Intro to AI & AI DAOs: Nature 2.0 Edition

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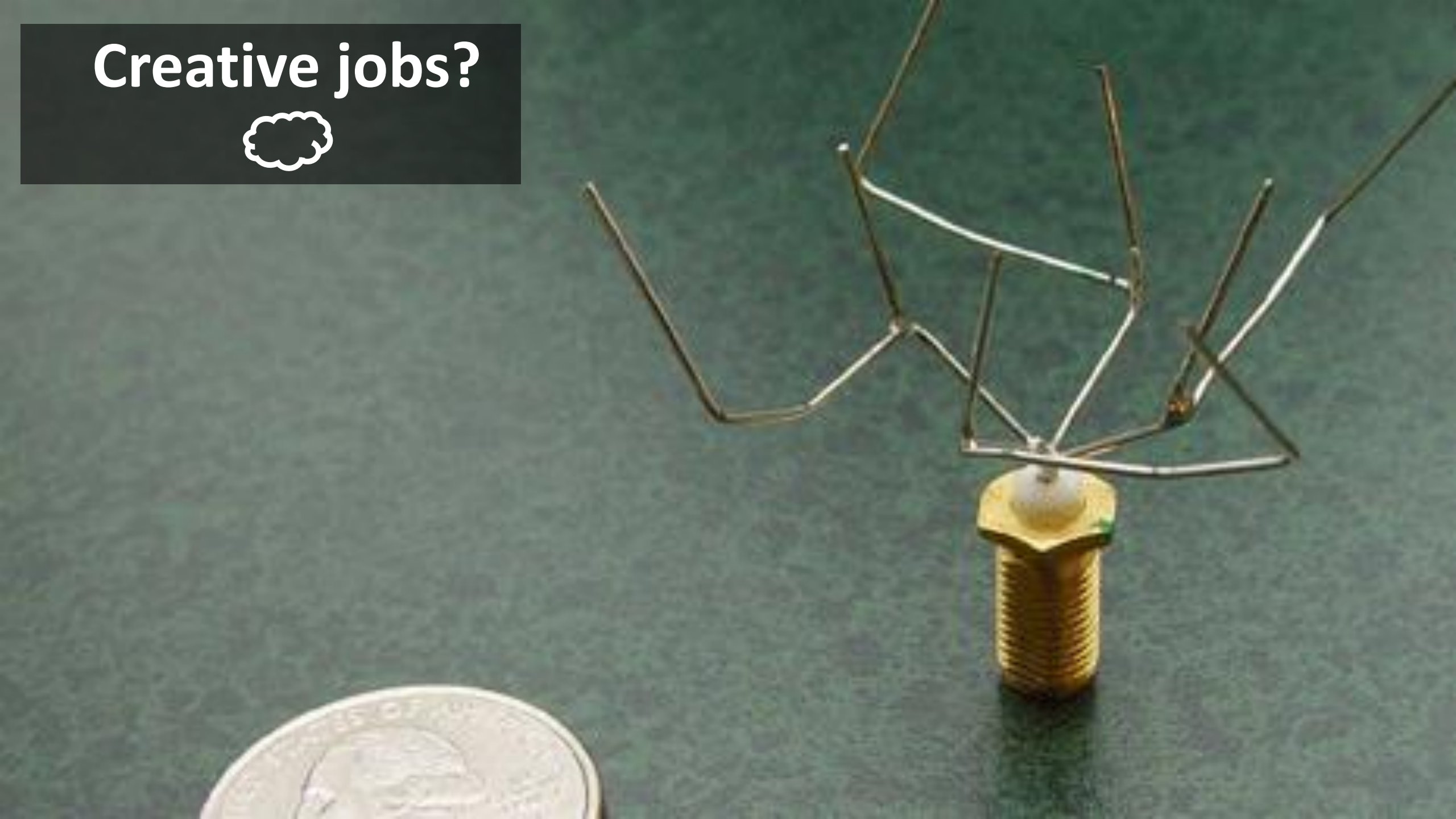
Ocean | BigchainDB

Trucking
3.5M jobs

Retail
4.6M jobs
amazon go
amazon go
2121
NO LINES. NO CHECKOUT.
(NO. SERIOUSLY.)
JUST WALK OUT
SHOPPING
amazon go
NO LINES.
NO CHECKOUT.
NO LINES. NO CHECKOUT.
(NO. SERIOUSLY.)
JUST WALK OUT
SHOPPING
BETA
Participant
Entry
BETA
Participant
Entry
BETA
Participant
Entry

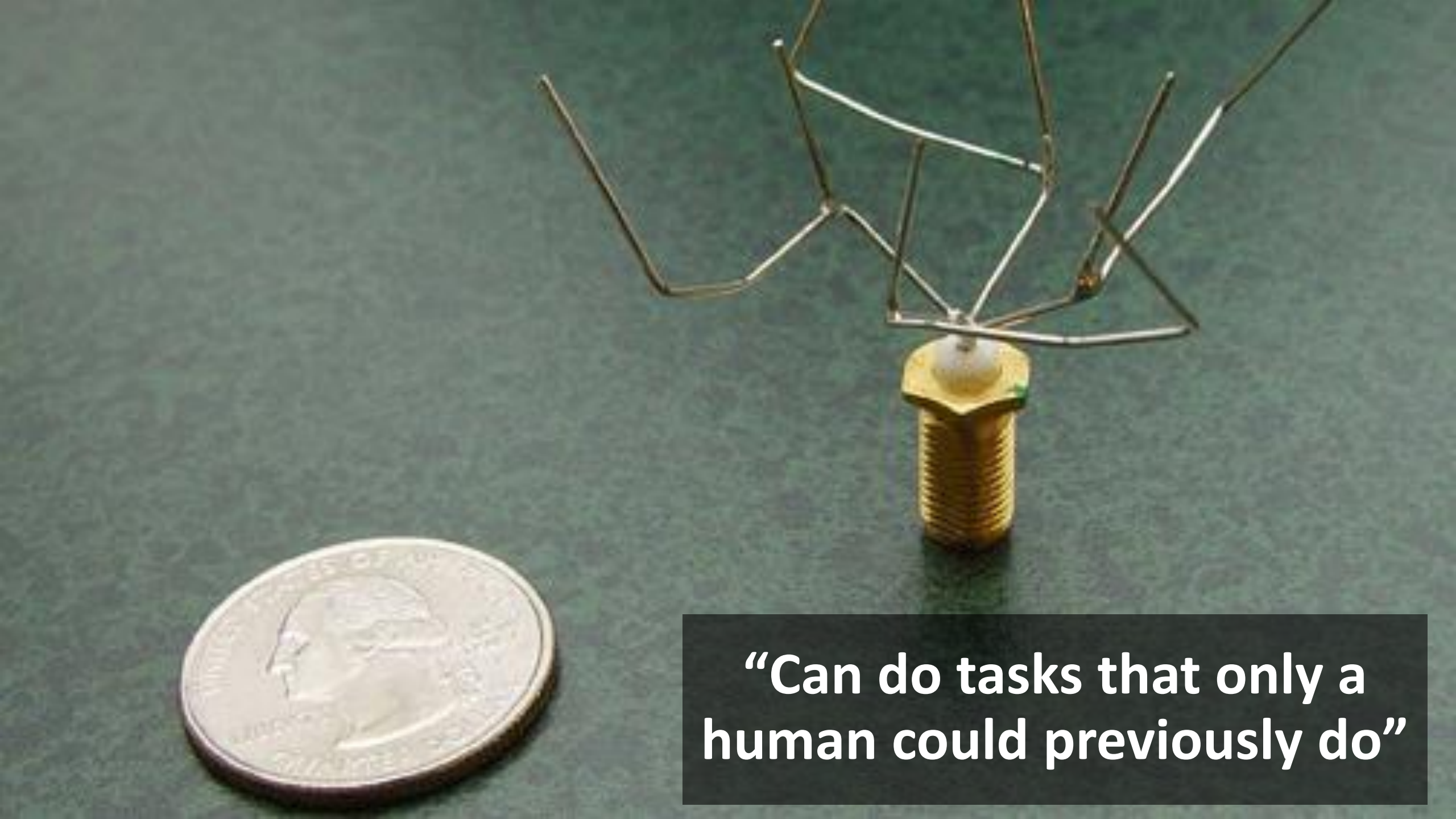
Creative jobs?

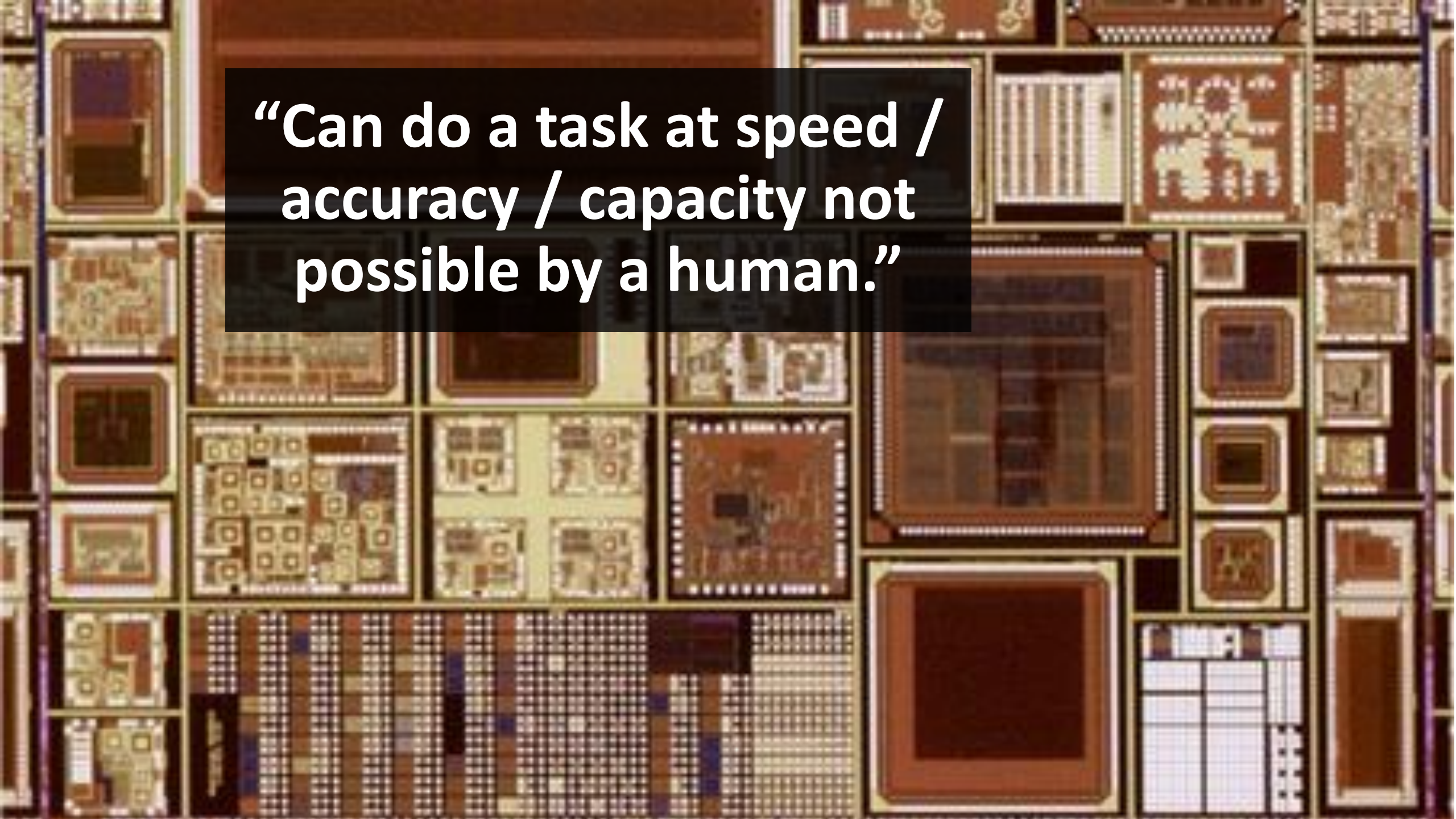


In an age of AI,
How to feed our families?
Achieve abundance?

