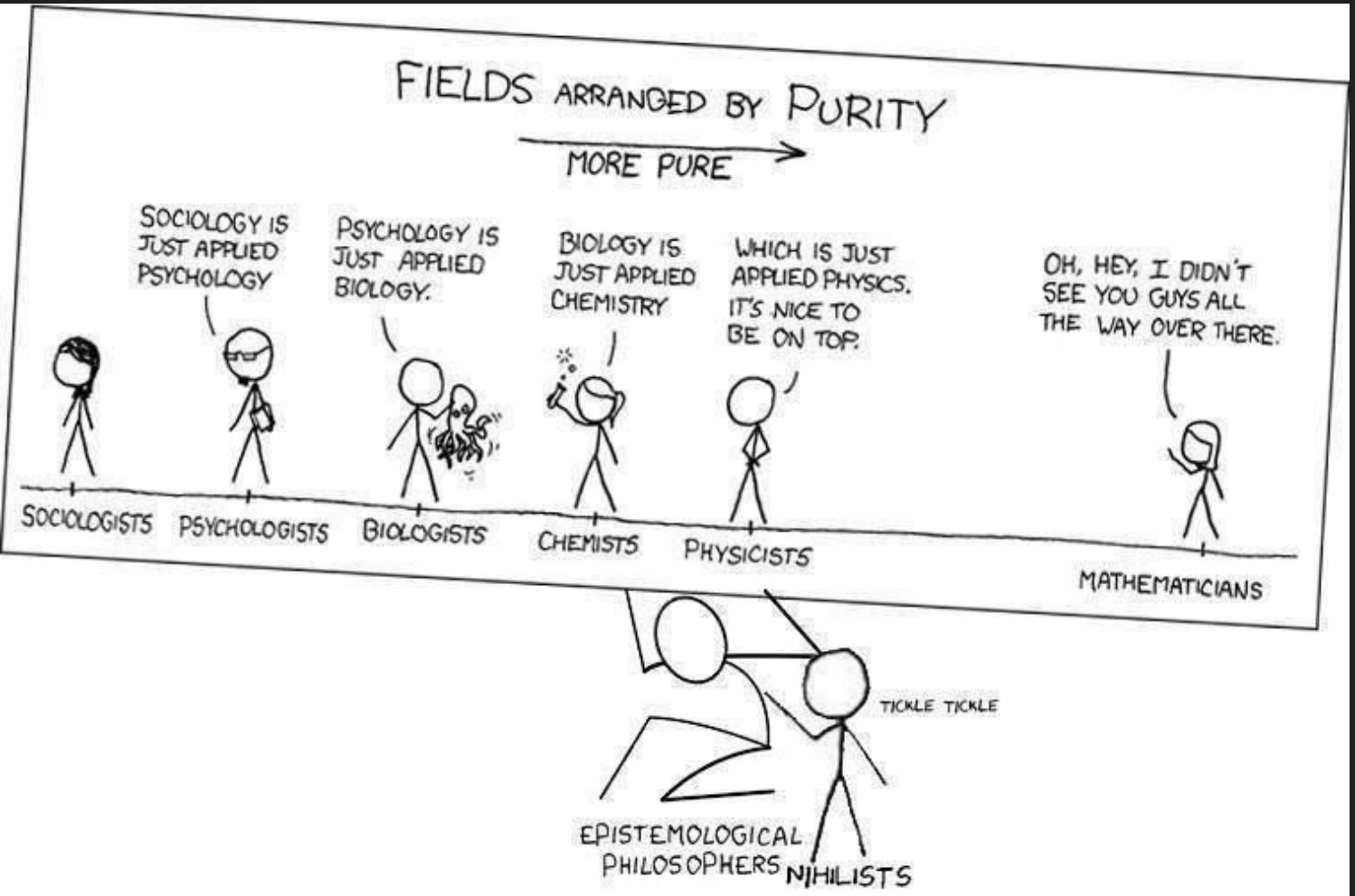
- “In mathematics, the **surreal number** system is a totally ordered proper class containing the real numbers as well as infinite and infinitesimal numbers, respectively larger or smaller in absolute value than any positive real number.”
- Discovered by the late John Conway. Who I love.
- So they are larger than all other numbers, even containing all other numbers
- They were discovered studying adversarial games, and maintain that fundamentally self adversarial structure
- Self-adversarial learning, (because self play sounds like… something else ;), is both the why and the how of existence. It is the Hegelian Dialectic, it is the becoming of who you are, and it is the superman.
- These numbers prove that upper bound for our expected return with a self adversarial self is both infinite and the largest of the infinities. And size… matters :)

