GeoModeling

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Acquaintance

Goal

- touching basis : know each other better
- some exercises; no grading :)

Class Survey
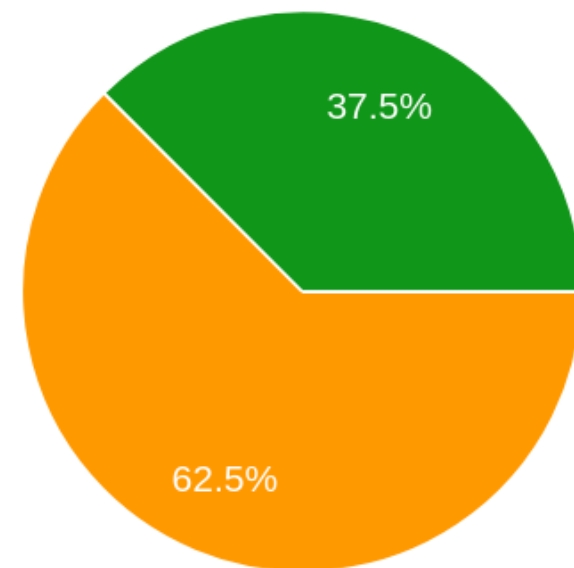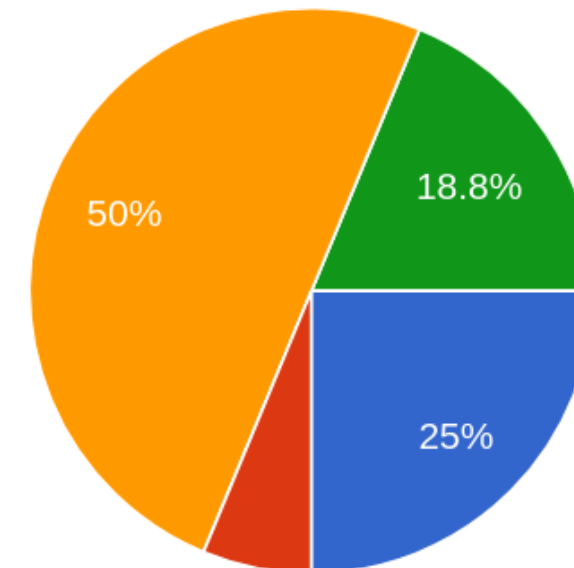
Class Survey

Math/Stat courses taken

16 responses

Course	Count (Percentage)
Caculus I/II	13 (81.3%)
Linear Algebra	12 (75%)
Probability theory	9 (56.3%)
Statistical Inference	4 (25%)
Machine learning	2 (12.5%)
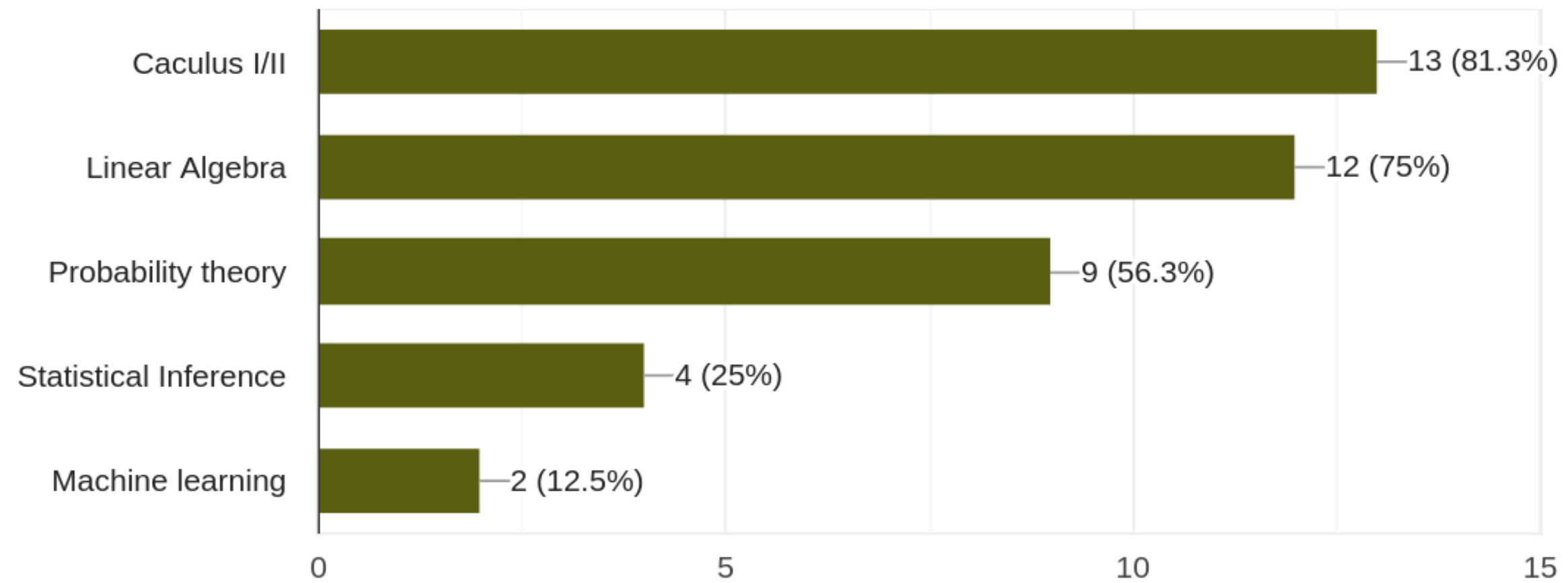
Class Survey