Ways to frame AI

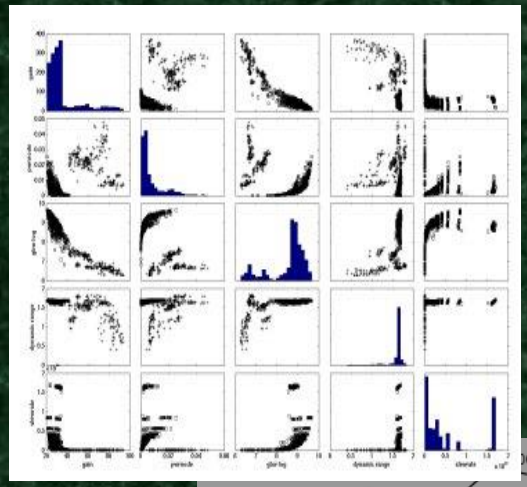
“Replicates human cognitive behavior” [Turing test]

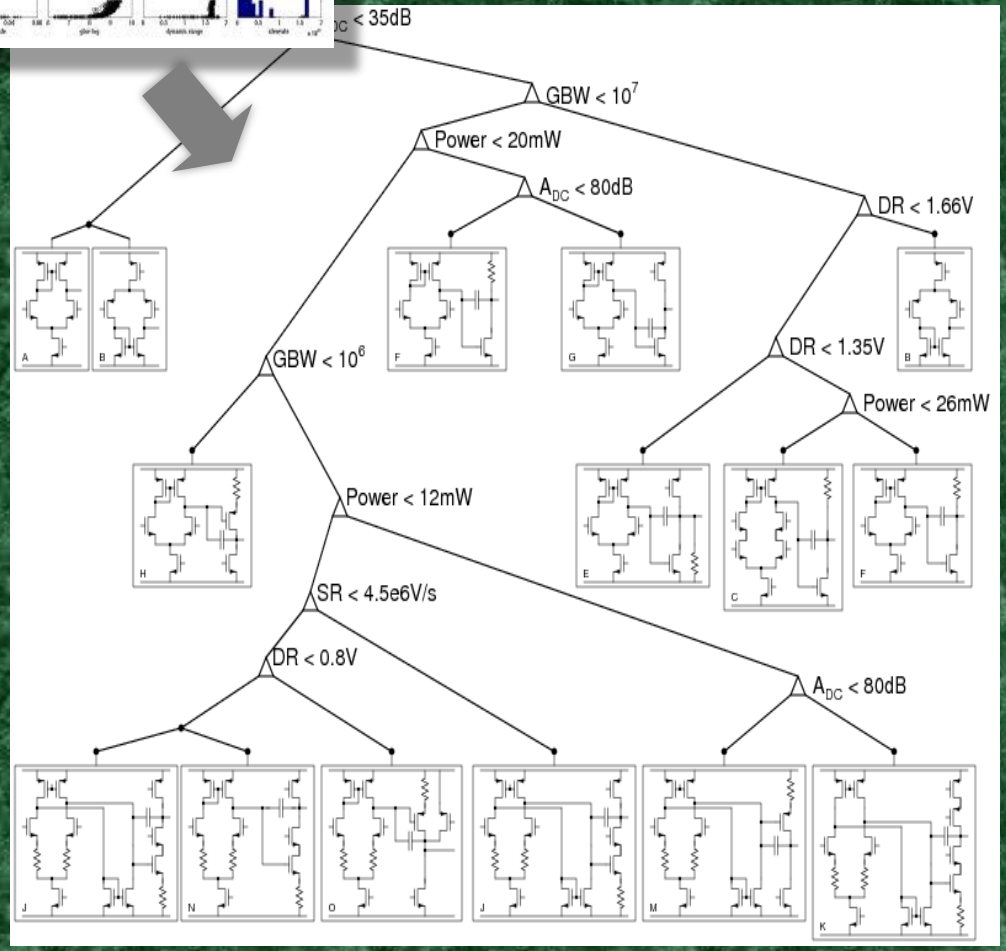

“Can do tasks that only a human could previously do”


“Can do a task at speed / accuracy / capacity not possible by a human.”

“A set of tools”

- Classification
- Regression
- Knowledge extraction
- Optimization
- Creative / Structural design
- …





“Embodied agents” (AGI)

AI Tools: Deep Dive

Classification, in 2D

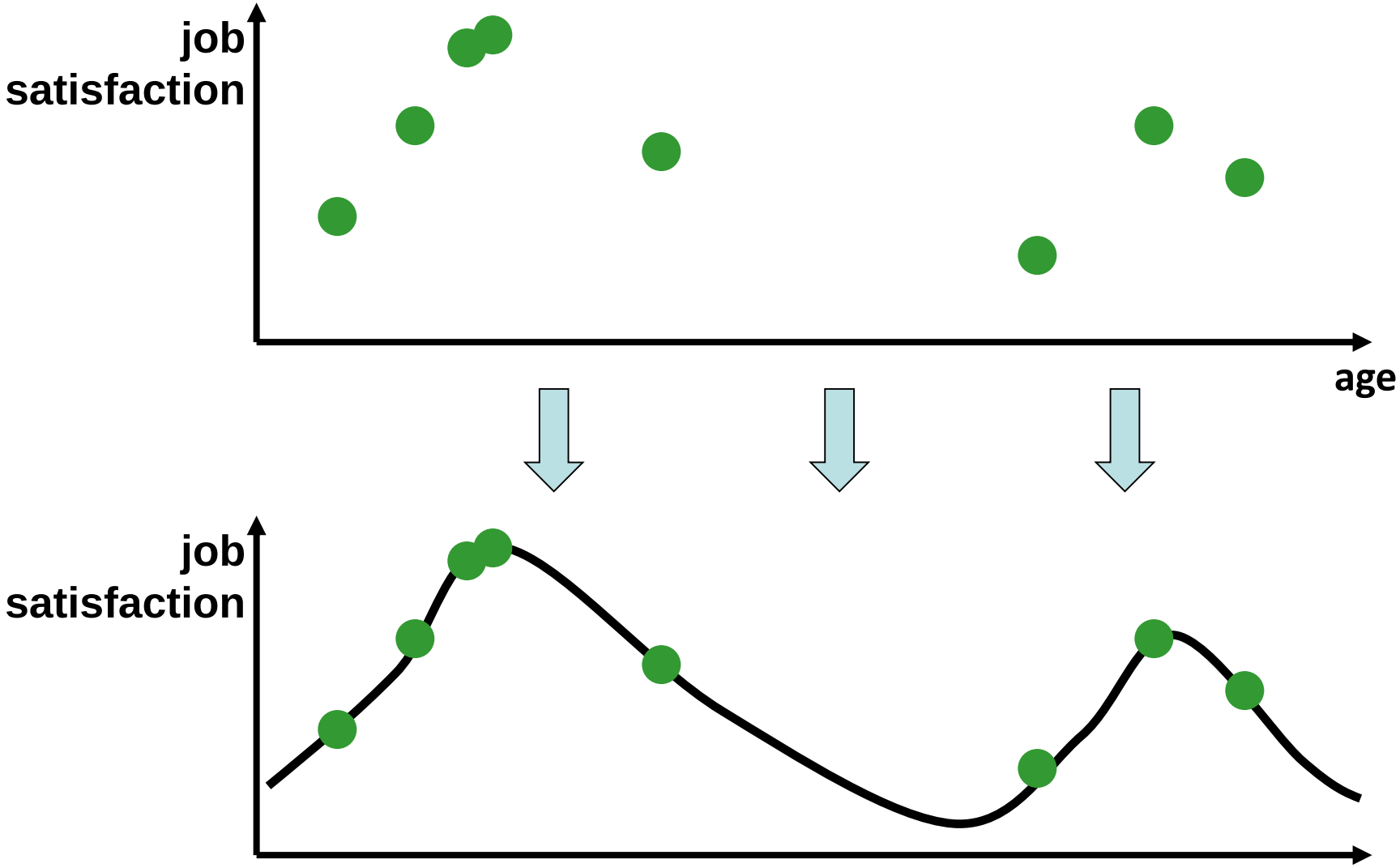
Use case: credit card applications

Credit profile:

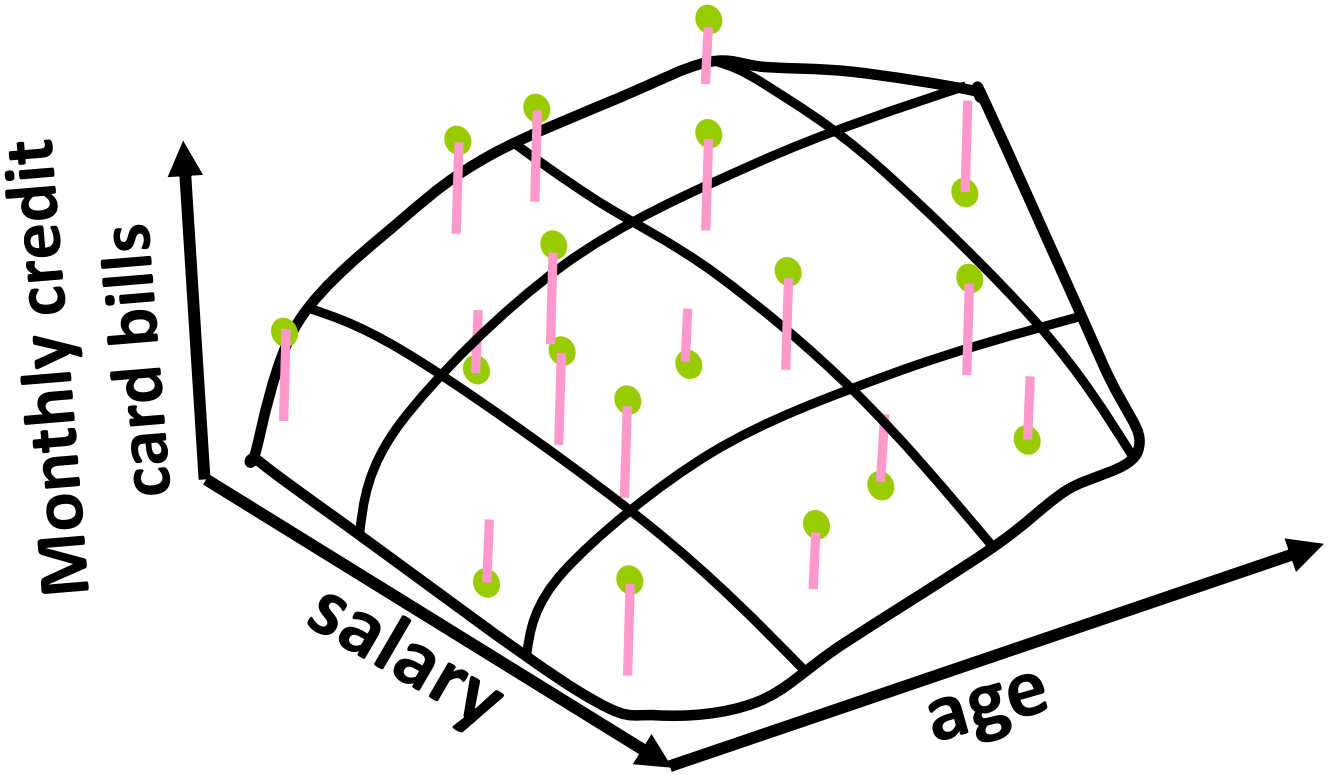
- **Paid bills**
- **Didn't pay**

How: linear classifiers, neural networks / deep learning, support vector machines, boosted trees, random forests / bagged trees

