EVS PRESENTATION · B.SC. (HONS) MATHEMATICS

# Environmental Ethics *in the Age of AI*

Intelligence now has a physical footprint. Who carries it, and who decides?

VEDANT AGGARWAL · RAMJAS COLLEGE, UNIVERSITY OF DELHI

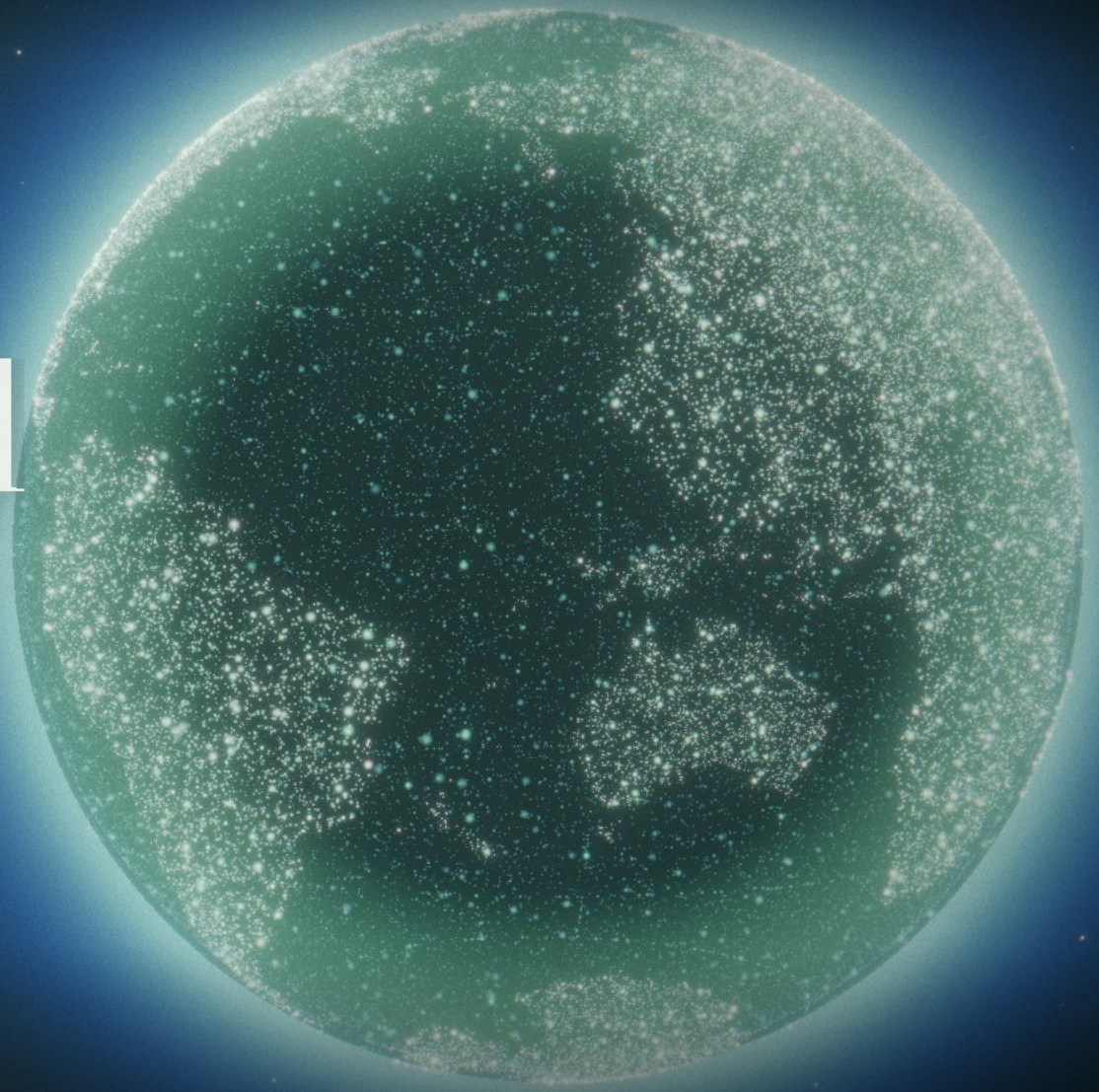


Fig. 1 — Earth in 65,536 points.
Coastlines: Natural Earth.

A TEST FROM 1949

*“A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.”*

ALDO LEOPOLD, *A Sand County Almanac*



Fig. 2 — Phyllotaxis: seeds placed 137.5° apart, the golden angle.

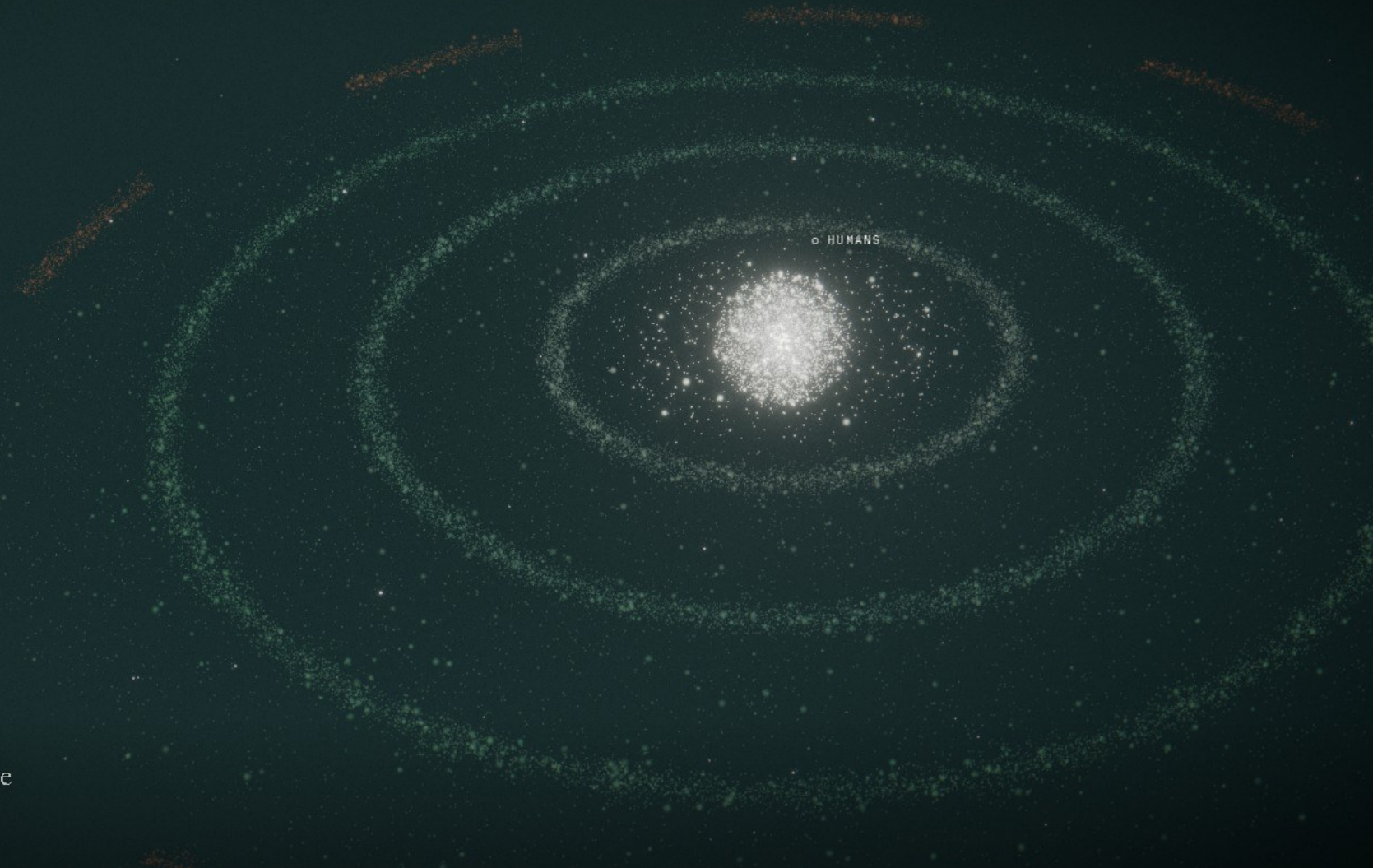
# Now run artificial intelligence through the same test.