- machine learning : supervised, unsupervised
- remote sensing
- parallel processing
- spatial data analysis, big data
- image analysis
- R and python ecosystem
- climate data tools, like cdo

Maximum Output

- building together

- You are living
- You occupy space
- You have a mass
- You Matter !
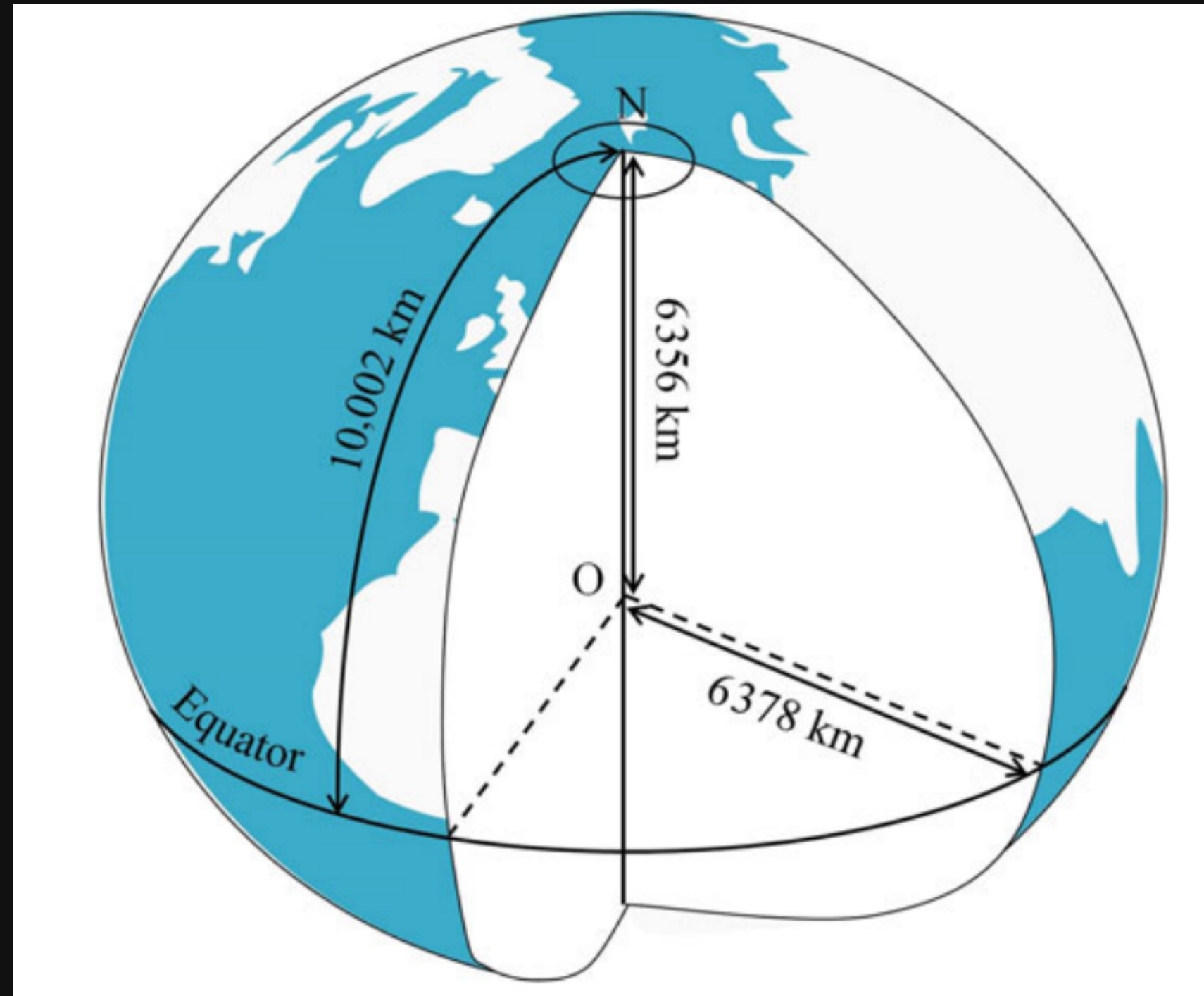
About me