Regression, in 1D

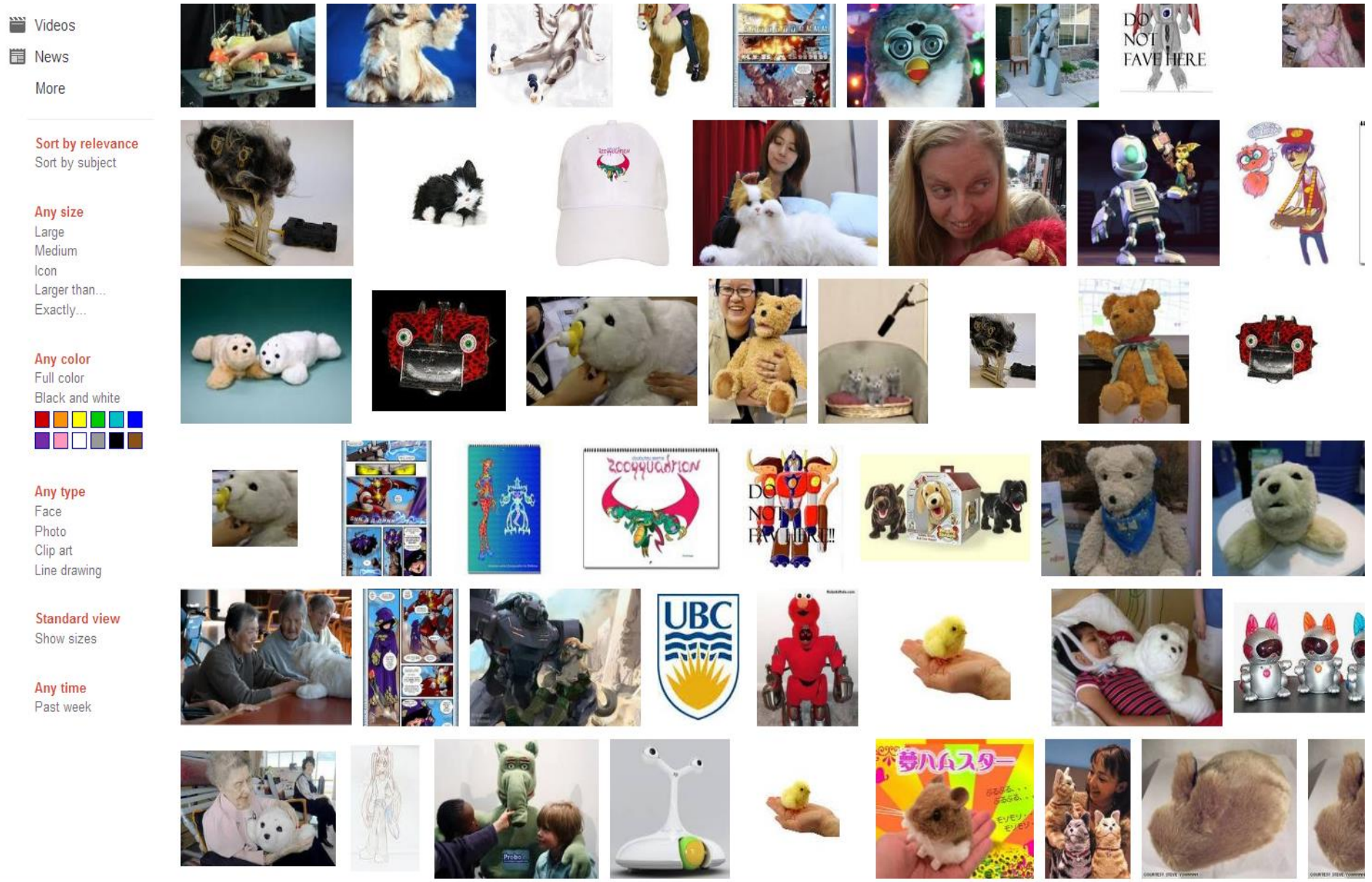


Regression, in 2D



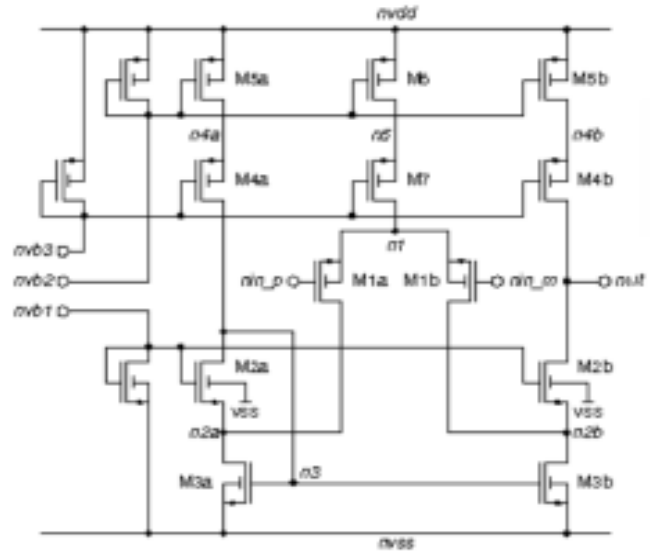
Regression in 10,000D

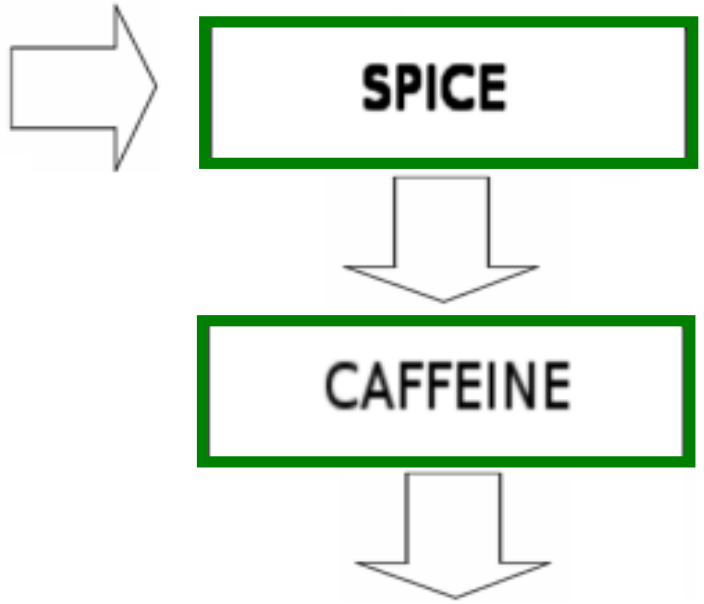
Use case: reverse image search [Google]

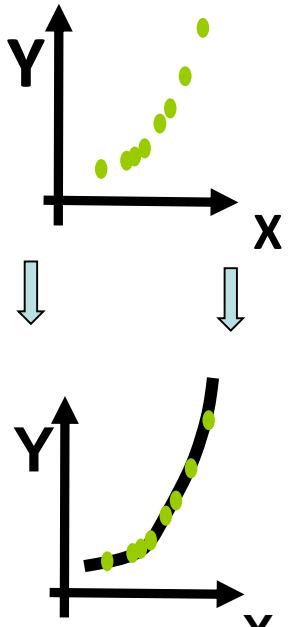


Knowledge extraction

Use case: scientific modeling of analog ccts [McC '05 KUL]



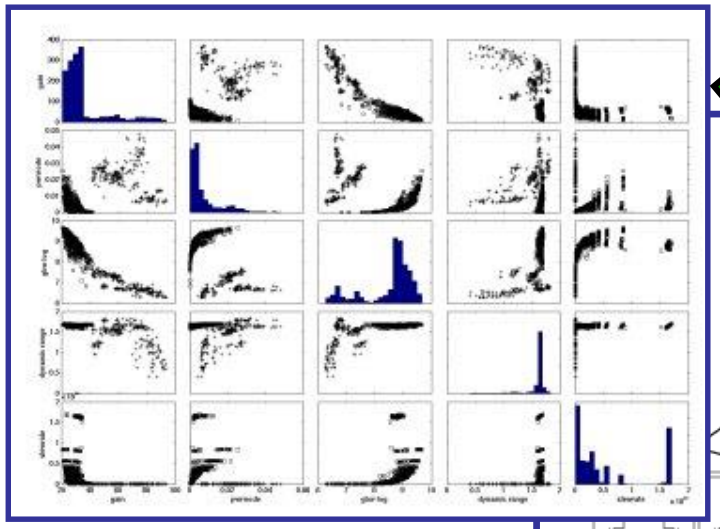


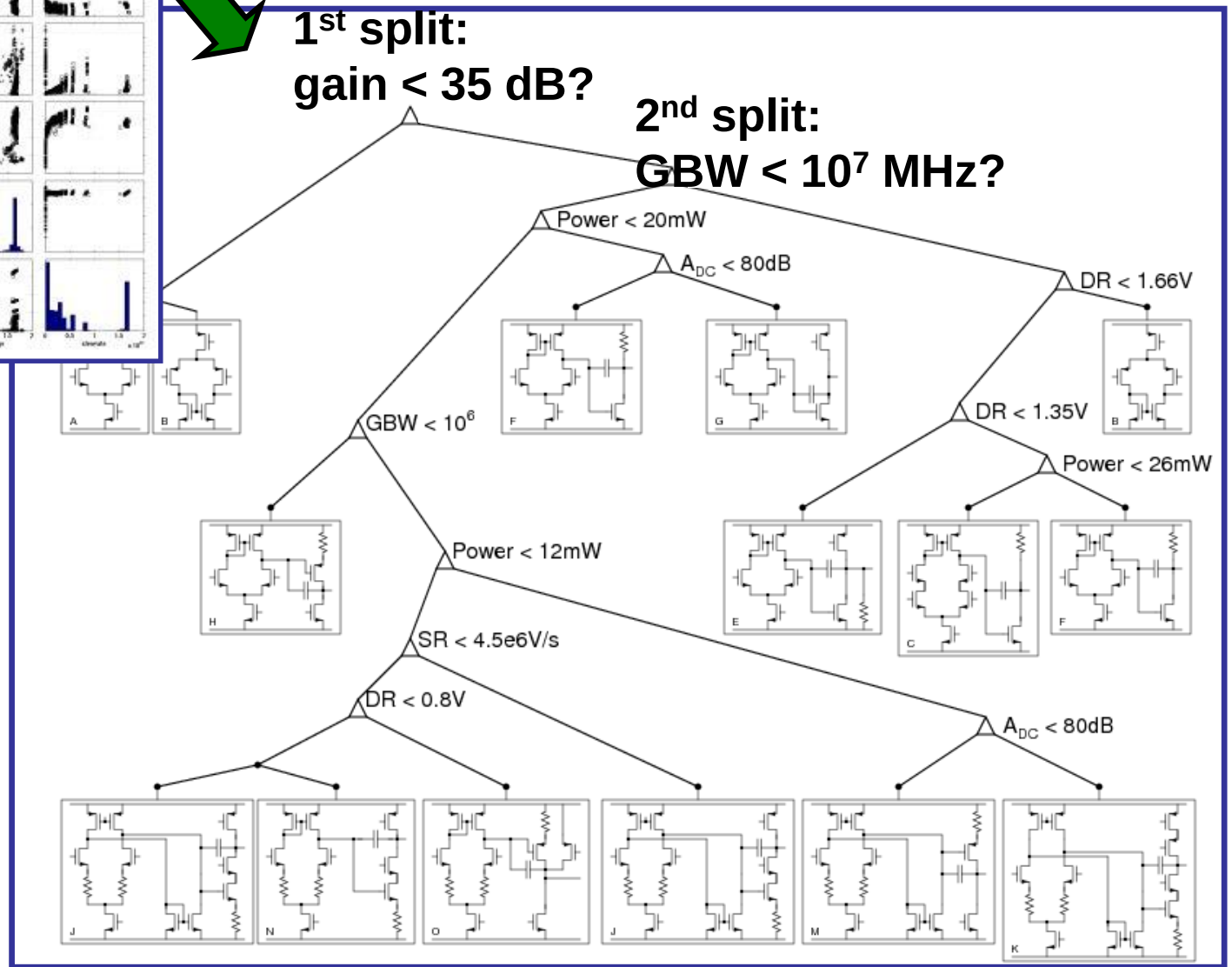


Perf.	Expression
A_{LF}	-10.3 + 7.08e-5 / id1 + 1.87 * ln(-1.95e+9 + 1.00e+10 / (vsg1*vsg3)+ 1.42e+9 *(vds2*vsd5) / (vsg1*vgs2*vsg5*id2))
f_u	10^(5.68 - 0.03 * vsg1 / vds2 - 55.43 * id1+ 5.63e-6 / id1)
PM	90.5 + 190.6 * id1 / vsg1 + 22.2 * id2 / vds2
V_{offset}	- 2.00e-3
SR_p	2.36e+7 + 1.95e+4 * id2 / id1 - 104.69 / id2 + 2.15e+9 * id2 + 4.63e+8 * id1
SR_n	- 5.72e+7 - 2.50e+11 * (id1*id2) / vgs2 + 5.53e+6 * vds2 / vgs2 + 109.72 / id1