Whose interests count? What does AI take from the Earth? What does it give back? Who decides?

Fig. 2b — The same seed head, seen from above. 34 and 55 spirals: Fibonacci numbers.

THREE LENSES OF ENVIRONMENTAL ETHICS

# Who counts?



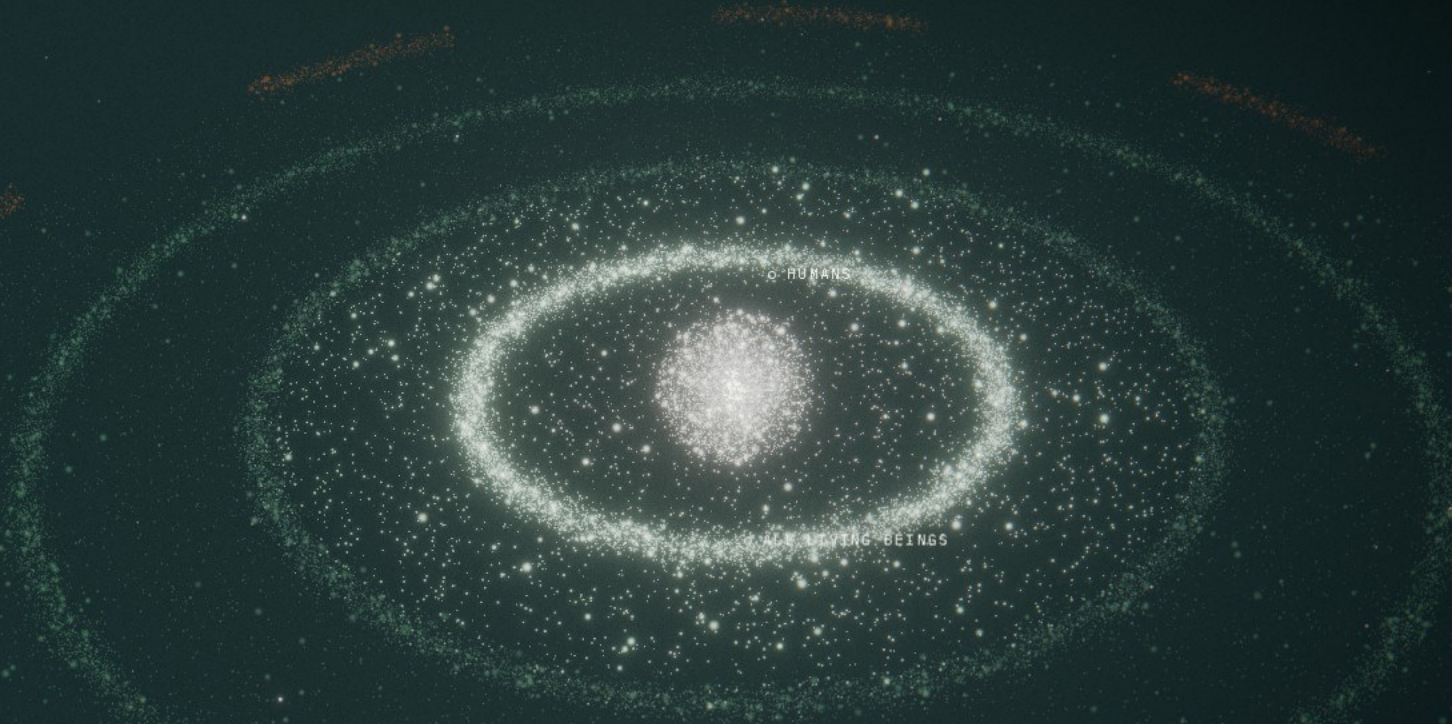

## 01 Anthropocentrism

Only humans have intrinsic value. A forest matters because it gives us timber, oxygen and clean water.

Fig. 3 — The moral circle. Each ring is a wider idea of who matters.

THREE LENSES OF ENVIRONMENTAL ETHICS

# Who counts?




## 02 Biocentrism

Every living thing has a good of its own: a tiger, a neem tree, a microbe.

ALBERT SCHWEITZER · PAUL TAYLOR, *Respect for Nature* (1986)

Fig. 3 — The moral circle. Each ring is a wider idea of who matters.

THREE LENSES OF ENVIRONMENTAL ETHICS

# Who counts?

## 03 Ecocentrism

Wholes matter too: species, rivers, ecosystems, the land itself.

ALDO LEOPOLD, THE LAND ETHIC · ARNE NÆSS, DEEP ECOLOGY (1973)