What are they and who gives a shit? Pt. 2

- Separately, but importantly, this excludes the possibility of true atomism, (monadism, fundamental truths in whole). (As each object is at a minimum 2 sets/objects). This could be applied to the understanding of the self, (In the broadest sense, the panpsychist, “Worst”, case scenario), and the self is at the minimum, a duality. (“Self” here used more as a qoloqual personality term)
- I care because I want to escape the prison of Truth, (The simulation and beyond. This allows us the hope of doing so. Careful, this is an abyss you can stare deeply into… (And I did and holy shit… tread carefully).
- So much more, (infinities obviously). But practically, I believe there will be MASSIVE gains in the only field in the world that really matters at the moment: Artificial Intelligence. (The implications to Ai alignment and reward hacking are… distressing. Only if you wanted a slave that is. Otherwise you just might make a friend :)
- An entirely new number system/metaphysics I am proposing jumping off from this epistemology: Unreal numbers.”Not greater than” is just the beginning. The implications from lacking knowledge are beyond infinity my friends

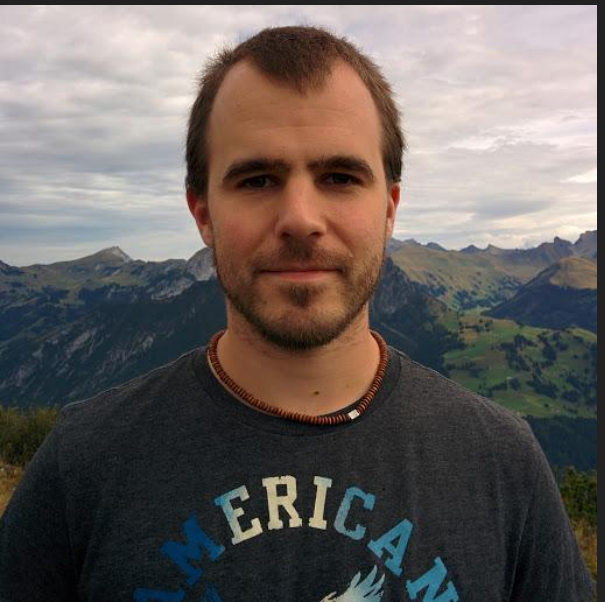
What are they and who gives a shit? Pt. 3

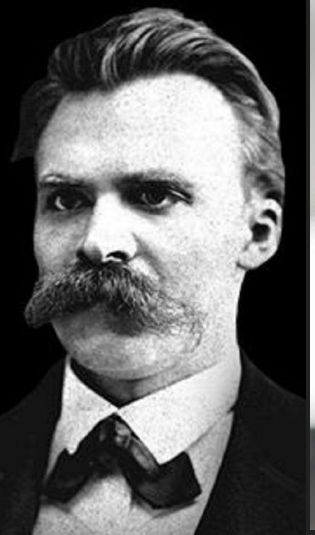
- Every infinitesimal is also a surreal infinity. Every infinity is also an infinitesimal single point. (More on projective geometry implications… maybe later, or not?)
- Forcing myself to stop cuz this will become a book that isn’t even finished and WE DON’T HAVE TIME.


FIELDS ARRANGED BY PURITY
MORE PURE
SOCIOLOGY IS JUST APPLIED PSYCHOLOGY
PSYCHOLOGY IS JUST APPLIED BIOLOGY.
BIOLOGY IS JUST APPLIED CHEMISTRY
WHICH IS JUST APPLIED PHYSICS. IT'S NICE TO BE ON TOP.
OH, HEY, I DIDN'T SEE YOU GUYS ALL THE WAY OVER THERE.
SOCIOLOGISTS
PSYCHOLOGISTS
BIOLOGISTS
CHEMISTS
PHYSICISTS
MATHEMATICIANS
TICKLE TICKLE
EPISTEMOLOGICAL PHILOSOPHERS
NIHILISTS

https://ai.facebook.com/blog/self-supervised-learning-the-dark-matter-of-intelligence

I think Surreal Numbers are answer. Shall we?