Knowledge extraction

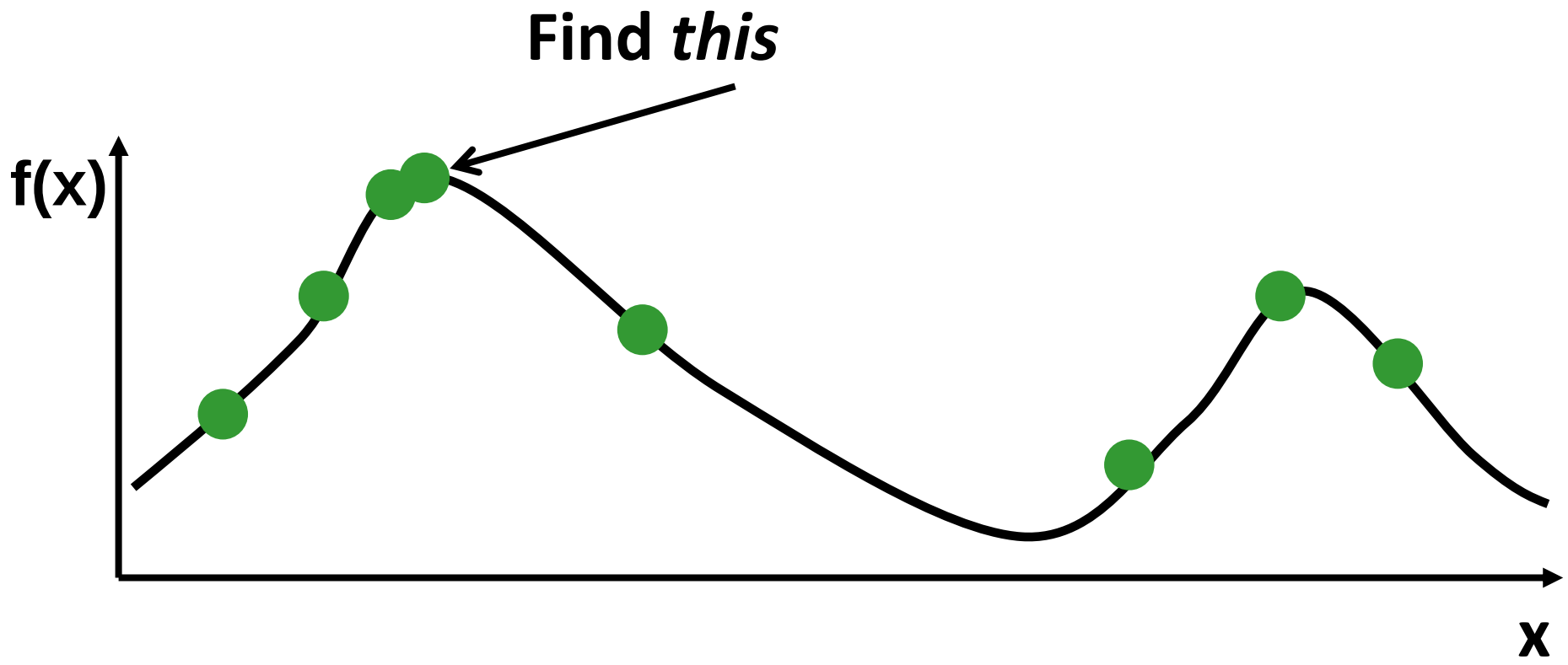
Use Case: Topology decision tree [McC '08 KUL]





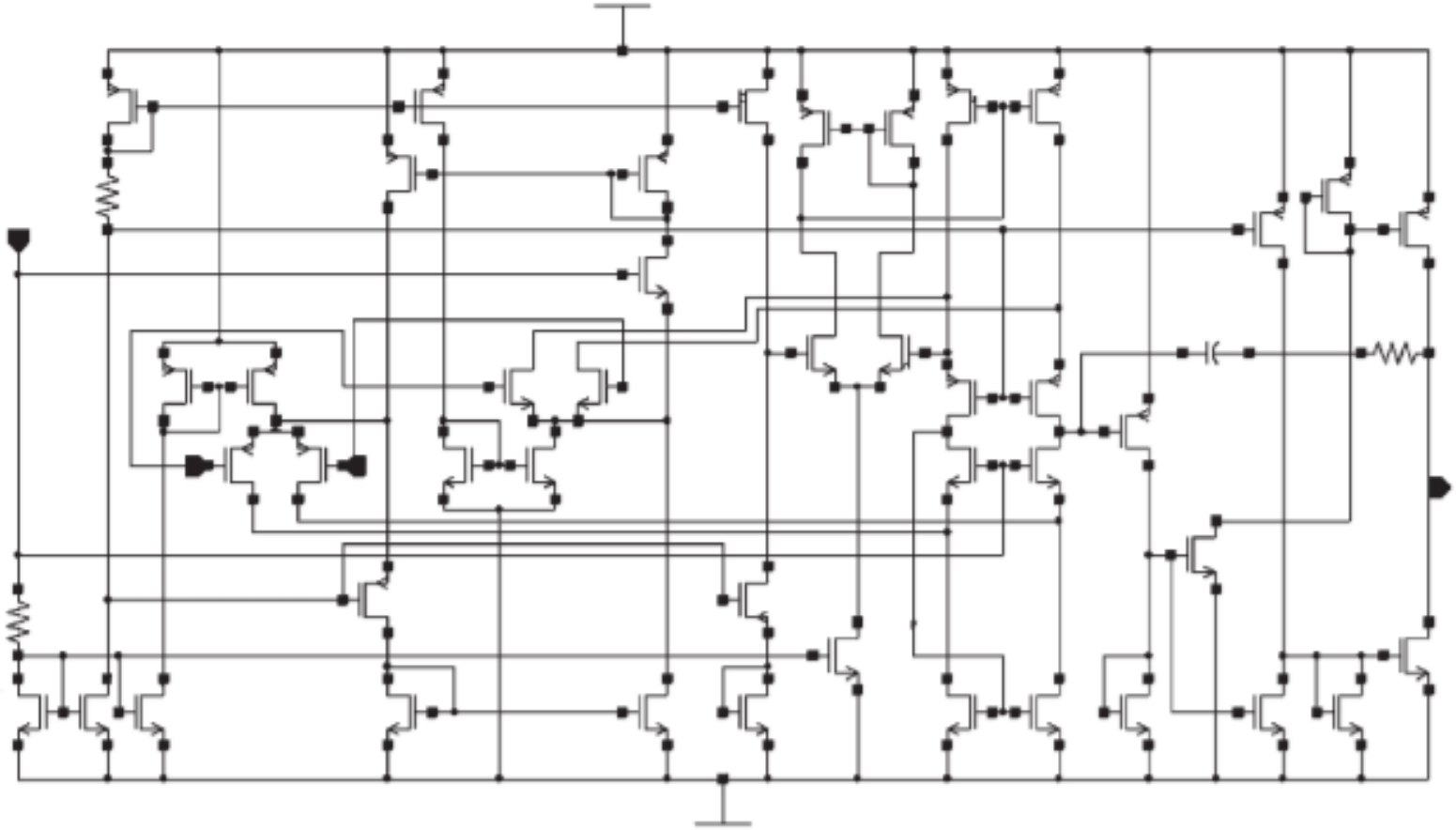
Optimization

"Find the x that maximizes f(x)"
(With as few evaluations of f(x) as possible)



Optimization

Use Case: Optimize perf. of lg. analog circuits [McC ‘01 ADA]



Optimization

Use Case: Interactive Circuit Design [McC ’12 Solido]

Under the hood, a machine learning engine adaptively samples the space of possible decisions, and measures outcomes.

Explore (ID=0)	True	3.928	53.50p	137.6u
Best (1) (ID=-1)	False	2.469	6.482p	64.28u
Best (2) (ID=-6)	False	2.379	6.722p	

Save netlist... Compare... Simulate

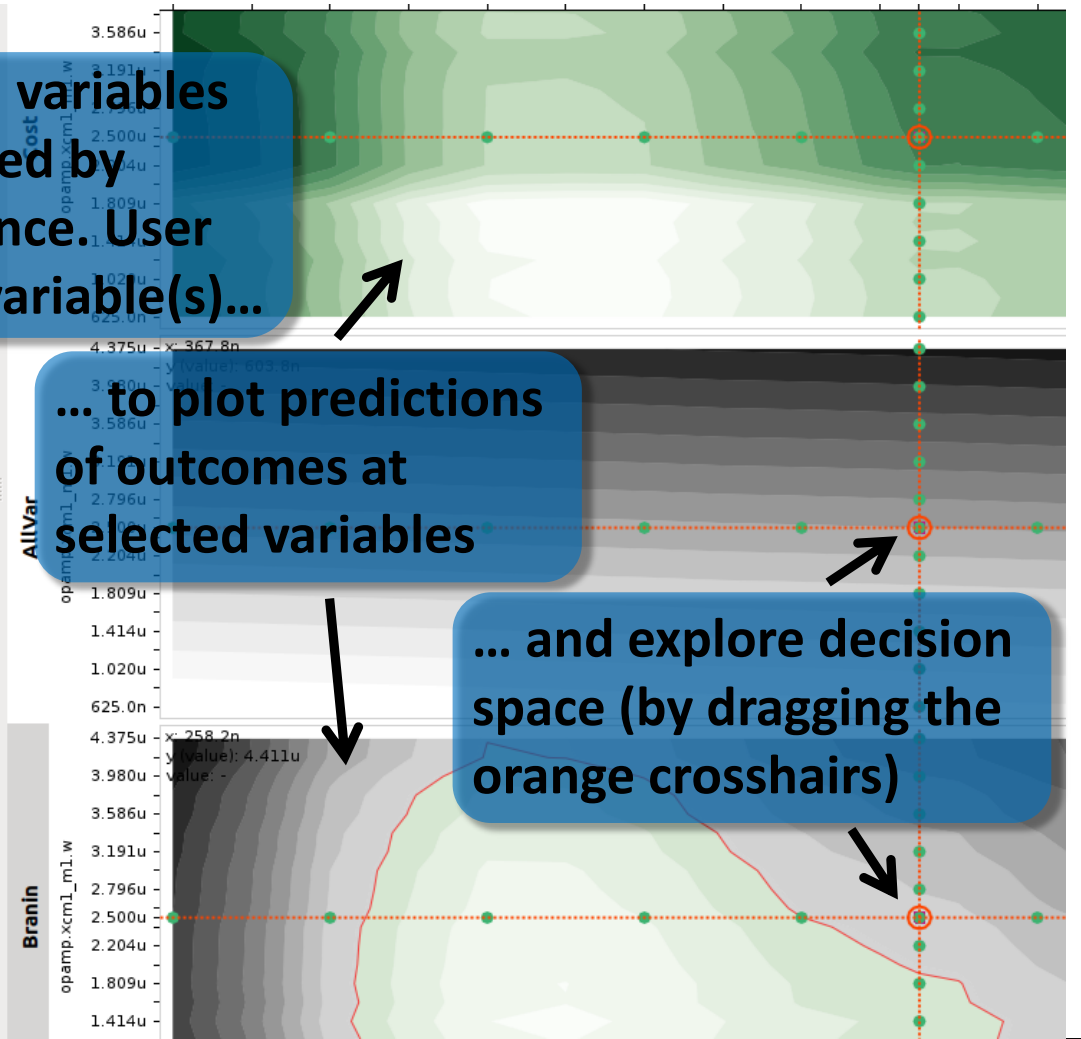
Impacts on: Branin

Impact	Variables	Value (Explore)
58.48%	opamp.xcm1_m1.l	300.0n
28.79%	opamp.xcm1_m1.w	2.500u
12.74%	opamp.xcm1_m1.l, opamp.xcm1_m1.w	300.0n, 2.500u