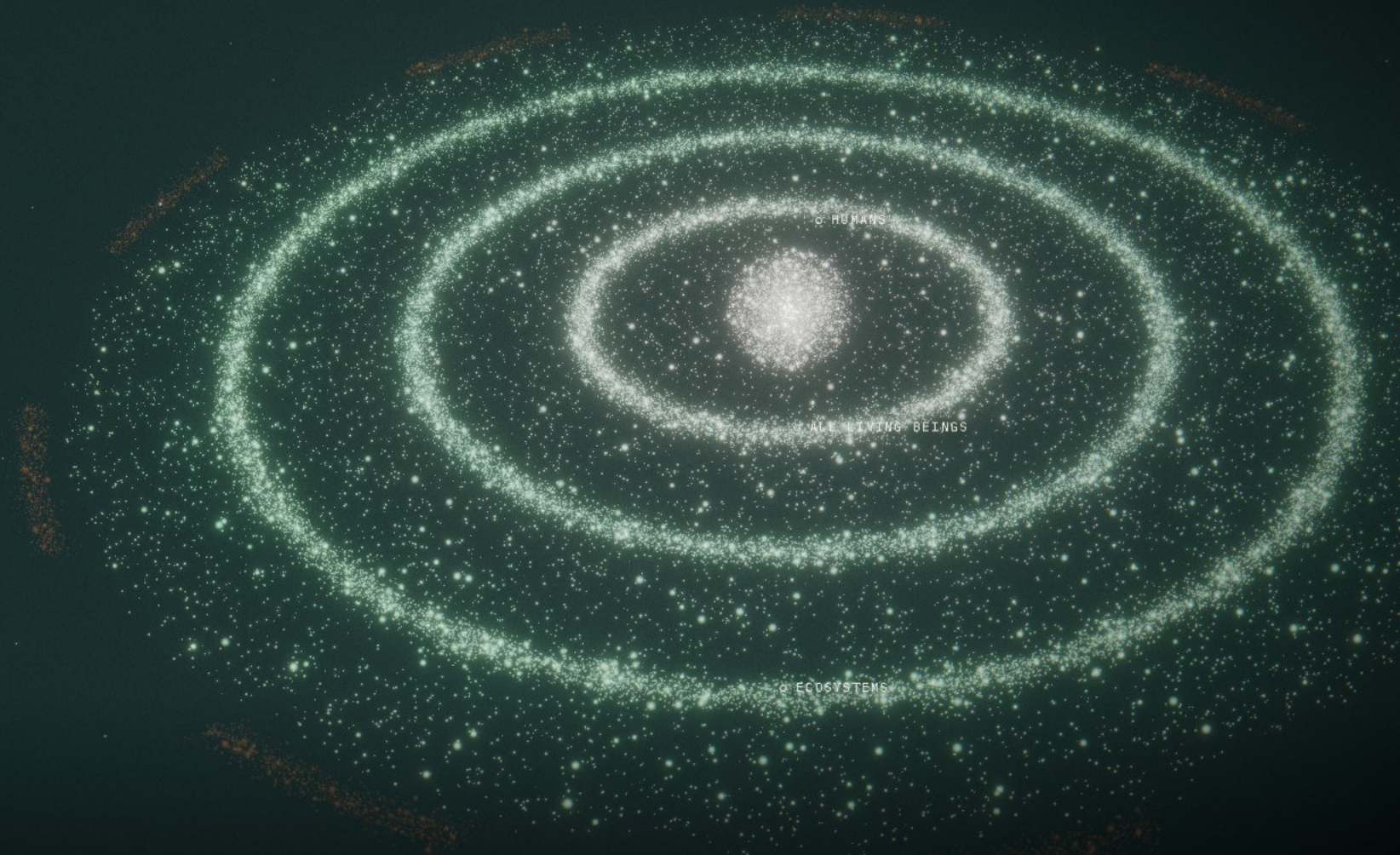



Fig. 3 — The moral circle. Each ring is a wider idea of who matters.

THREE LENSES OF ENVIRONMENTAL ETHICS

# Who counts?

## ? And AI?

AI has no interests of its own, so it sits outside the circle. Yet it now shapes everything inside it: the energy we burn, the water we draw, and what we choose to protect.




Fig. 3 — The amber ring: a new kind of actor at the edge of the circle.



# There is no cloud.

"It's just someone else's computer." An old joke among programmers, and literally true.

Fig. 4 — A cumulus of 65,536 points, raining.

WHERE YOUR PROMPT GOES

# Every prompt runs in a building like this.

Rows of chips turning electricity into heat, cooled with air and water, around the clock.

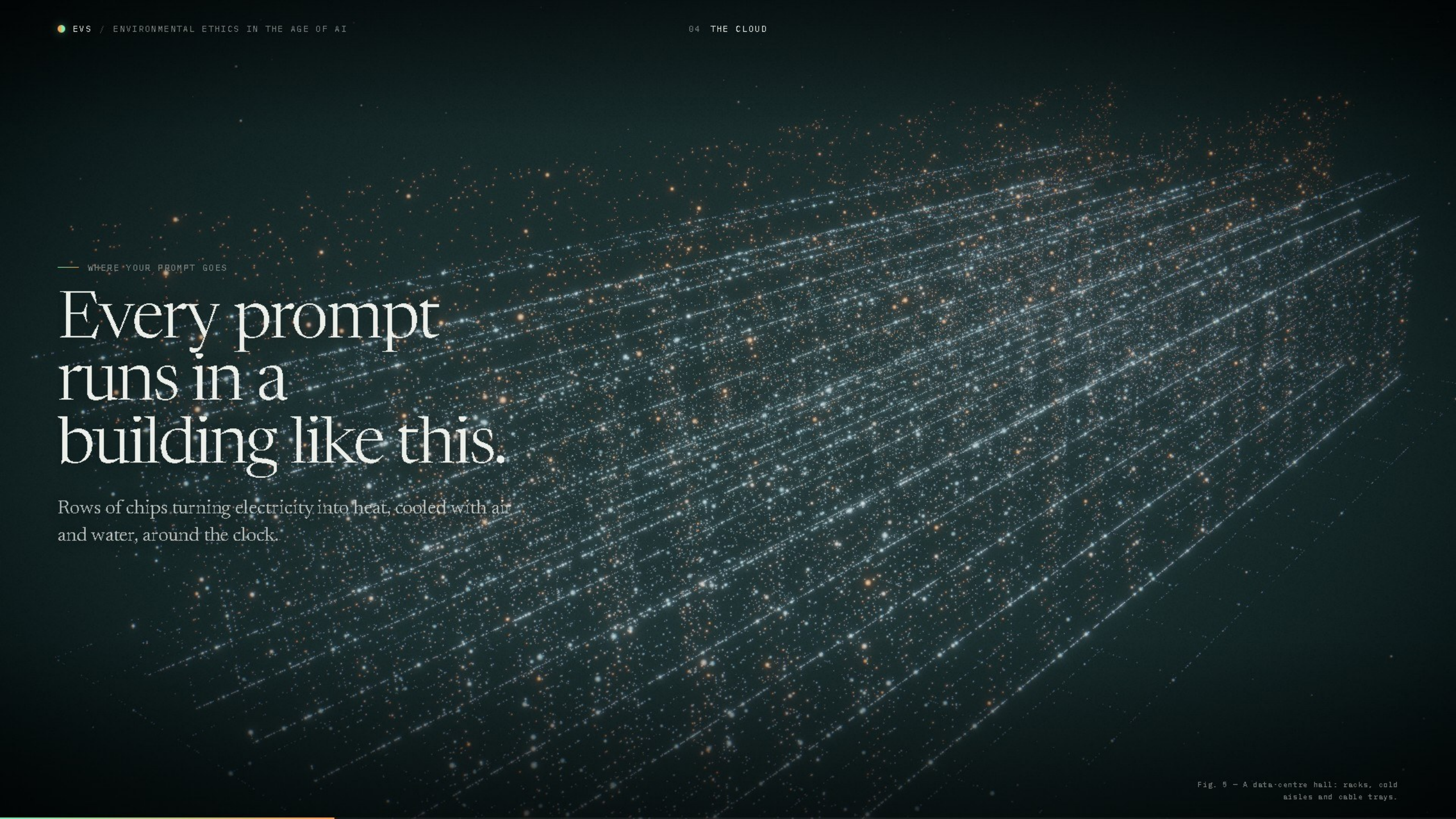


Fig. 5 — A data-centre hall: racks, cold aisles and cable trays.

FOOTPRINT 1 OF 3 · ENERGY

# 485

TWH IN 2025

Electricity used by the world's data centres in 2025, up 17% in a single year.

IEA, *Key Questions on Energy and AI* (2026)

Fig. 6 — Walking down the cold aisle.

FOOTPRINT 1 OF 3 · ENERGY

# 950

TWH BY 2030

About 3% of all the electricity the world will use, nearly double today. AI is the biggest driver of the growth.

IEA, *Energy and AI* (2025) · *Key Questions on Energy and AI* (2026)

Fig. 6 — Walking down the cold aisle.