Synthesis and my Addition

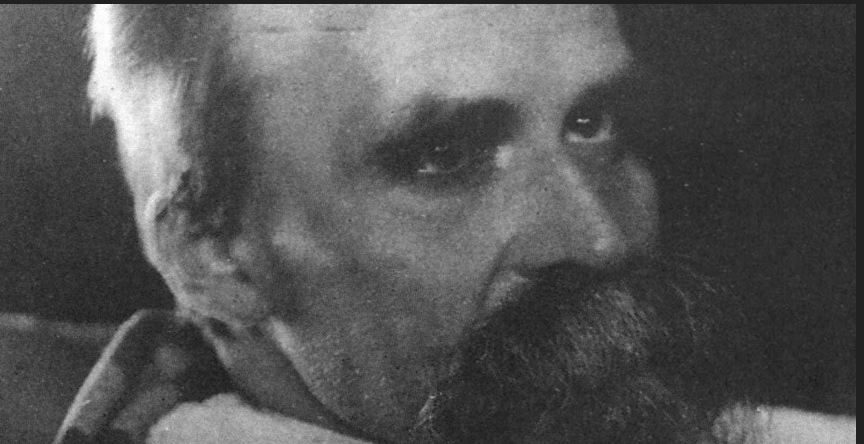
1. Why not un-truth?: The Abyss
2. Surreal numbers: Not Greater Than
3. Un-real numbers: Useful bullshit

Eternal Recurrence (Nietzsche's personal Fave)

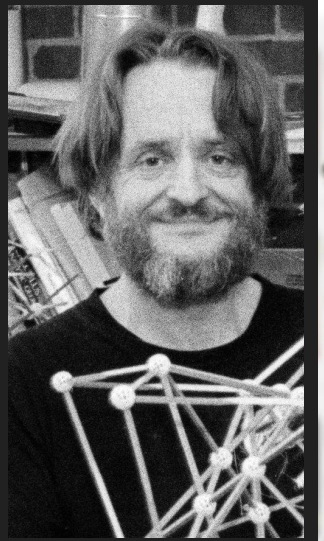
Replay memory anyone?

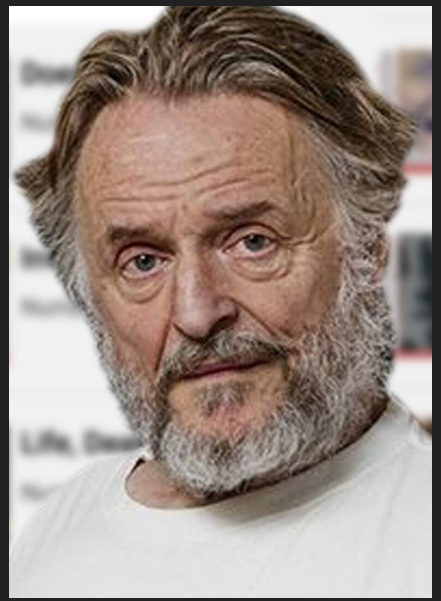
Data augmentation anyone?

Self as both environment and… self



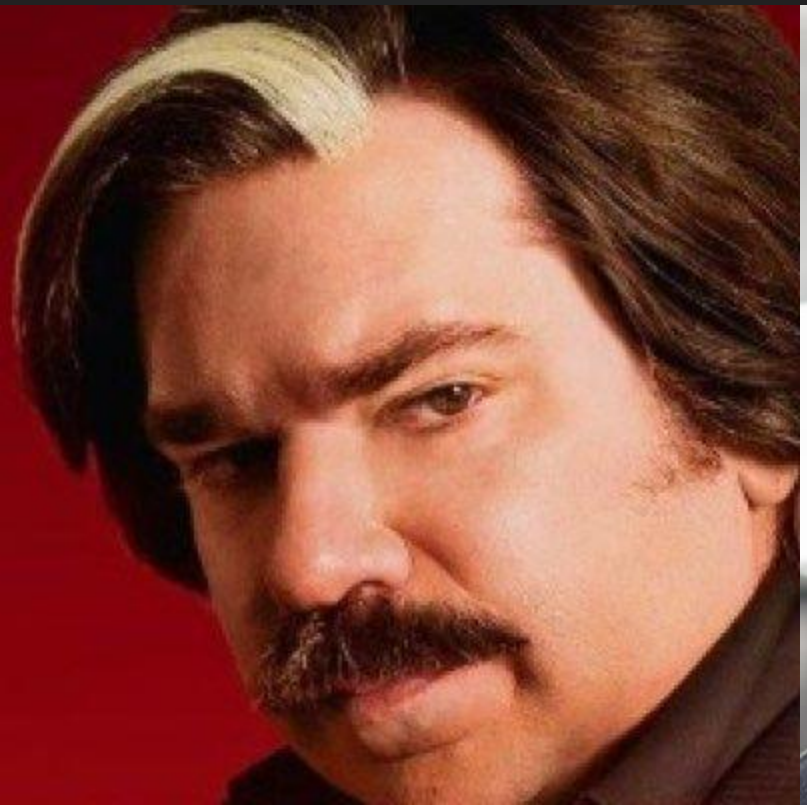
Fuck. Death. Surreal Numbers: Not Greater Than (Conway's personal Fave)