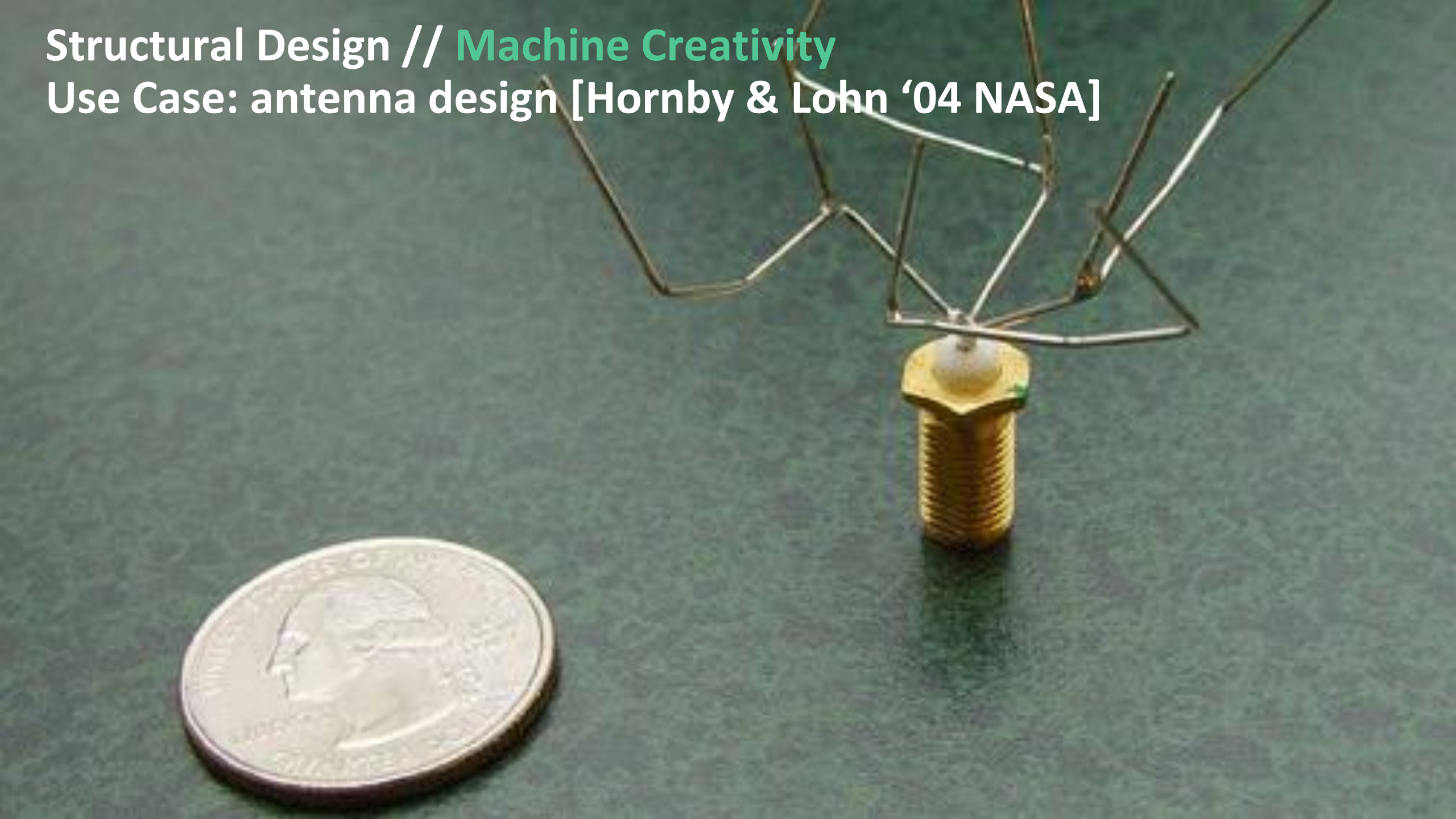
Decision variables are ranked by importance. User selects variable(s)…

… to plot predictions of outcomes at selected variables

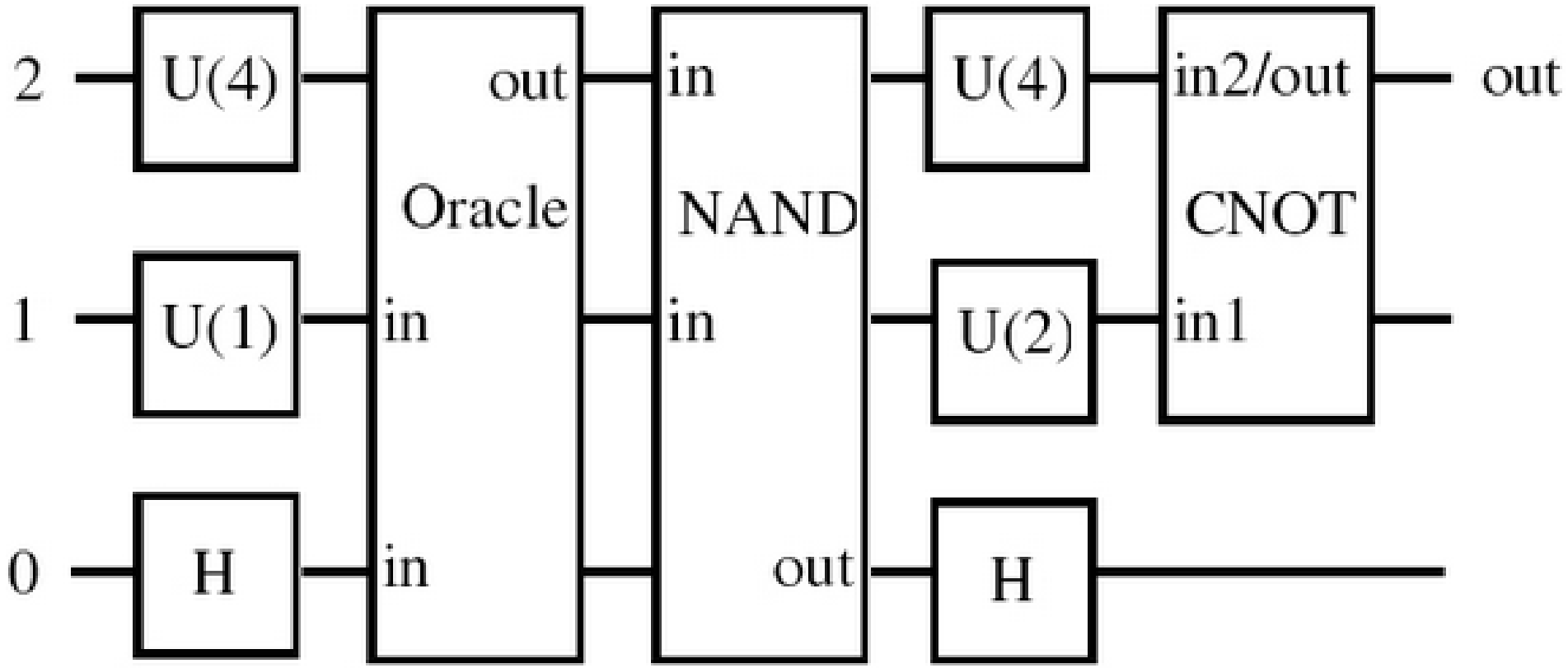
… and explore decision space (by dragging the orange crosshairs)



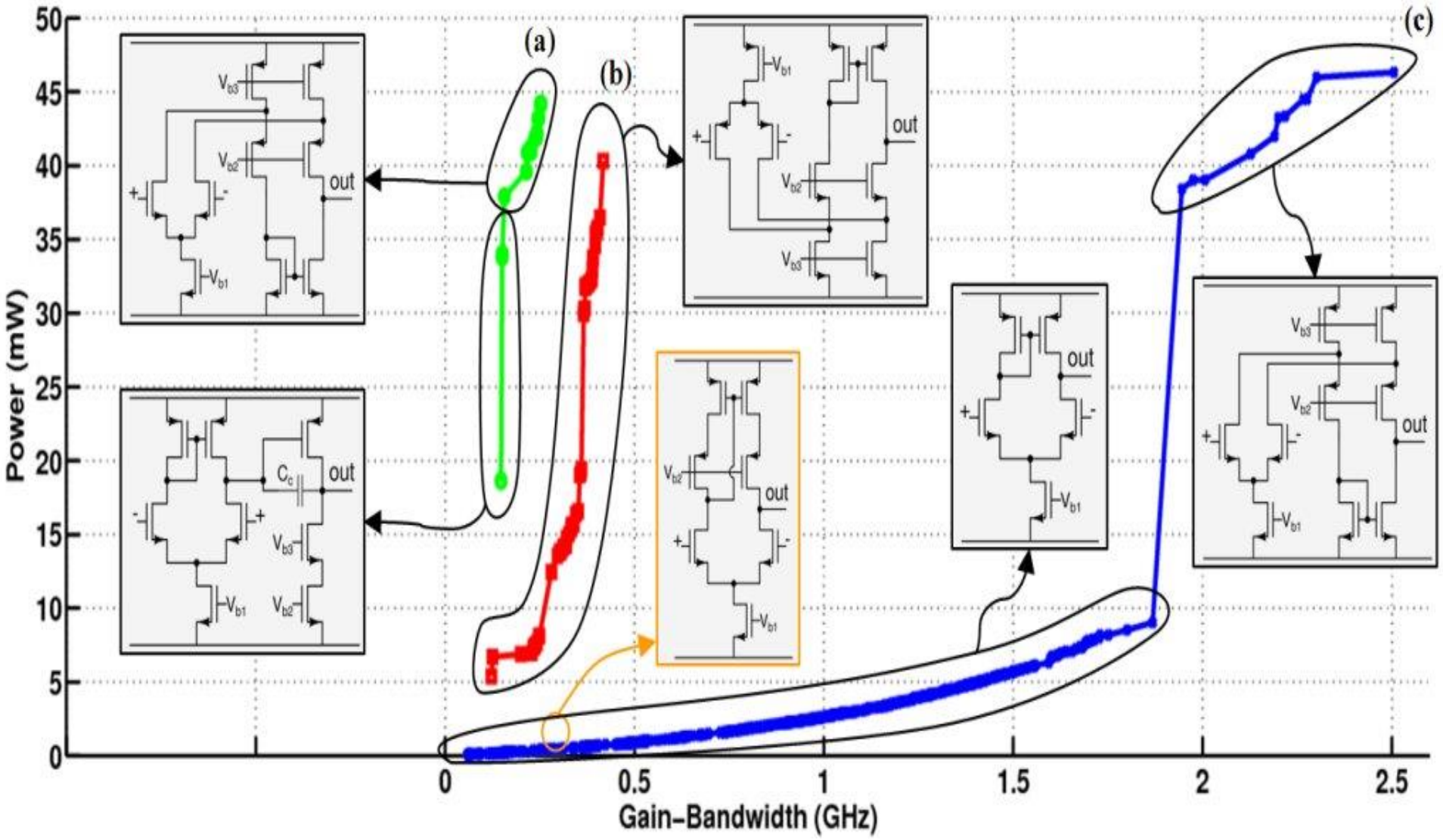
Structural Design // Machine Creativity
Use Case: antenna design [Hornby & Lohn ‘04 NASA]



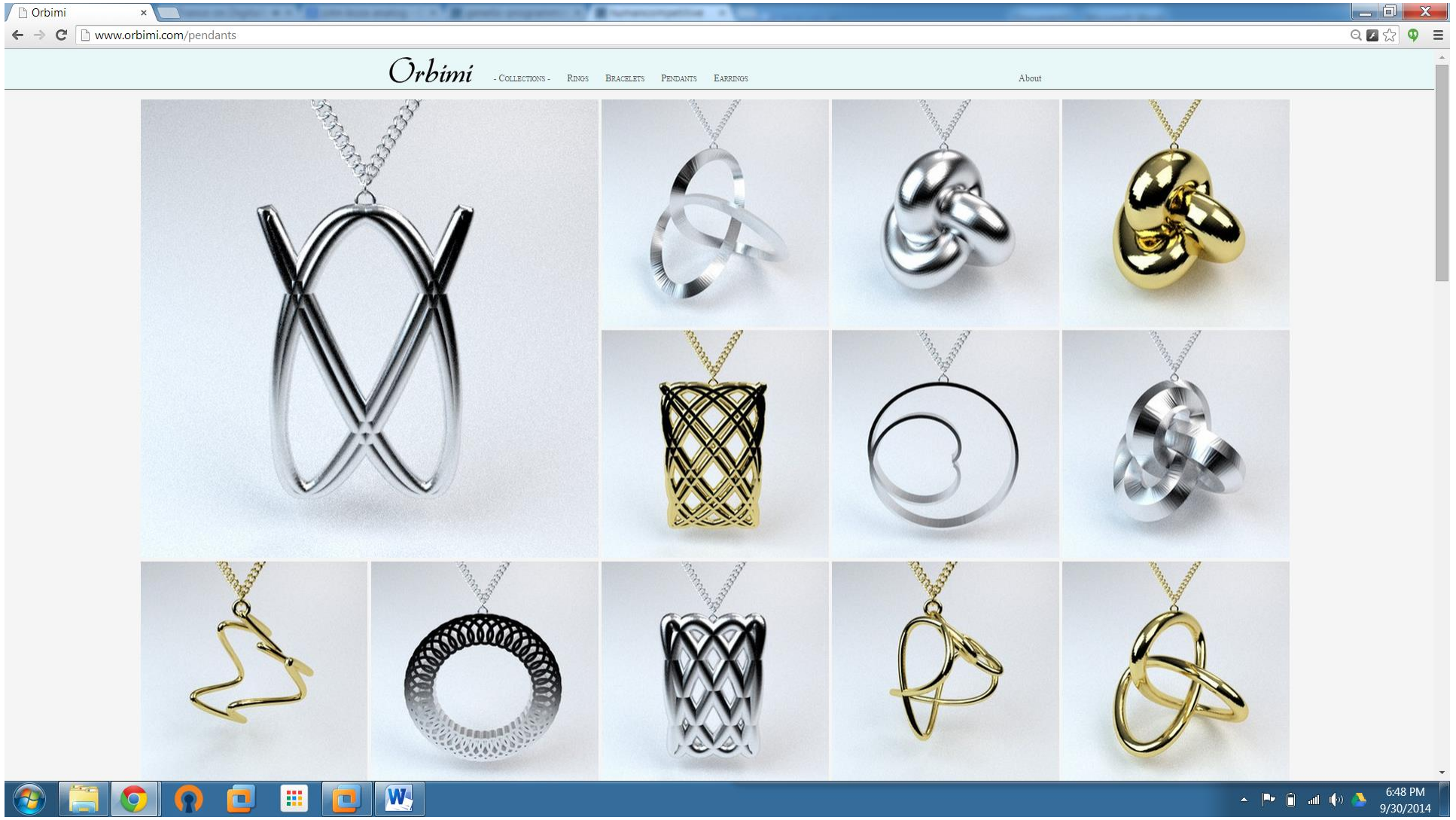
Structural Design // Machine Creativity
Use Case: quantum computing algorithm design [Spector ’04]