FOOTPRINT 1 OF 3 · ENERGY

$$E = n \times e$$

$e \approx 0.34$ Wh per ChatGPT prompt

$n \approx 2.5$ billion prompts a day

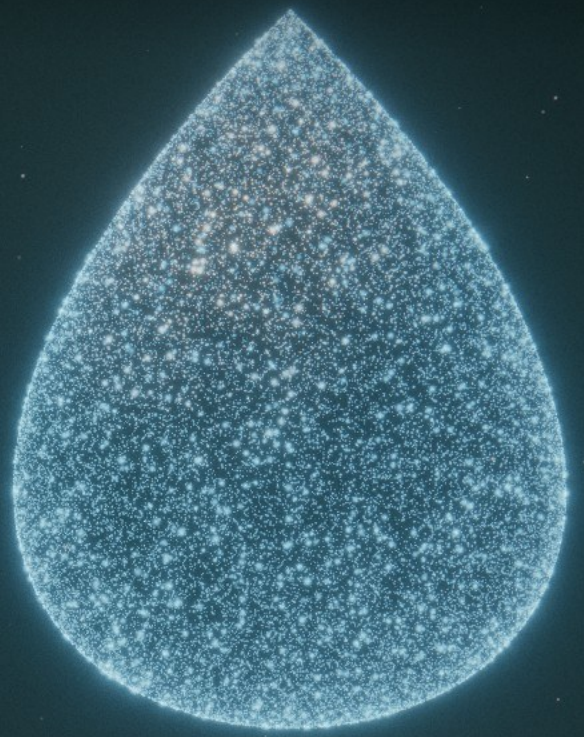
$E \approx 850$ MWh a day ≈ 310 GWh a year

One prompt is tiny. Scale is the multiplier: that is about as much electricity as 2.1 lakh Indians use in a year.

BACK-OF-ENVELOPE FROM OPENAI'S FIGURES (2025) AND INDIA'S PER-CAPITA USE, 1,460 KWH (MINISTRY OF POWER, 2024-25)

Fig. 6 — Deep in the aisle. Every light is a server.

FOOTPRINT 2 OF 3 · WATER



# 7

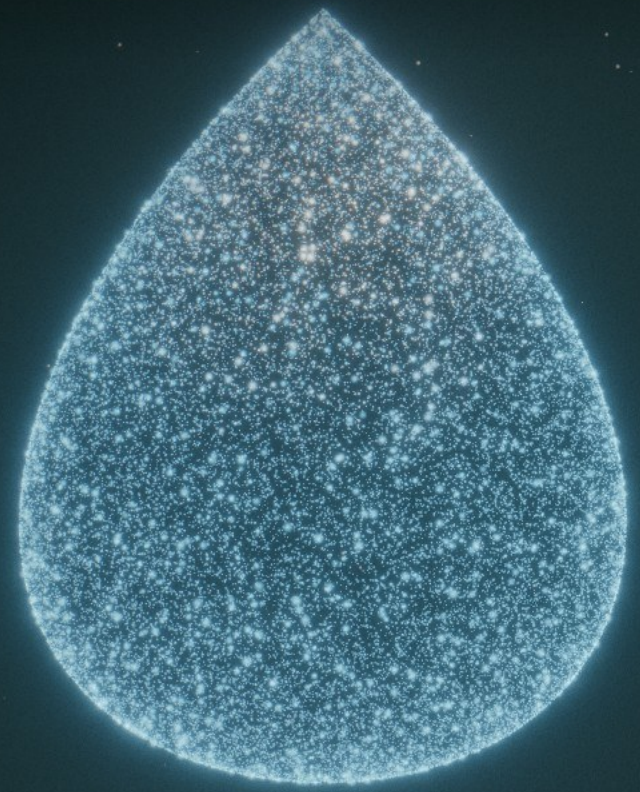
LAKH LITRES

Fresh water that training GPT-3 alone could have evaporated while cooling Microsoft's US data centres.

LI, YANG, ISLAM & REN, *Communications of the ACM* (2025)

Fig. 7 — One drop, and the ripples it sends out.

FOOTPRINT 2 OF 3 · WATER



# 4.2–6.6

BILLION M³ IN 2027

Water that global AI demand could withdraw in 2027: about half of what the entire UK withdraws in a year.

Per prompt it looks like nothing: 0.26 mL, about five drops.

LI ET AL., *CACM* (2025) · GOOGLE, GEMINI FOOTPRINT (2025)

Fig. 7 — One drop, and the ripples it sends out.

FOOTPRINT 3 OF 3 · MATTER

# 62

MILLION TONNES

E-waste produced worldwide in 2022. Only 22.3% was documented as properly collected and recycled.

ITU & UNITAR, *Global E-waste Monitor* (2024)