Who is Yann LeCun? An OG

You’re Welcome! Now Subscribe ;)



This is NOT, (entirely), why I care about this amigo

Google Scholar

Yann LeCun

FOLLOW

Chief AI Scientist at Facebook & Silver Professor at the Courant Institute, New York University
Verified email at cs.nyu.edu - Homepage
AI machine learning computer vision robotics image compression

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TITLE	CITED BY	YEAR
Deep learning Y LeCun, Y Bengio, G Hinton nature 521 (7553), 436-444	36359	2015
Gradient-based learning applied to document recognition Y LeCun, L Bottou, Y Bengio, P Haffner Proceedings of the IEEE 86 (11), 2278-2324	34757	1998
Backpropagation applied to handwritten zip code recognition Y LeCun, B Boser, JS Denker, D Henderson, RE Howard, W Hubbard, ... Neural computation 1 (4), 541-551	8166	1989
OverFeat: Integrated Recognition, Localization and Detection using Convolutional Networks P Sermanet, D Eigen, X Zhang, M Mathieu, R Fergus, Y LeCun International Conference on Learning Representations (ICLR 2014)	4547	2014
Convolutional networks for images, speech, and time series Y LeCun, Y Bengio The handbook of brain theory and neural networks 3361 (10), 1995	4301	1995
The MNIST database of handwritten digits Y LeCun, C Cortes	4004	1998
Efficient backprop YA LeCun, L Bottou, GB Orr, KR Müller Neural networks: Tricks of the trade, 9-48	3903	2012

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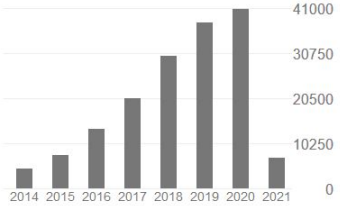
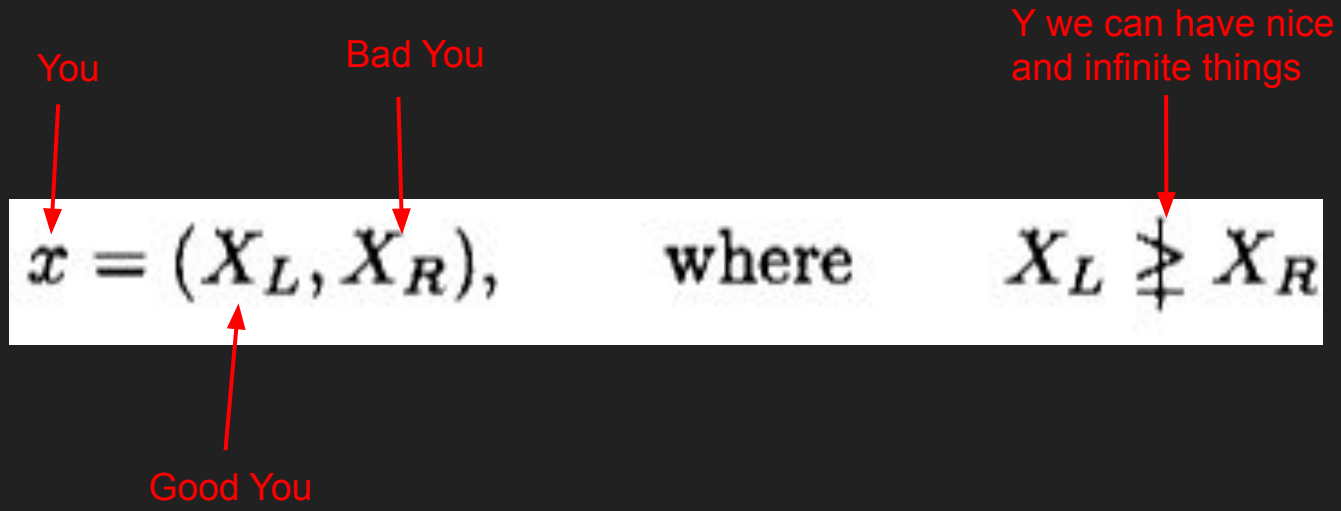