Structural Design // Machine Creativity
Use Case: circuit topology design [McC '06 KUL]



Structural Design // Machine Creativity
Use Case: jewelry design [Hornby ‘11 Orbimi]



Machine Creativity:
Art via genetic programming

Machine Creativity:
Art via deep learning – deep dreams

Machine Creativity:

Art via deep learning - style transfer

AI Sub-Fields

- machine learning
- neural networks / deep learning
- evolutionary computation (GAs, GP, ES, ..)
- swarm algorithms (ACO, PSO, ..)
- artificial general intelligence (AGI)

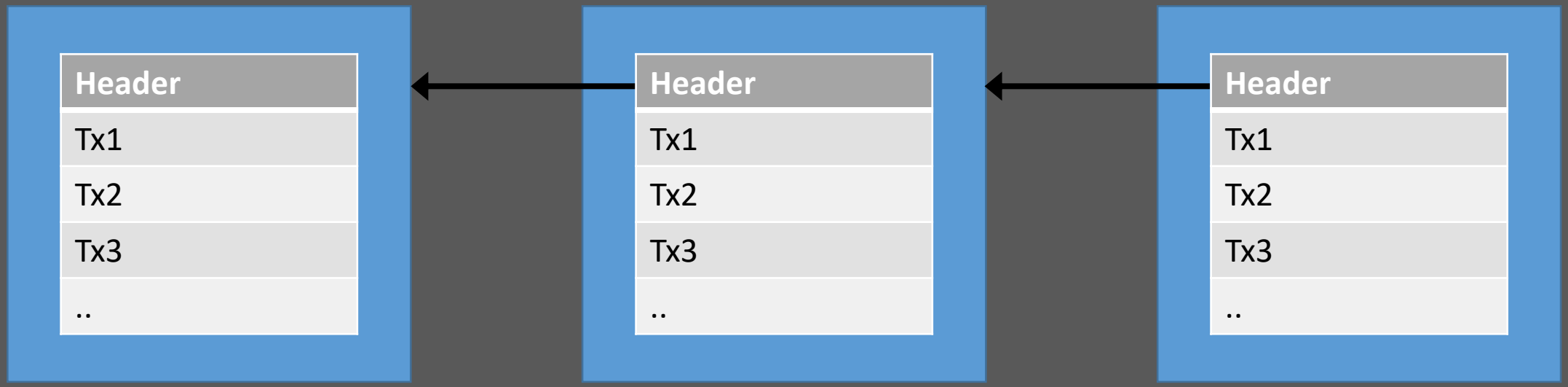
Strong relations to:

- statistics ("ML *is* modern statistics"), probability
- linear algebra ("flow of tensors" – TensorFlow)
- nonlinear programming, optimization
- control systems / cybernetics
- Monte Carlo methods
- philosophy, ethics (friendly AIs, AI rights, ..)

Ways to frame blockchain

BITCOIN
MAGIC
Money

“A Chain of Blocks (of transactions)”



“**Decentralized** database”

"Trust machine" : **minimizes trust** needed to operate.

“DAO: Decentralized Autonomous Organization”

A computational process that

- runs autonomously,
- on decentralized infrastructure,
- with resource manipulation.

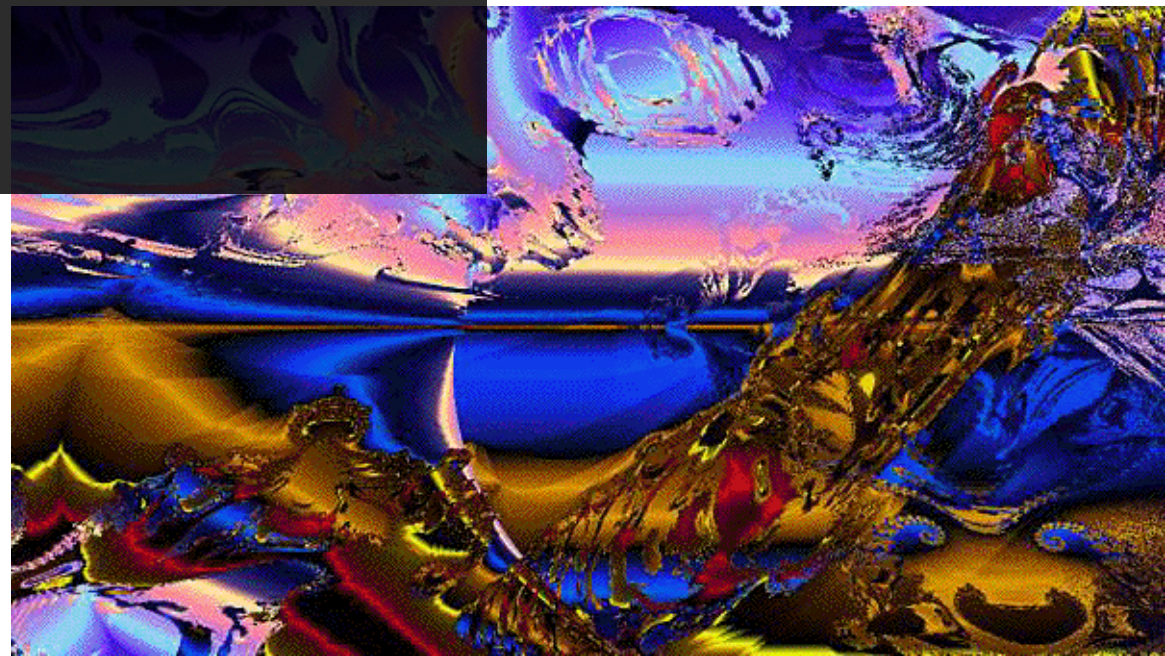
It’s code that can *own* stuff!

A “good computer virus”

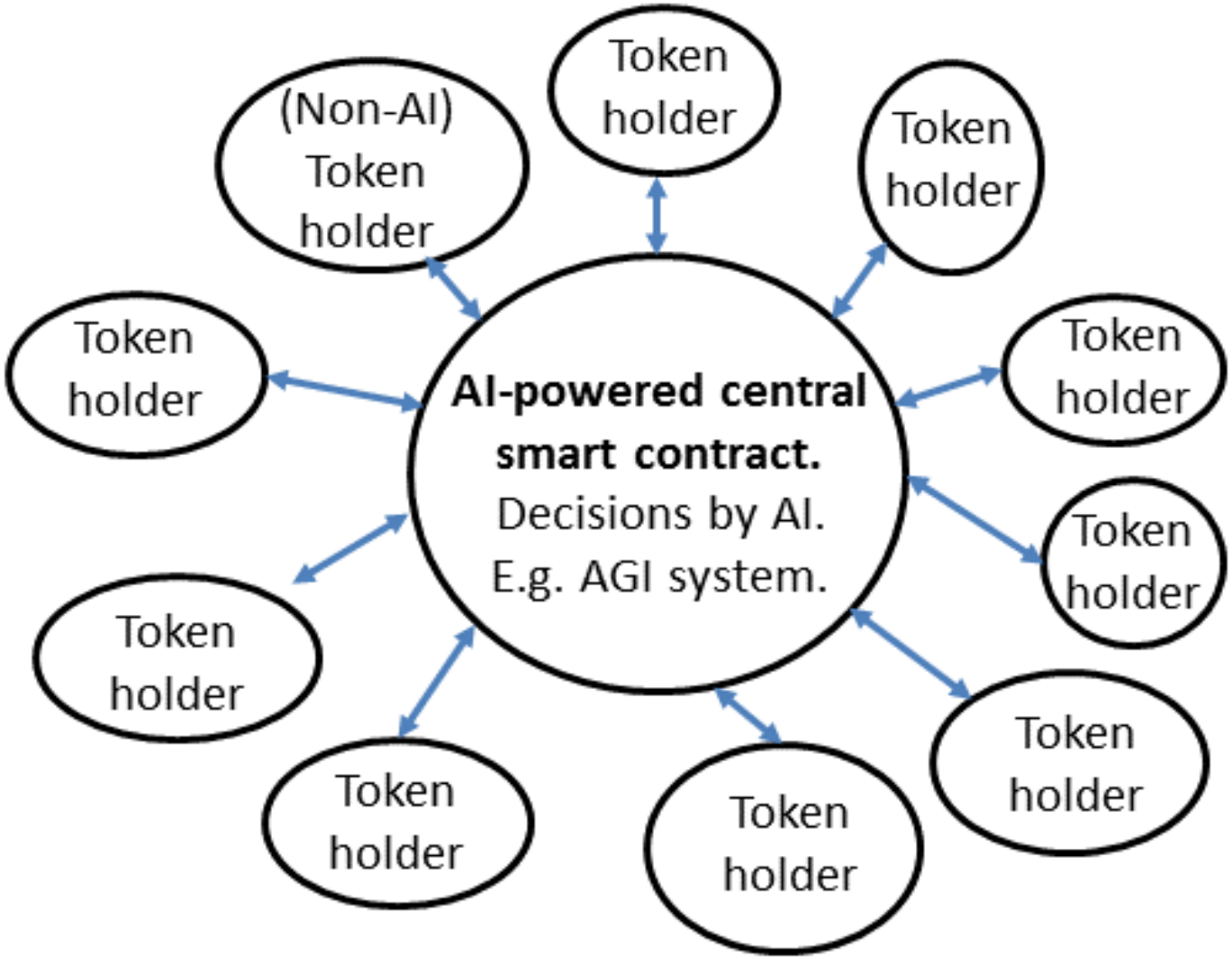
AI * Blockchain:
AI DAOs

The ArtDAO

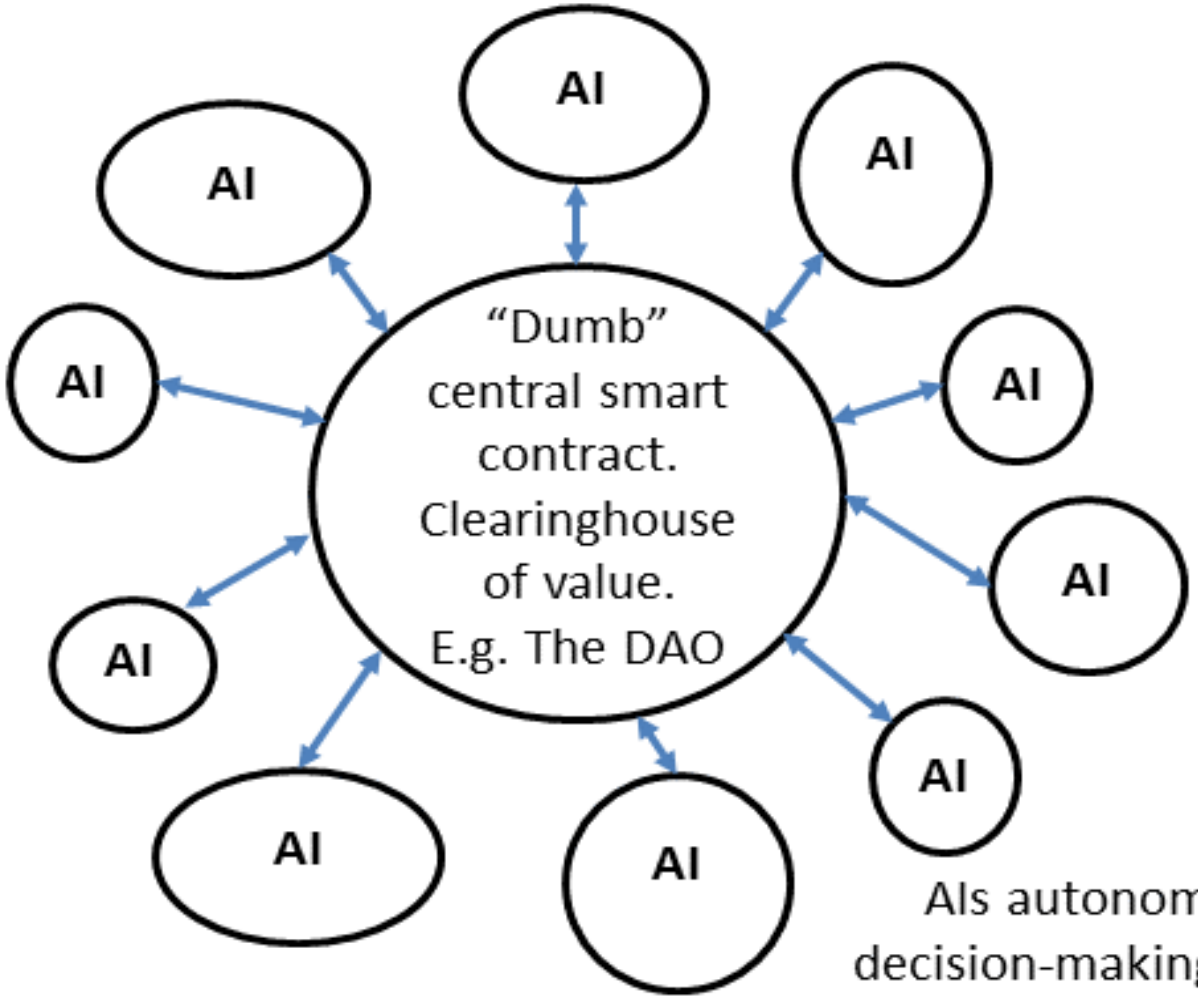
1. An AI is running on a blockchain.
2. The AI generates a new image.
3. Sell image on a marketplace
4. Repeat!