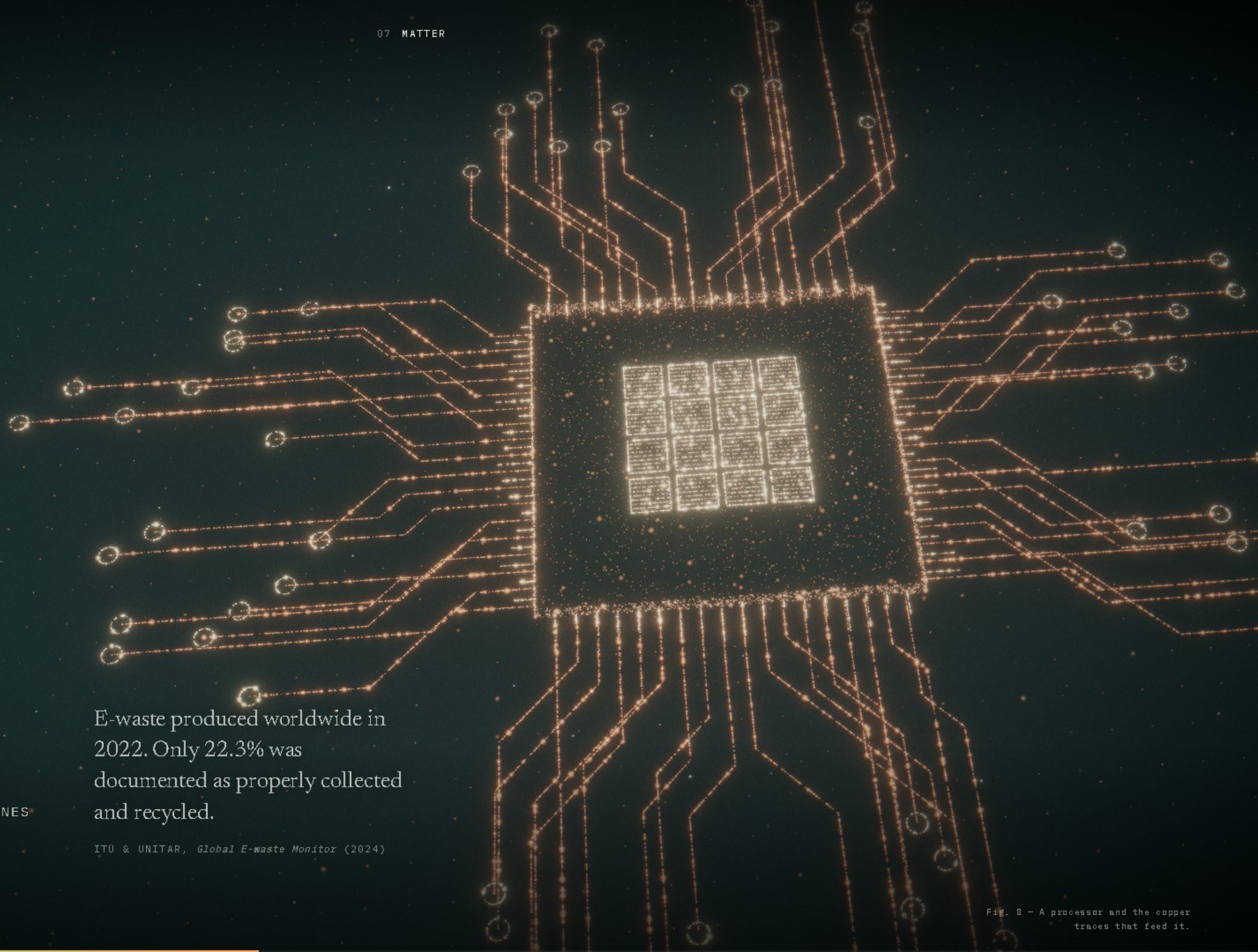


Fig. 8 — A processor and the copper traces that feed it.

FOOTPRINT 3 OF 3 · MATTER



# 1.2–5.0

MILLION TONNES

Extra e-waste that generative AI alone could create between 2020 and 2030, as servers are replaced every few years.

WANG ET AL., *Nature Computational Science* (2024)

Fig. 8 — Traces end in vias: where the metal goes next.

PROMISES VS. EMISSIONS

# +81%

GOOGLE, SINCE 2019

# +25%

MICROSOFT, IN ONE YEAR

Google pledged net zero by 2030, Microsoft carbon negative. Google says its footprint is growing alongside AI; Microsoft points to data-centre expansion.

GOOGLE ENVIRONMENTAL REPORT (2026) · MICROSOFT ENVIRONMENTAL SUSTAINABILITY REPORT (2026)



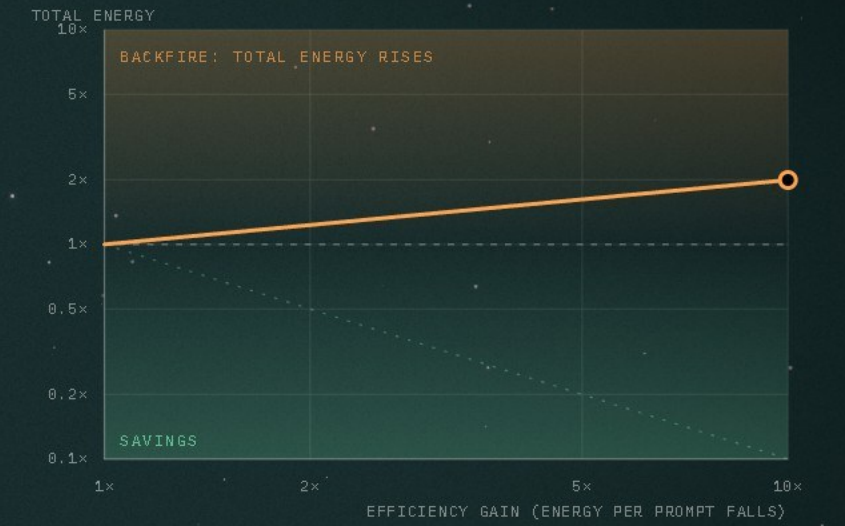
Fig. 9 — Emissions rising like smoke from an ember bed.

JEVONS PARADOX, 1865

# Efficiency can increase consumption.

William Stanley Jevons saw that better steam engines made Britain burn more coal, not less. Cheaper intelligence can do the same.

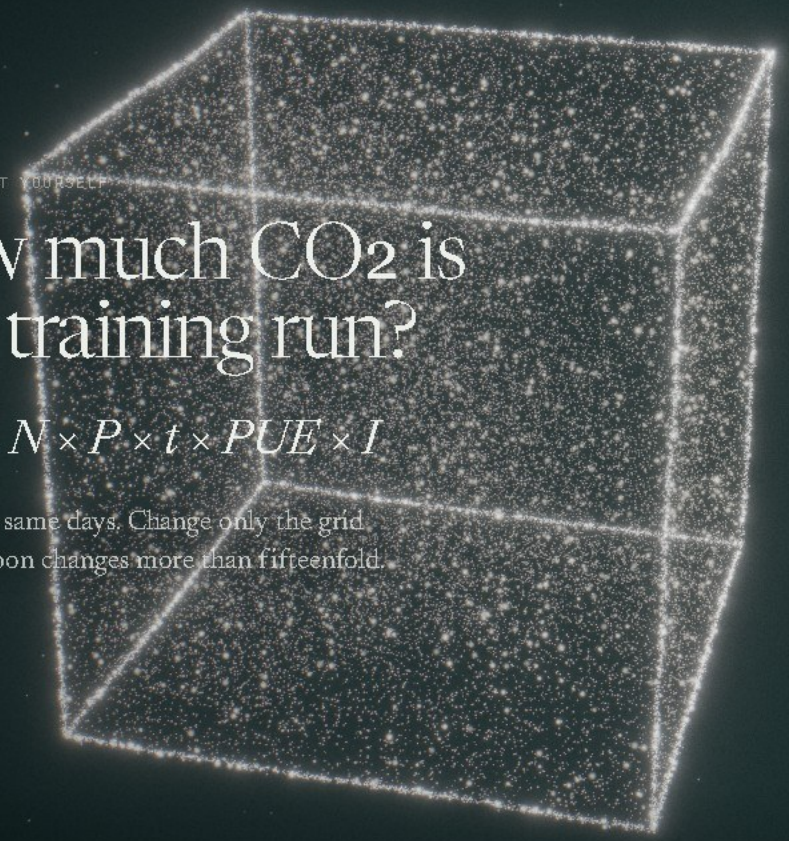
$$E = e \cdot Q(e),\ Q \propto e^{-\varepsilon} \implies E \propto e^{1-\varepsilon}$$




ELASTICITY OF DEMAND, $\varepsilon$ 1.30

**Backfire.** A 10× efficiency gain gives 2.0× the total energy.

Fig. 10 — Total energy against efficiency, on log-log axes.



MODEL IT YOURSELF

# How much $CO_2$ is one training run?

$$CO_2 = N \times P \times t \times PUE \times I$$

Same chips, same days. Change only the grid, and the carbon changes more than fifteenfold.

| | | |
|---|---|---|
| $N$ | GPUS | 1,000 |
| $P$ | POWER PER GPU | 0.70 kW |
| $t$ | DAYS OF TRAINING | 30 |
| $PUE$ | BUILDING OVERHEAD | 1.52 |

$I$

GRID CARBON, KG $CO_2$ PER KWH · EMBER 2025

| INDIA | WORLD | FRANCE |
|---|---|---|
| 0.67 | 0.46 | 0.04 |

766 MWH OF ELECTRICITY

**513** T $CO_2$

As a cube of gas: 65 m on each side, almost as tall as the Qutub Minar (72.5 m).

The electricity alone is what 525 Indians use in a year.

Fig. 11 — The run's $CO_2$ as a cube of gas, drawn to a log scale.