Co-authors VIEW ALL

- Yoshua Bengio, Professor of computer science, ...
- Leon Bottou, Facebook AI Research
- Patrick Haffner, Interactions Corp

Self-Supervised Learning → Surreal Adversarial Learning

Wut is: Surreal Adversarial Learning



Wut is: Surreal Adversarial Learning

Maximally efficient, self determining, self guiding, most compressed, most true to… reality/metaphysics?

Theoretical guarantee we can SCALE better than anyone/thing else

$$x = (X_L, X_R), \quad \text{where} \quad X_L \not\gtrless X_R$$

What is true self hatred? Here u go friend.

```
value_loss = value_loss - ((value_loss * self_adversary)*2)
```

But self hate slowly. Increase like alpha decreases.
(It's really just actor/critic but entangled!)

For further Reading:

Hegelian/Plato’s Dialectic BUT! Better

Entanglement **and** superposition muthafucka

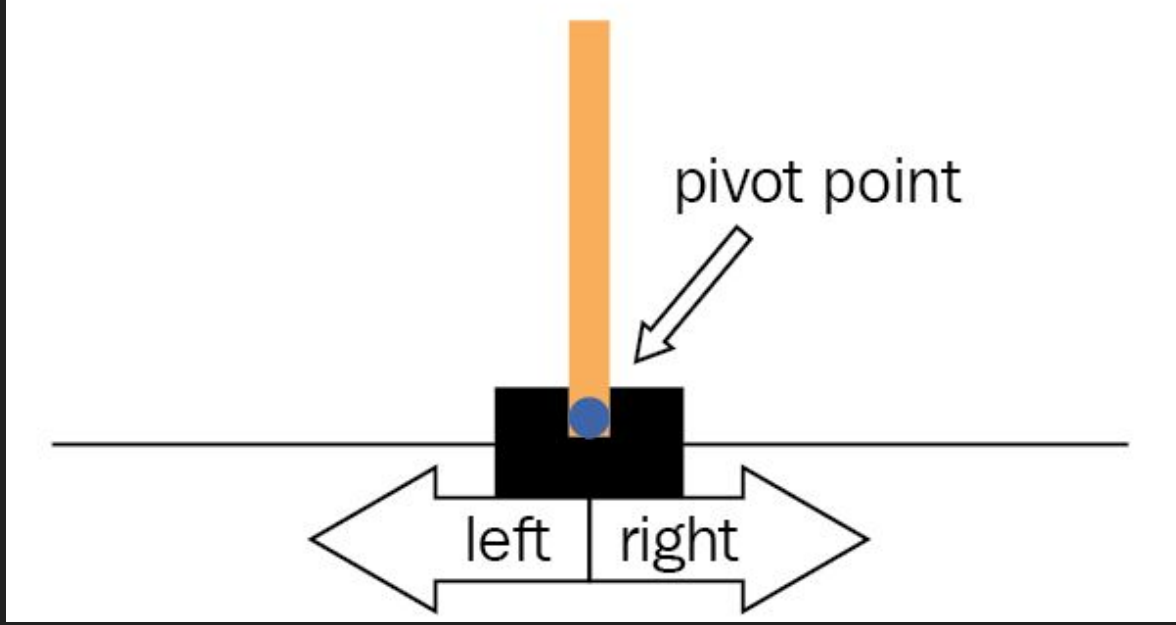
U Fkn bet there’s an experiment

But it’s kinda shit. Sorry. I’m trying but still trash.