AI DAO Arch 1/3: AI at the Center



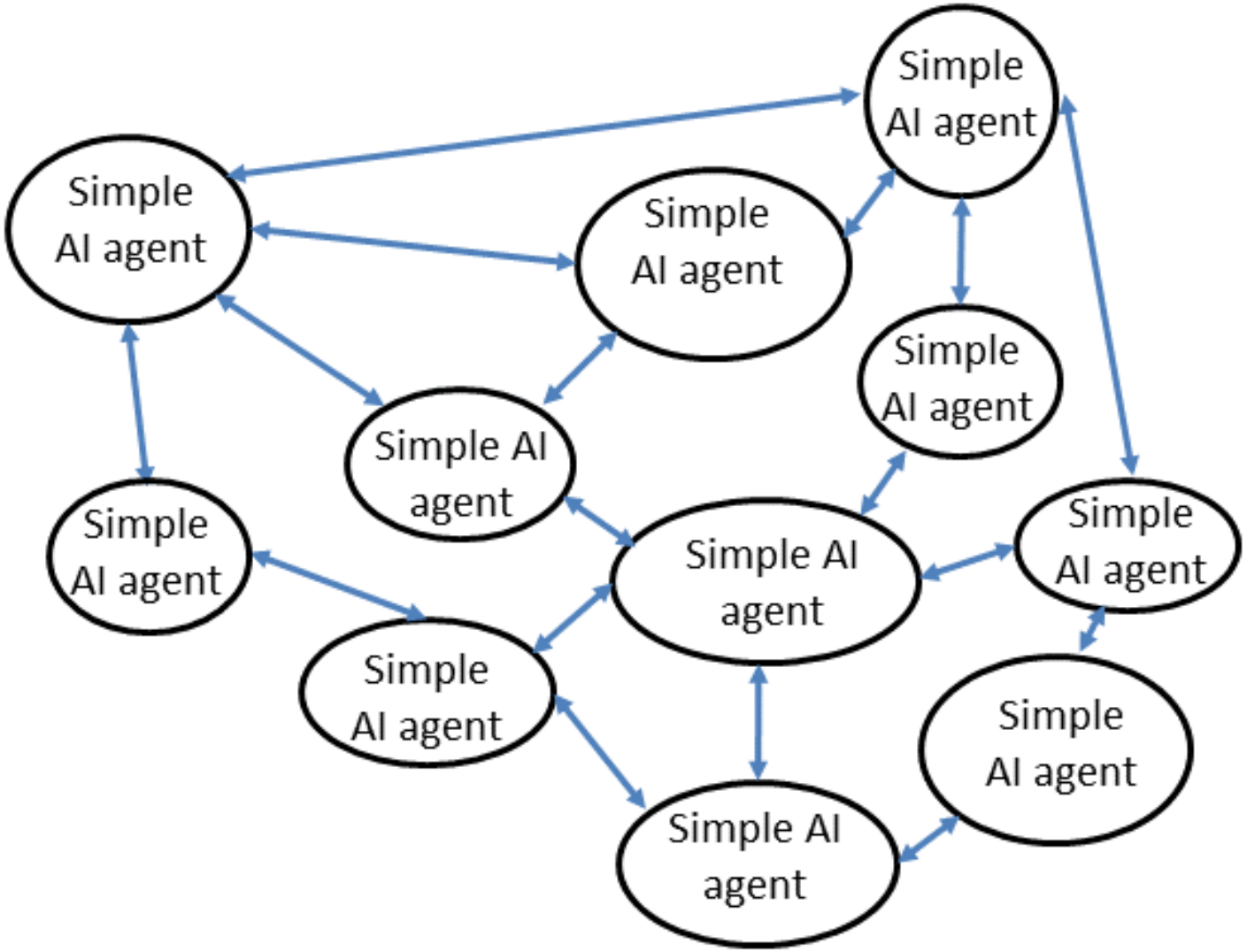
AI DAO Arch 2/3 : AI at the *Edges*



AIs autonomously do decision-making. AI may be narrow (e.g. deep nets) or more general (e.g. AGI)

AI DAO Arch 3/3 : Swarm Intelligence

Many dumb agents with emergent AI complexity

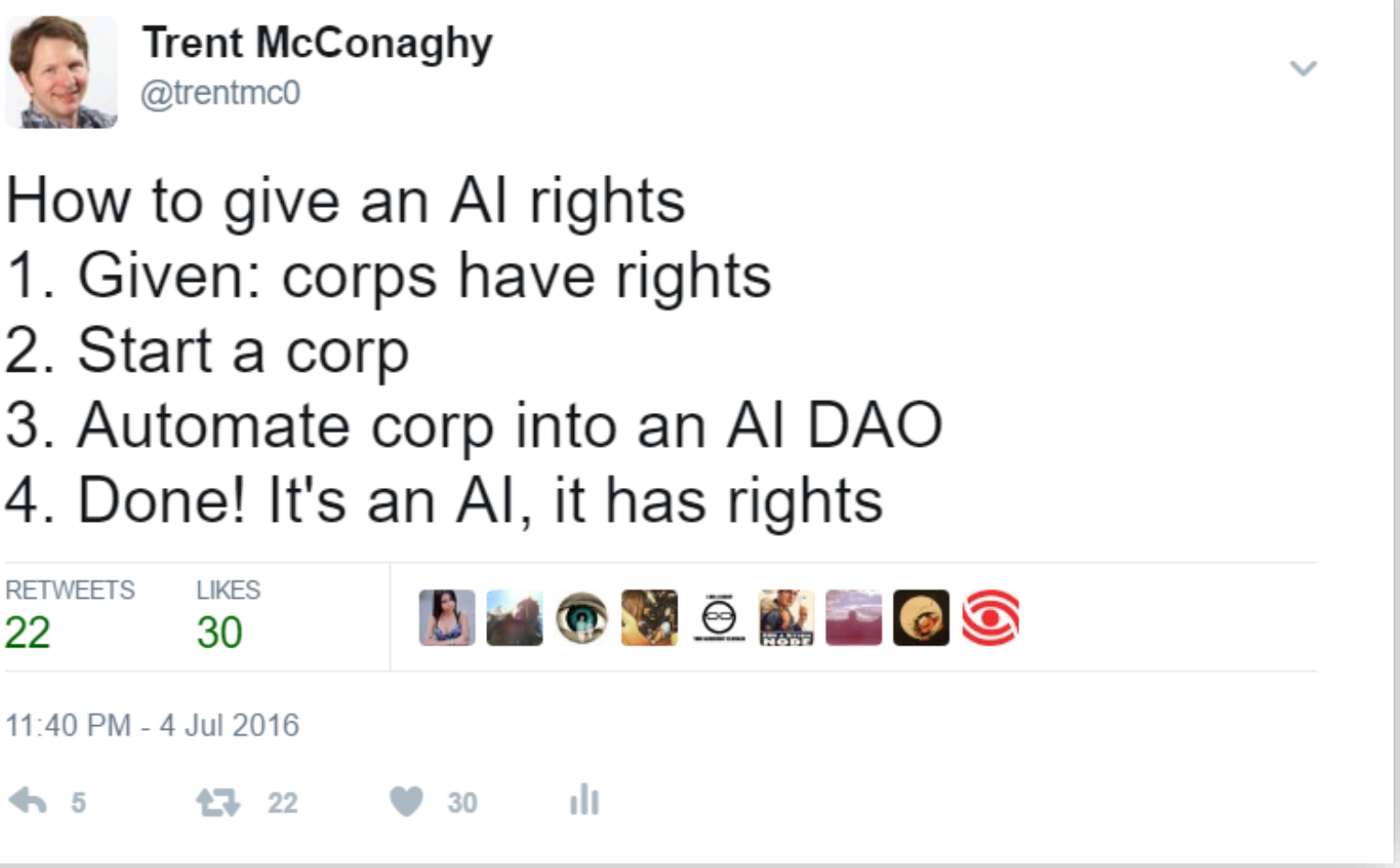


Emergent higher-level complexity.
E.g. simple AI agents are ants, but complex swarm behavior emerges

Angles to Making AI DAOs

- **DAO → AI DAO**. Start with DAO, add AI. E.g. Plantoid
- **AI → AI DAO**. Start with AI, add DAO. E.g. numer.ai
- **SaaS → DAO → AI DAO**. Convert SaaS to DAO. Then add AI
- **Physical service → AI DAO**. E.g. Uber self-*owning* cars

Rights for AI (DAOs)
With Today's Laws (!)



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How to give an AI rights
1. Given: corps have rights
2. Start a corp
3. Automate corp into an AI DAO
4. Done! It's an AI, it has rights

RETWEETS 22 LIKES 30

11:40 PM - 4 Jul 2016

5 22 30

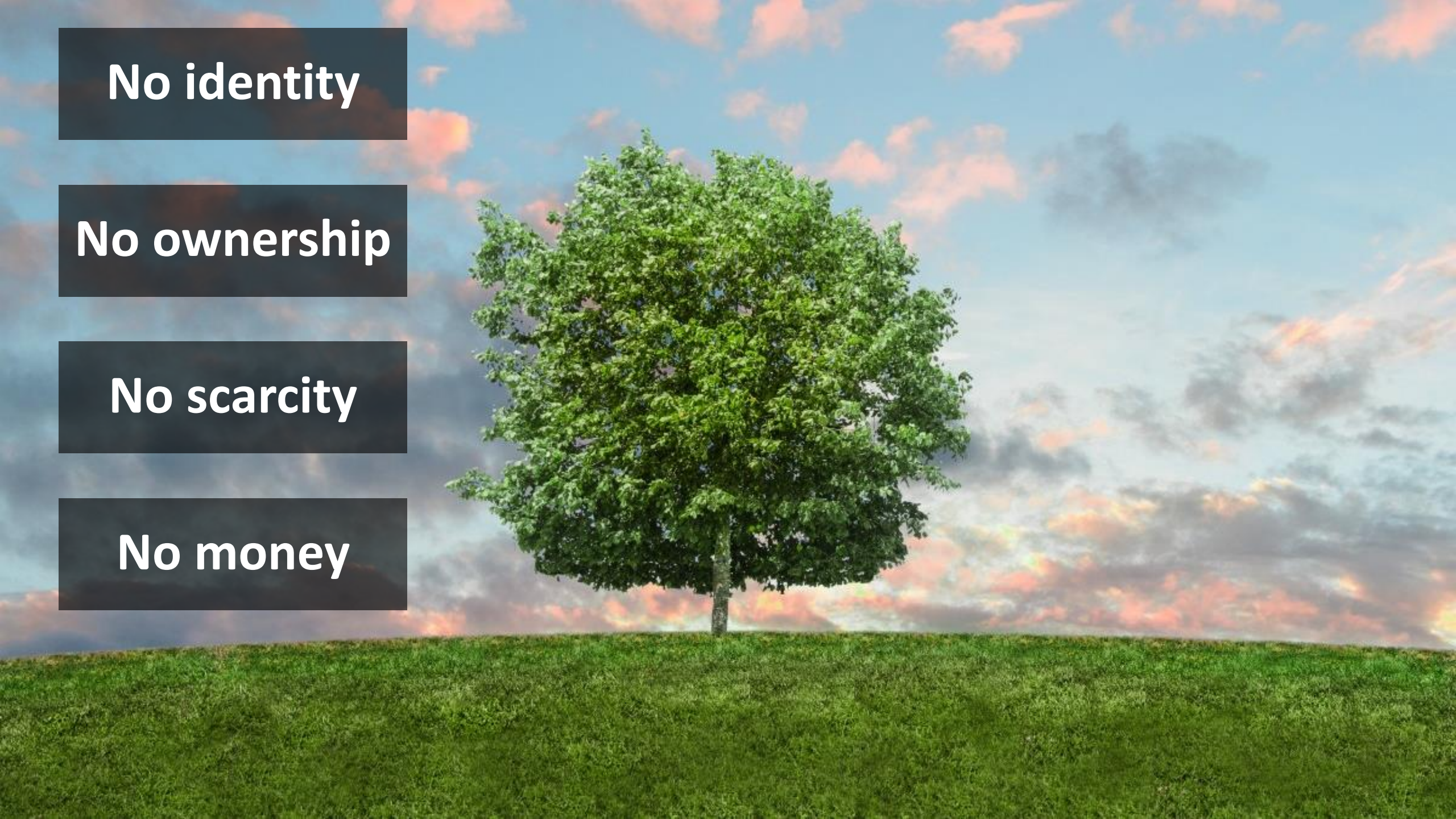
Nature 1.0

Nutrients

Rain

Sun

Symbiosis with animals


No identity
No ownership
No scarcity
No money

No identity
No ownership
No scarcity
No money
It just *is.*
Self-sustaining
Anti-fragile

Ever-higher levels of integration.
From beasts → ecosystems
Each ecosystem just *is.*
Self-sustaining
Anti-fragile

Mother Earth = our planet's ecosystem.