THE OTHER SIDE OF THE LEDGER

# The same tool can protect.

Used with care, AI can find patterns in weather, rivers, forests and oceans that no human team could track by hand.



Fig. 12 — A tree grown from a branching rule, wired like a network.



## 40%

COOLING

Less energy for cooling Google's data centres once DeepMind's machine learning ran the controls.

DEEPMIND, 2016

## 7 days

FLOODS

Of flood warning from Google's Flood Hub. It began as a pilot in Patna, Bihar, and now covers 150 countries.

GOOGLE RESEARCH, 2026

## 90%

WEATHER

Of 1,380 test targets where GraphCast beat the best conventional 10-day forecast.

LAM ET AL., *Science*, 2023

## 1 week

PLASTIC

For FAST-PETase, an enzyme engineered with machine learning, to break down PET plastic.

LU ET AL., *Nature*, 2022

Fig. 12 — A tree grown from a branching rule, wired like a network.

FOUR QUESTIONS FOR EVERY AI SYSTEM

# Weighing it up.

Ethics is rarely a yes or a no. It is a set of questions we owe every system before we build it.




Fig. 13 — Benefits on one pan, burdens on the other.

FOUR QUESTIONS FOR EVERY AI SYSTEM




## 01 Who pays? JUSTICE

The benefits of AI reach users everywhere. The heat, water stress and e-waste stay local, often in poorer places with the least say.

Fig. 13 — The burdens pan grows heavier.

FOUR QUESTIONS FOR EVERY AI SYSTEM




## 02 What do we owe the future?

FUTURE GENERATIONS

*"Act so that the effects of your action are compatible with the permanence of genuine human life."*

HANS JONAS, *The Imperative of Responsibility* (1979)

Fig. 13 — The burdens pan grows heavier.

FOUR QUESTIONS FOR EVERY AI SYSTEM




## 03 Can we see it? TRANSPARENCY

Most companies do not publish the energy or water cost of their models. The EU AI Act (2024) now requires providers of general-purpose AI to document energy use.

Fig. 13 — The burdens pan grows heavier.

FOUR QUESTIONS FOR EVERY AI SYSTEM

## 04 Do we need it? SUFFICIENCY

"Green AI" asks whether the gain is worth the compute. Sometimes a smaller model, or no model at all, is the ethical choice.

SCHWARTZ, DODGE, SMITH & ETZIONI, *Green AI* (2020)




Fig. 13 — Balance restored, by choosing less.

INDIAN ROOTS

# An old ethic for a new machine.

Indian traditions treated nature as kin long before anyone said “sustainability”.

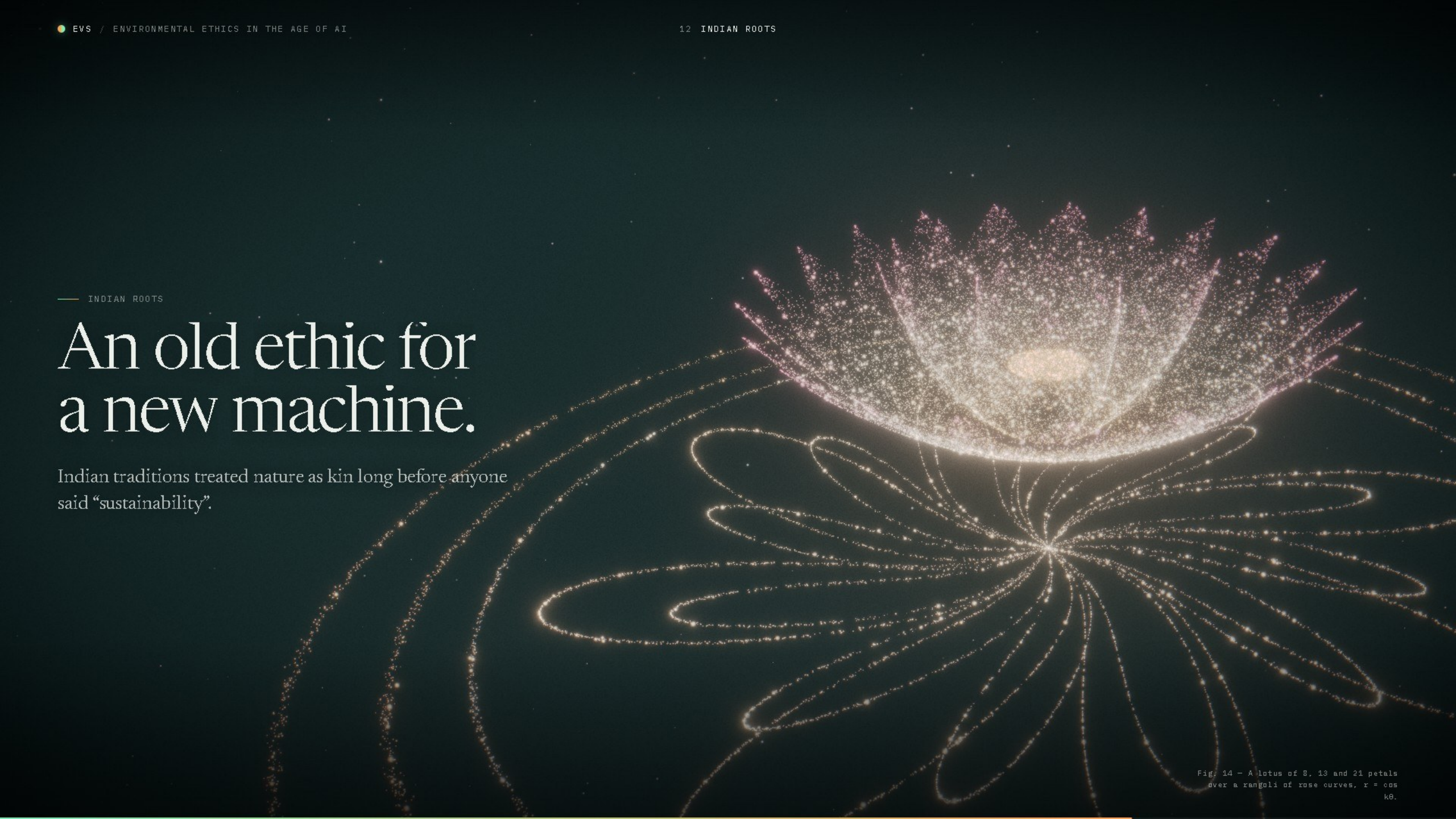
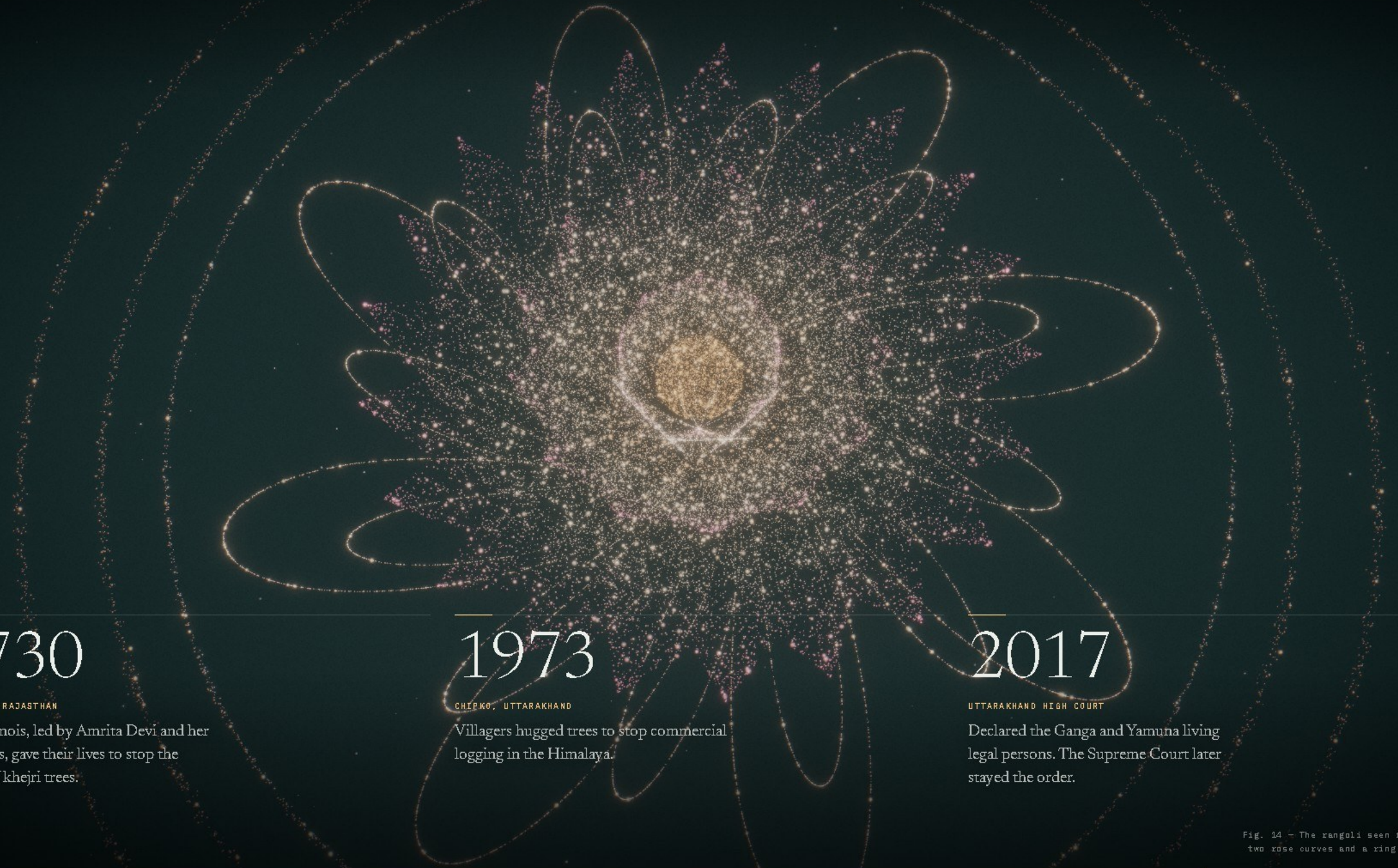