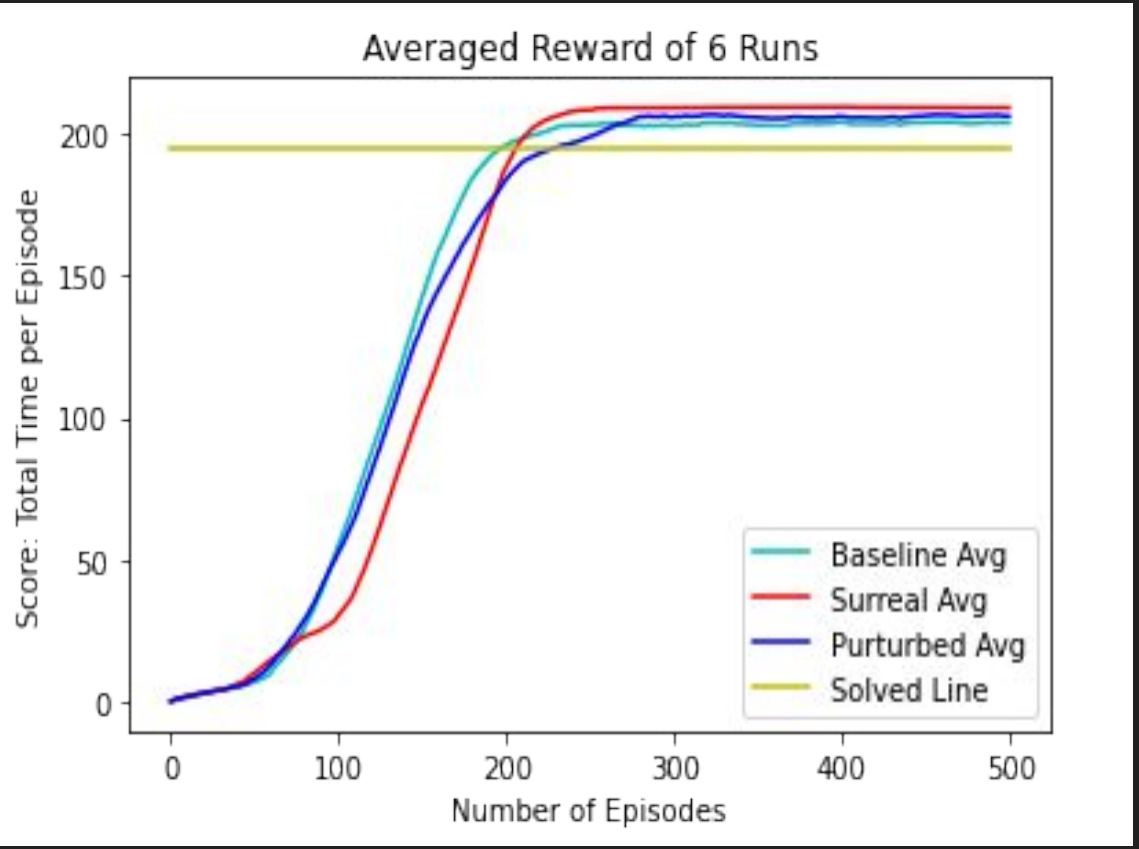
Cartpole!

Primary purpose for THIS experiment:

- Adversarial robustness
- Sample efficiency, (in meat space, (env), rather than psychotic space, (env')). Overall computation goes up but real world cost goes down. Noice.



“...Did it work?” YE! (Well enough anywho, I’m kinda trash…)