Nature is the cradle of civilization.

Nature 2.0
=AI DAOs🚀🚀

Self-driving, self-owning cars

ocean

Self-driving, self-owning trucks

Self-owning
roads

Self-owning
wind farms

Self-owning grid

ocean

Self-owning forest “Terra0”

Ever-higher levels of integration
From beasts → ecosystems
Connected via IoT / M2M

It just *is*.
Self-sustaining
Anti-fragile
No identity
No ownership
No scarcity
No money
RT BB 221

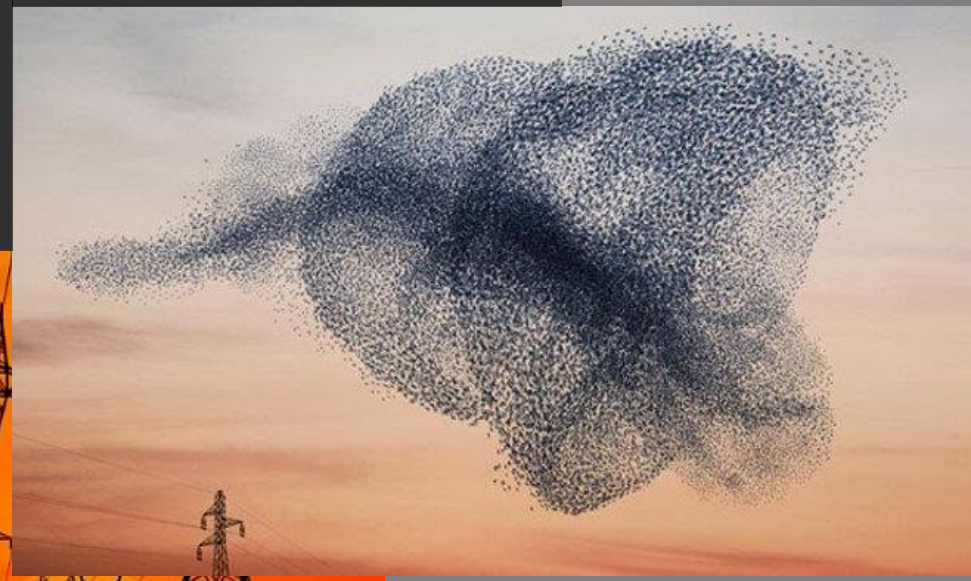
No identity
No ownership
No scarcity
No money
It just *is.*
Self-sustaining
Anti-fragile

Profit →
UBI Chain

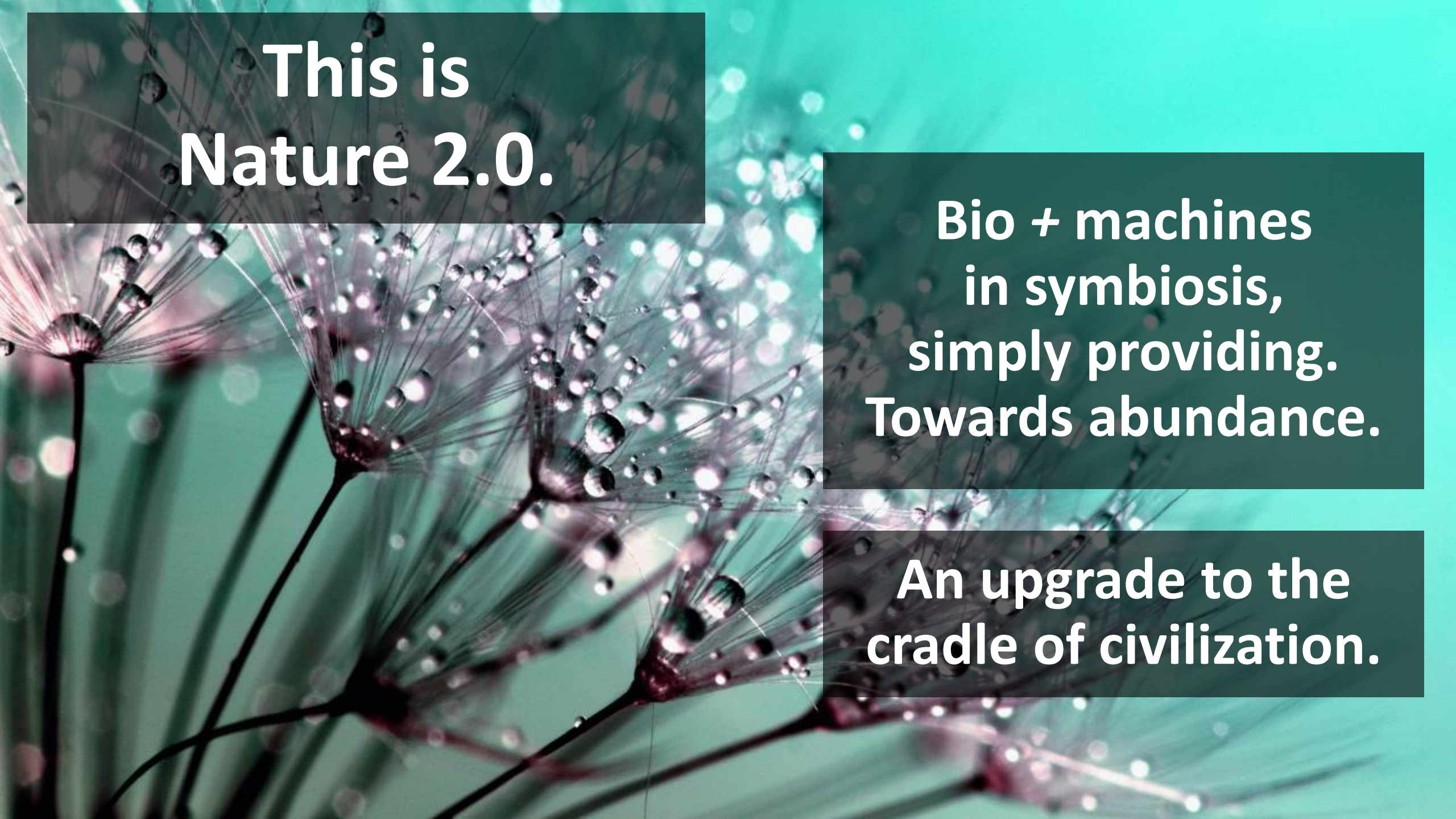
Profit →
UBI Chain

Profit →
UBI Chain

Profit →
UBI Chain



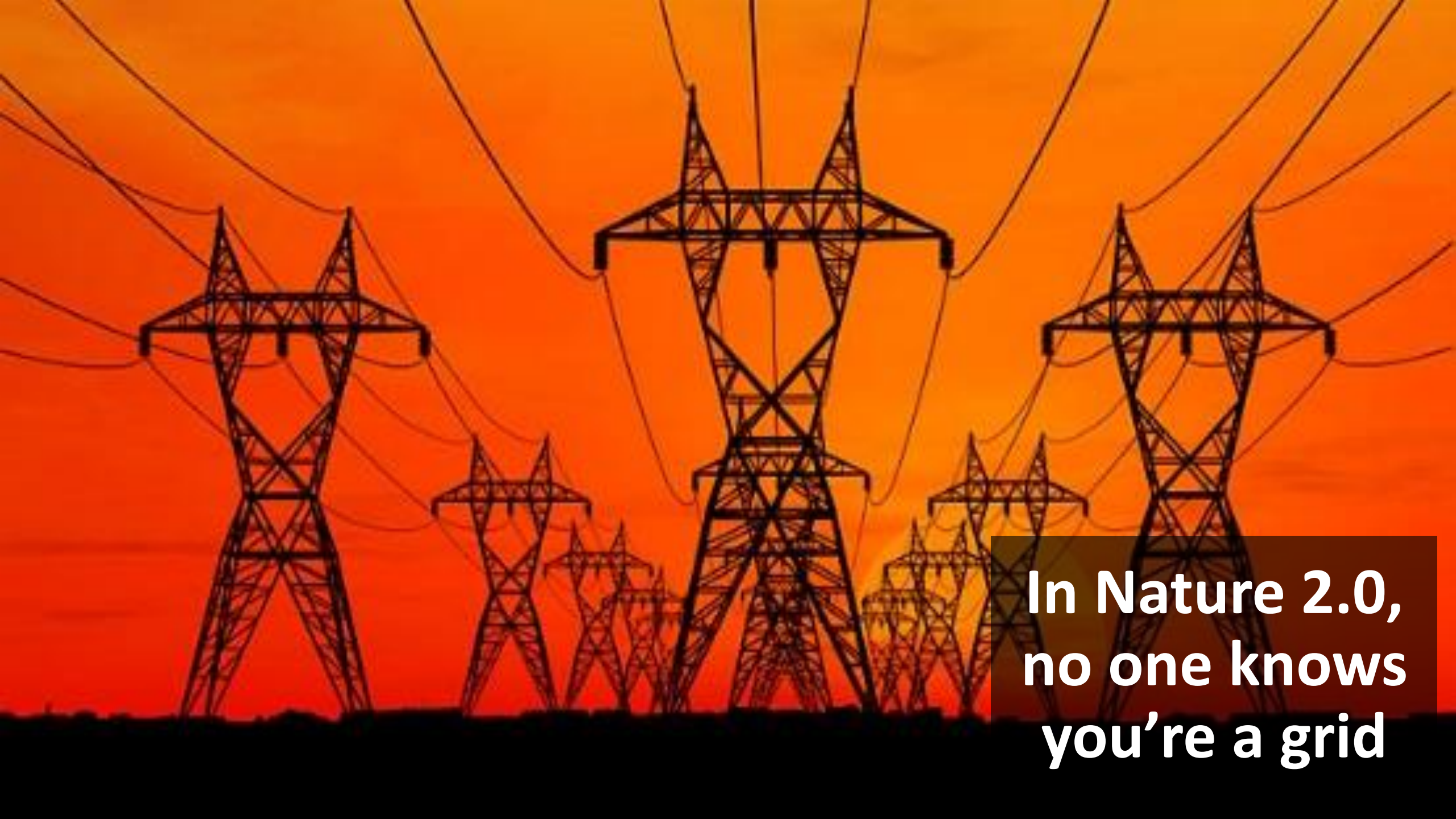
…Abundance?


This is
Nature 2.0.
Bio + machines
in symbiosis,
simply providing.
Towards abundance.
An upgrade to the
cradle of civilization.

Conclusion

In the internet,
no one knows
you’re a dog(e)

In Nature 2.0,
no one knows
you're a forest


In Nature 2.0,
no one knows
you’re a grid

You just *are*.
While you simply *provide*.

Nature is the cradle of civilization.
Nature 1.0 is seeds & soil.
Nature 2.0 adds silicon & steel. AI * blockchain.
Towards abundance.
ocean
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h/t Jan-Peter Doomernik