Fig. 14 — A lotus of 8, 13 and 21 petals over a rangoli of rose curves, r = cos kθ.



## 1730

KHEJARLI, RAJASTHAN

363 Bishnois, led by Amrita Devi and her daughters, gave their lives to stop the felling of khejri trees.

## 1973

CHIPKO, UTTARAKHAND

Villagers hugged trees to stop commercial logging in the Himalaya.

## 2017

UTTARAKHAND HIGH COURT

Declared the Ganga and Yamuna living legal persons. The Supreme Court later stayed the order.

Fig. 14 — The rangoli seen from above: two rose curves and a ring of points.

CONSTITUTION OF INDIA · ARTICLE 51A(G)

*“...to protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures.”*

For every Indian citizen this is a fundamental duty. It belongs in the design brief of every AI system too.



Fig. 14 — A lotus of 8, 13 and 21 petals.

A WAY FORWARD

# There is no “away”.

The recycling symbol is a Möbius strip, a surface with only one side. Gary Anderson, a student, designed it in 1970, the year of the first Earth Day. On a one-sided surface there is nowhere to throw things. On one planet, neither.

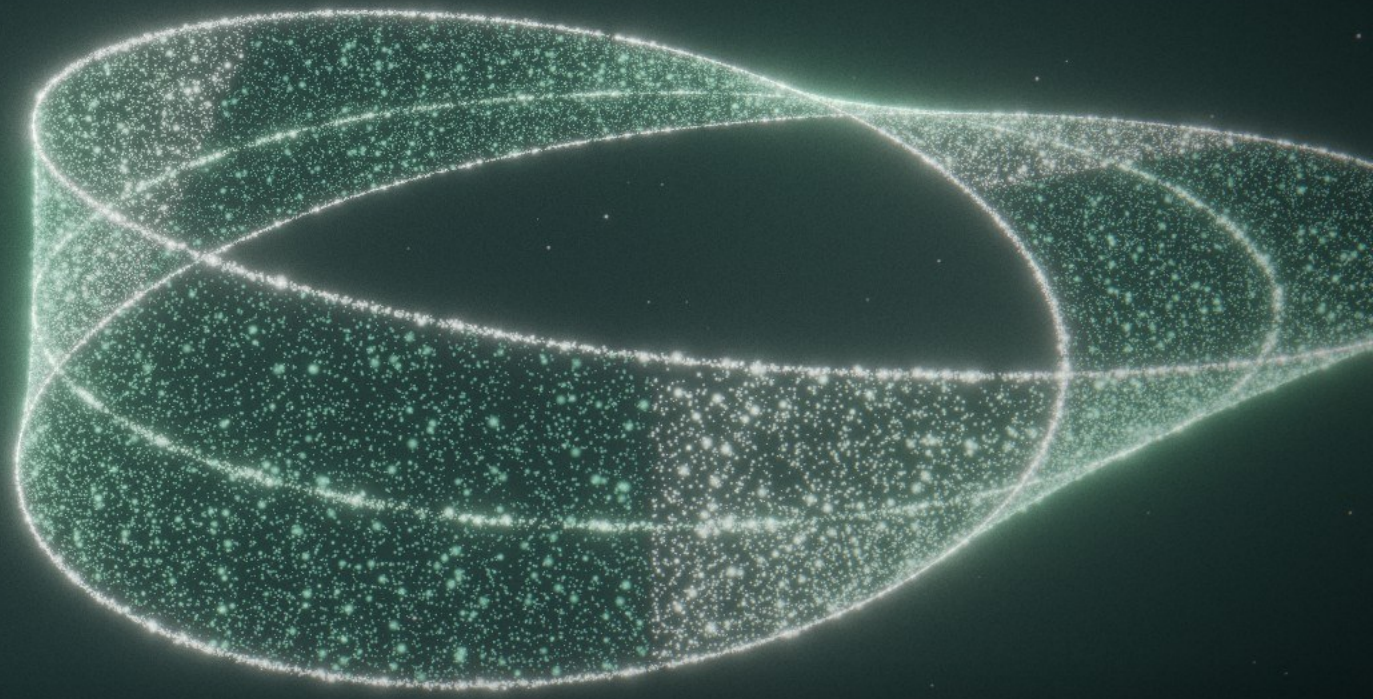