Who am I ?

Who am I?

- Modeller
- Scientific Programmer
- Unix Enthusiast

Interests

- 340 BC, Aristotle knew earth is round!!!

Interests

fundamental questions

- whether universe has a beginning in time
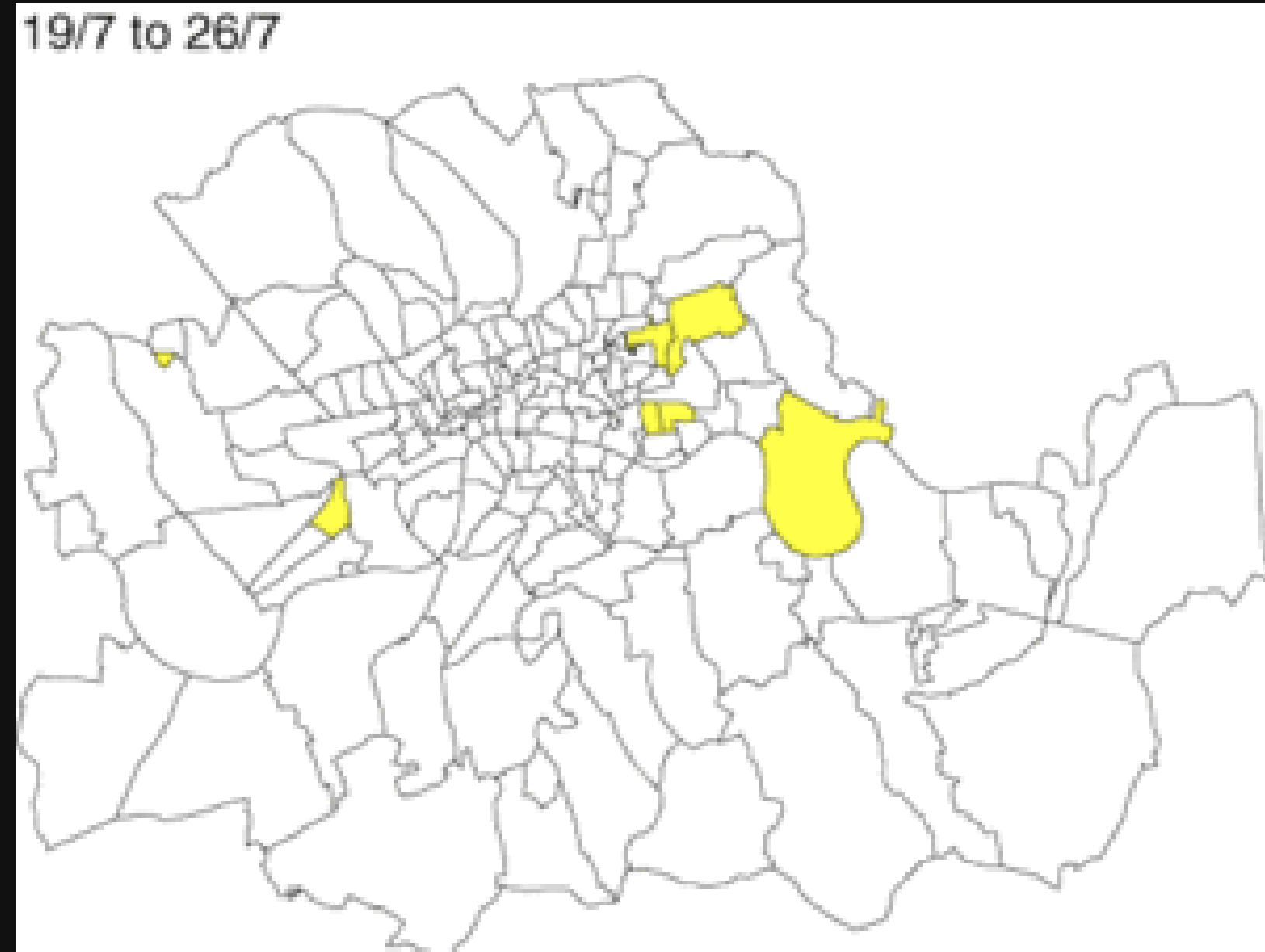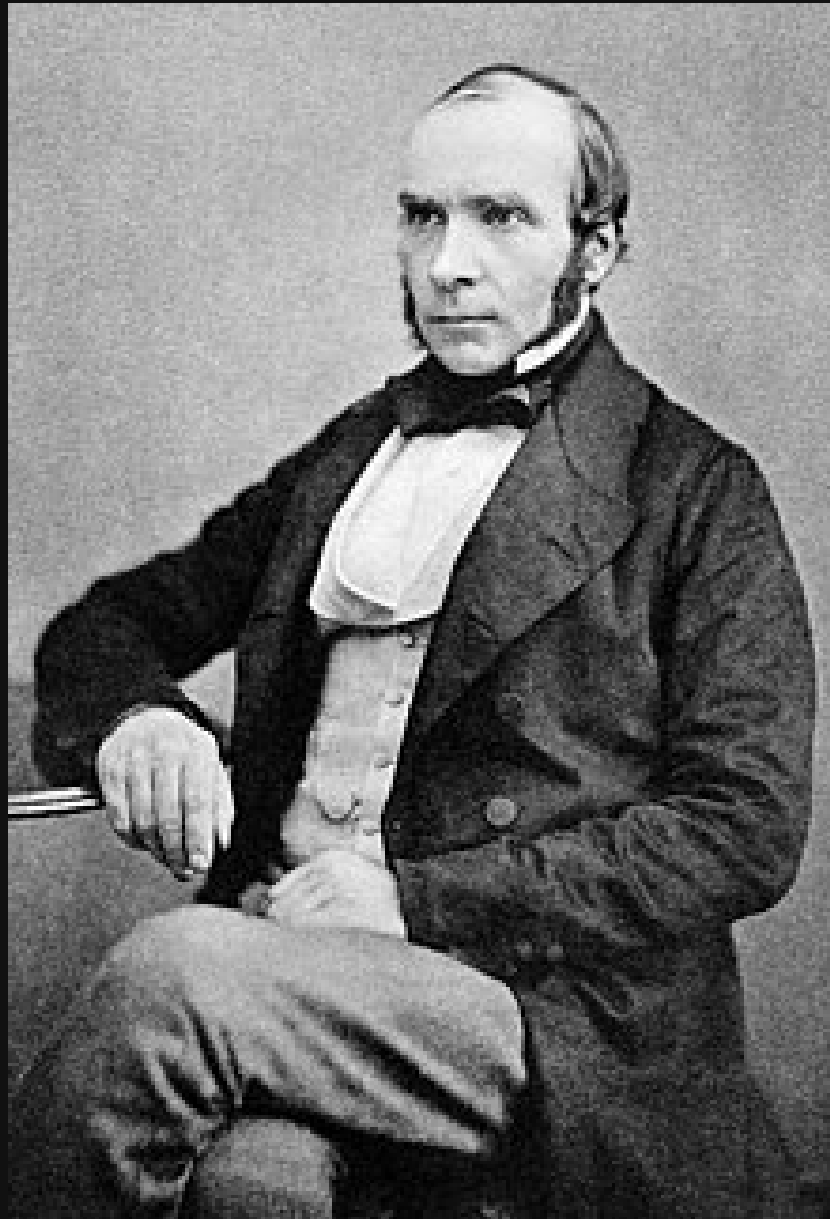- whether universe is limited by space