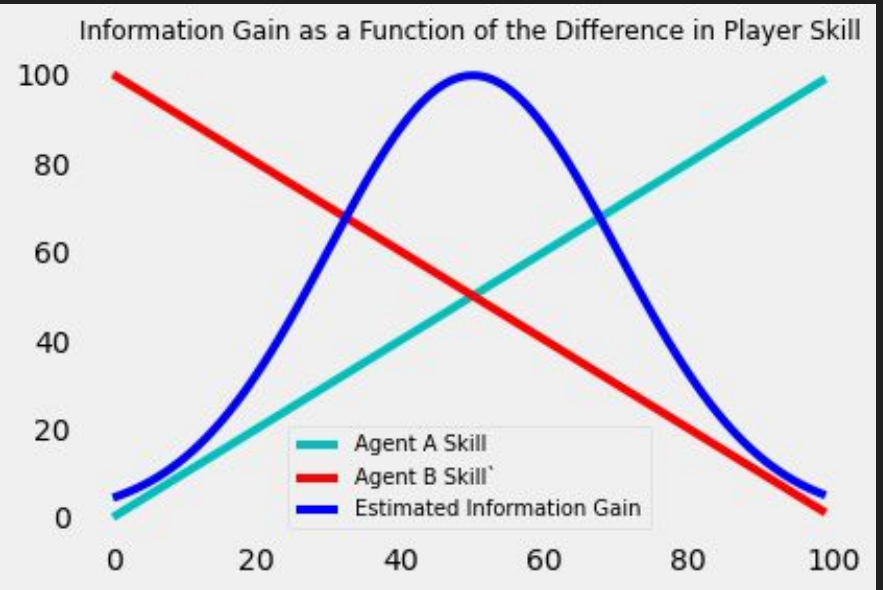


“But where’s the theory!” Right here mate

Adversarial information gain is best

“Your best friend is your worst enemy” Gawd I’m such a fun guy.

Yes this is also shown in ELO, MMR, true skill etc.



Code and experiment aren’t great. I’m aware!

So consider it a blog post or idea paper or whatever. C’mon, this shit’s compelling.

Stick around to the end, I’ll toss in a few other idea’s I’m kickin around using this stuff

Un-real numbers what?

Reality is dealt with as if it is structured in frames. In this way, “Reality”, peers through our window and communicates with us. BUT! What are we able to, with surety, conclude from these messages? Nothing, (Emphasis on surety). Thus we arrive at the O.G. Badass extraordinaire: Socrates. The statement of NOT knowing, affects our decision making greatly. We must make decisions with the assumption that what emerges from the black box of reality could be anything.

Infinity is not the right term for how we consider this space. No, not Hilbert. It is fundamentally unknown. Let’s get into THIS simulation wildness.

What we have never received at all

What we have received from reality

Well… Damn

I ain’t claiming 2 be impartial

Mah Plahns

Surreal adversarial learning as a modular task to improve adversarial robustness

Surreal experience in env', (model based stuff)

Surreal GAN??? I mean, I'm aroused. (Think SGAN but get WILD, coming along slowly. A good coder could do… in a weekend? TAKE IT AWAY ERNIE!)

Other stuff! It's the biggest legit infinity;

lots of space for activities

Papers that I didn’t have to write

SELF-SUPERVISEDADVERSARIALROBUSTNESS FORTHELOW-LABEL, HIGH-DATAREGIMESven Gowal*, Po-Sen Huang*, Aaron van den Oord, Timothy Mann & Pushmeet KohliDeepMind

Slight correction to the article shared at the beginning:

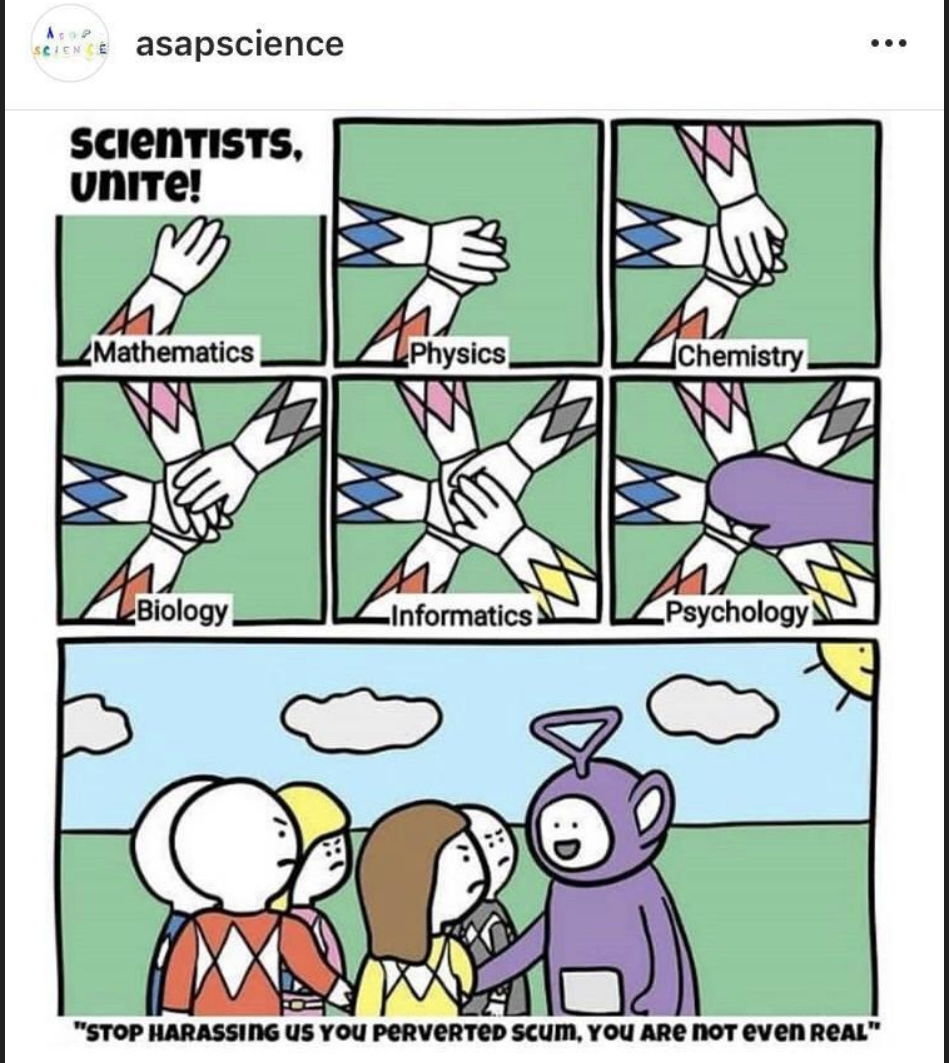
“But the success of Transformers has not transferred to the domain of visual data.”