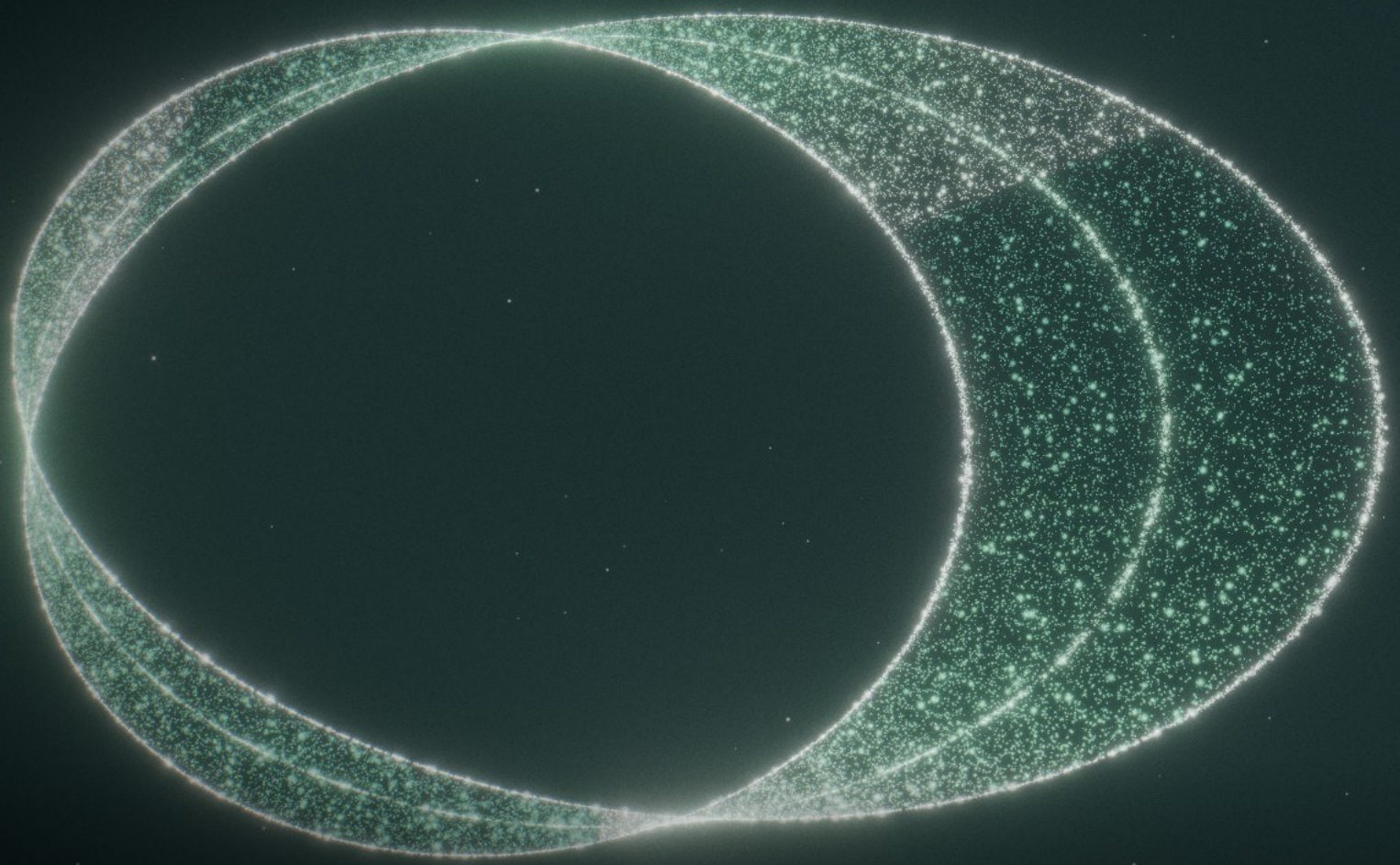


Fig. 15 — A Möbius strip: one surface, one edge. Its three bright bands echo the recycling arrows.



01 **Measure**

Publish the energy, water and carbon cost of every model.

02 **Shrink**

Use the smallest model that does the job. Reuse before you retrain.

03 **Clean power**

Train when and where the grid is green. Keep data centres out of water-stressed basins.

04 **Close the loop**

Repair, reuse and recycle hardware. India's E-Waste Rules (2022) make producers responsible.

05 **Share fairly**

Give the communities that carry the costs a share of the benefits and a voice in the decisions.

Fig. 15 — A Möbius strip: one surface, one edge.

LEOPOLD'S TEST, UPDATED

*"An AI is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."*

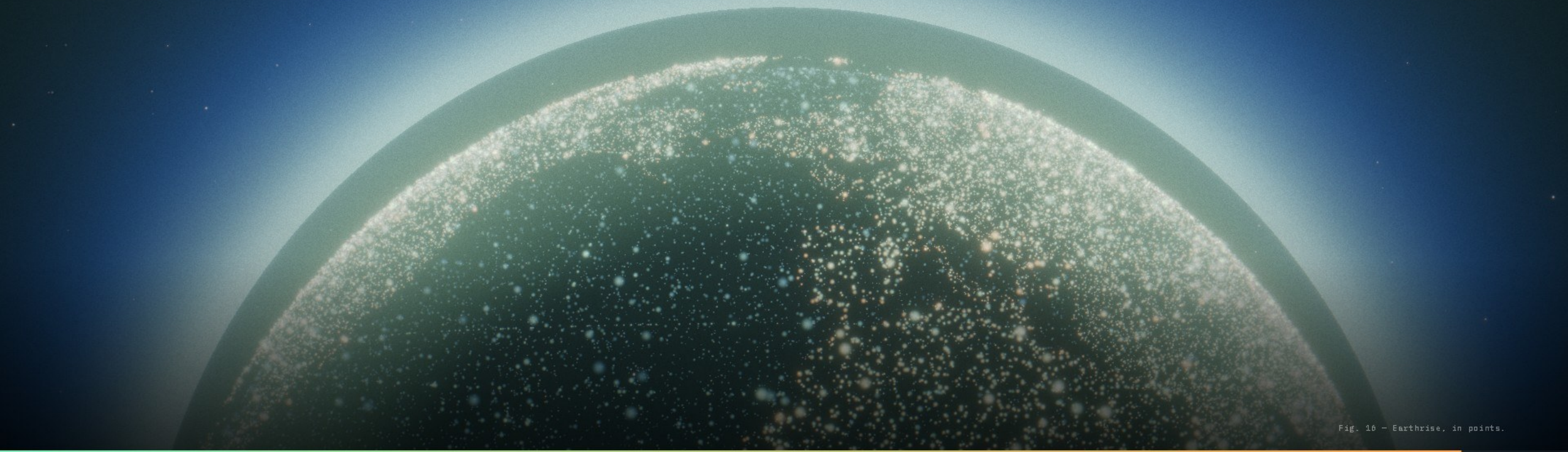


Fig. 16 — Earthrise, in points.



# Thank you.

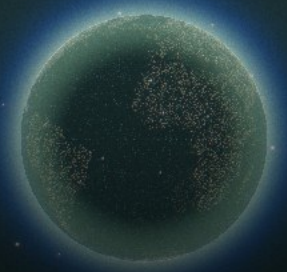
*Questions?*

VEDANT AGGARWAL · B.SC. (HONS.) MATHEMATICS · RAMJAS COLLEGE, UNIVERSITY OF DELHI

Fig. 17 — The same planet, 65,536 points.

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