Interests

SPACETIME

Beginning

It all begins with

a Man and his Map

a Man and his Map

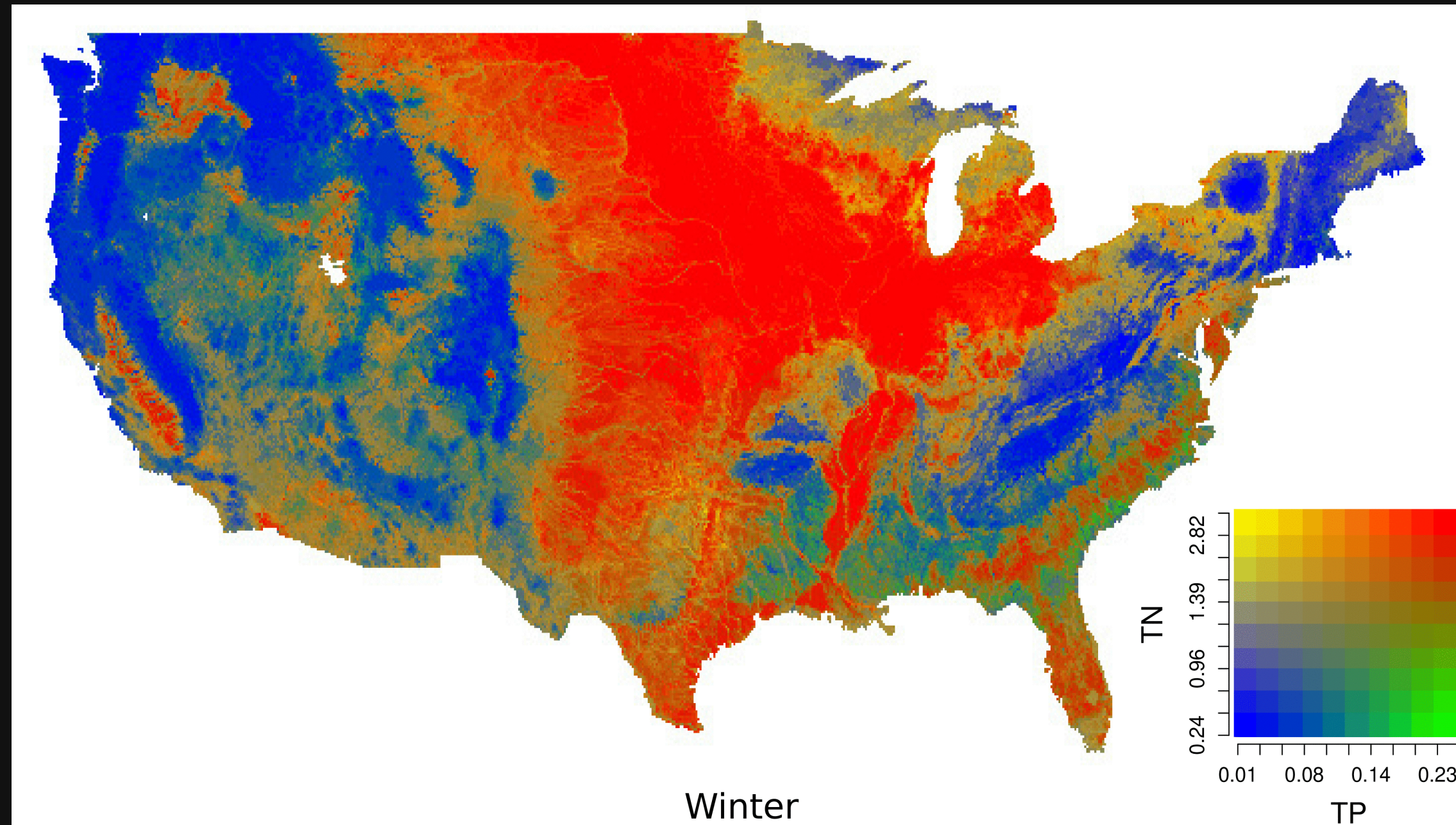# Applications

Corona

Flight

Shipping

Important Questions