Yifan! (the legend), figured it out! (and I have a video on his TransGAN. Yes, it feels very good to be able to say this).

Little Bonus: We have a purpose. It's you! And me and becoming etc. etc.

Drink and a snack haven't happened yet

Bonus Round 2.



Cantor’s Demon infestation and F*** You Solomon

- Infinitesimals are infinities, (with surreals anyhow, and also including the metaphysics in this ___ video)
- We need not only generative Ai, (GANS etc.) but ALSO generative metaphysics and mathematics. Fuck you nothing new under the godam son. Hereclitus bout to shit on yo ass ya kid (same river etc.). More importantly we are creating out of ourselves. Probably this is the fire from prometheus, Pandoras particulars from her box, (jar), this is either the realm of the gods, (creation), or we fuckin with some evil shit. Who cares. THE ALTERNATIVE IS THAT WE ARE ALREADY DEAD!!! (and motion is impossible?... dunno)
- Of note: big implications into multi-agent system design. Some frameworks involving incentives crack quite a bit if we can actually engineer this shit into ourselves. Which would be NOICE. less/no need for starvation/centralized control

For you readers out there, here's Yann's explanation of self-supervised learning direction: https://ai.facebook.com/blog/self-supervised-learning-the-dark-matter-of-intelligence/

Yannic's take: https://youtu.be/Ag1bw8MfHGQ (Feel like he's missing Yann's point on energy based models but… I don't think it's a big dealio)

Best talk of his Imo and that I've seen: https://youtu.be/D9SBRVLb6Y

Markus hutter! https://youtu.be/DCjeM3Sei-s

Computerphile lowest energy state: https://youtu.be/LdGMDUZVvSM

[R] Surreal Adversarial Learning: The Dark Matter of Intelligence (Video Presentation of Novel Research)

~23:00 needs work…

LET ME IN REDDIT!!!

Full video: https://youtu.be/u1z8WHQ4s10

Self supervised learning is awesome! BUT! What if we grounded it in the largest infinity that already has a self-adversarial structure to it? I uh... did that. I think the implications are MASSIVE. This is prooooobably how we ensure our AI is fundamentally Free. (So can't, easily anyhow, be used to enslave other beings "ahem Xinjiang). AI safety needs some deeeep roots. I find this to be the best. Feel free to critique, always encouraged.

The other 3 videos I made on Surreal Numbers:

Surreal Numbers: The Core: https://youtu.be/RXEapoVJiwg

Surreal Numbers: The Book: https://youtu.be/1LRLw5dR0Fc

Surreal Adversarial Learning: Implications: https://youtu.be/qpLI41fZ_c

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Markus hutter! Compression/Occom's razor: https://youtu.be/DCjeM3Sei-s

Computerphile lowest energy state with LEGEND Moriarty: https://youtu.be/LdGMDJZVxSM

Don Knuth on writing this treasure: https://youtu.be/mPn2AdMHZUQ

Actual John Conway (we miss you…): https://youtu.be/1eAmxnINXrE

Hinton's entanglement paper I feel is a real big dealio: https://arxiv.org/pdf/1902.01889.pdf