Machine Learning

- learning task : $X \xrightarrow{f} Y$
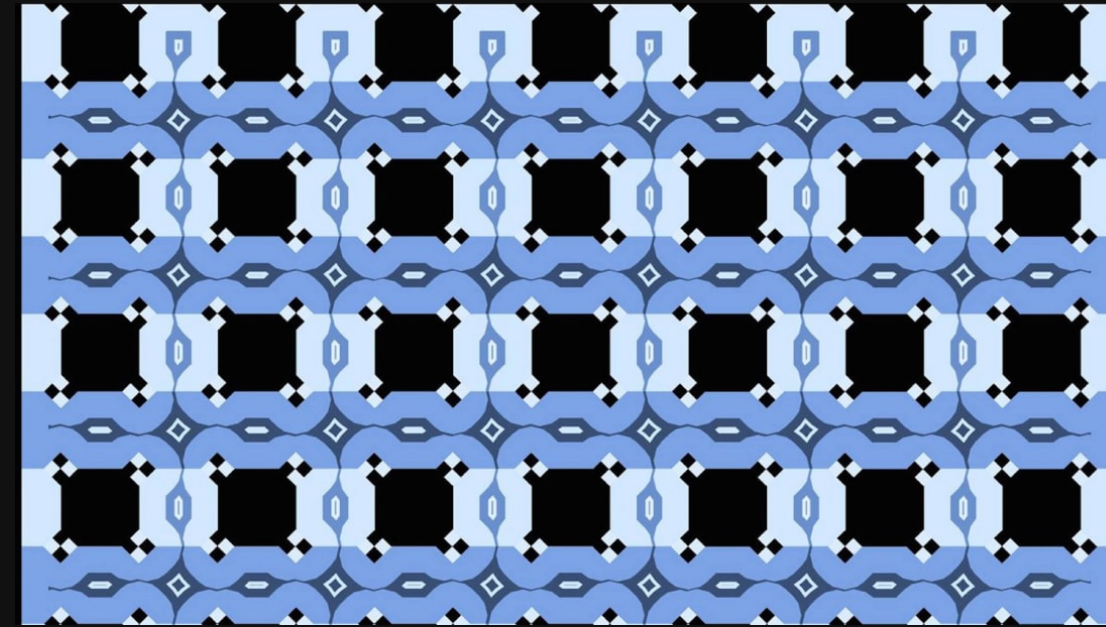- min $L(y, f(X))$
- training + testing
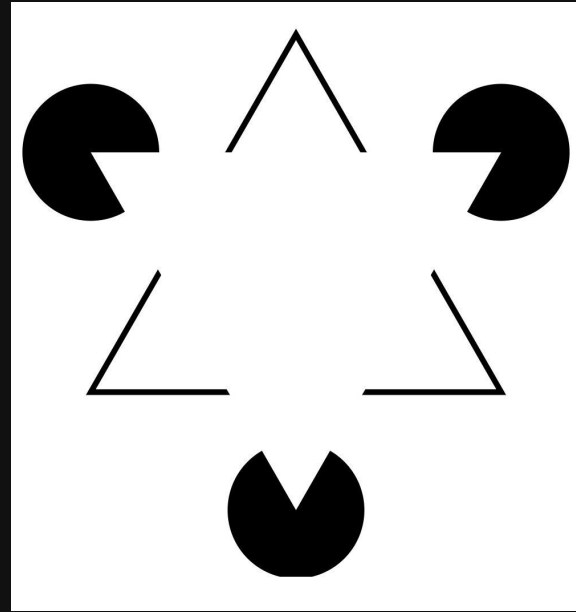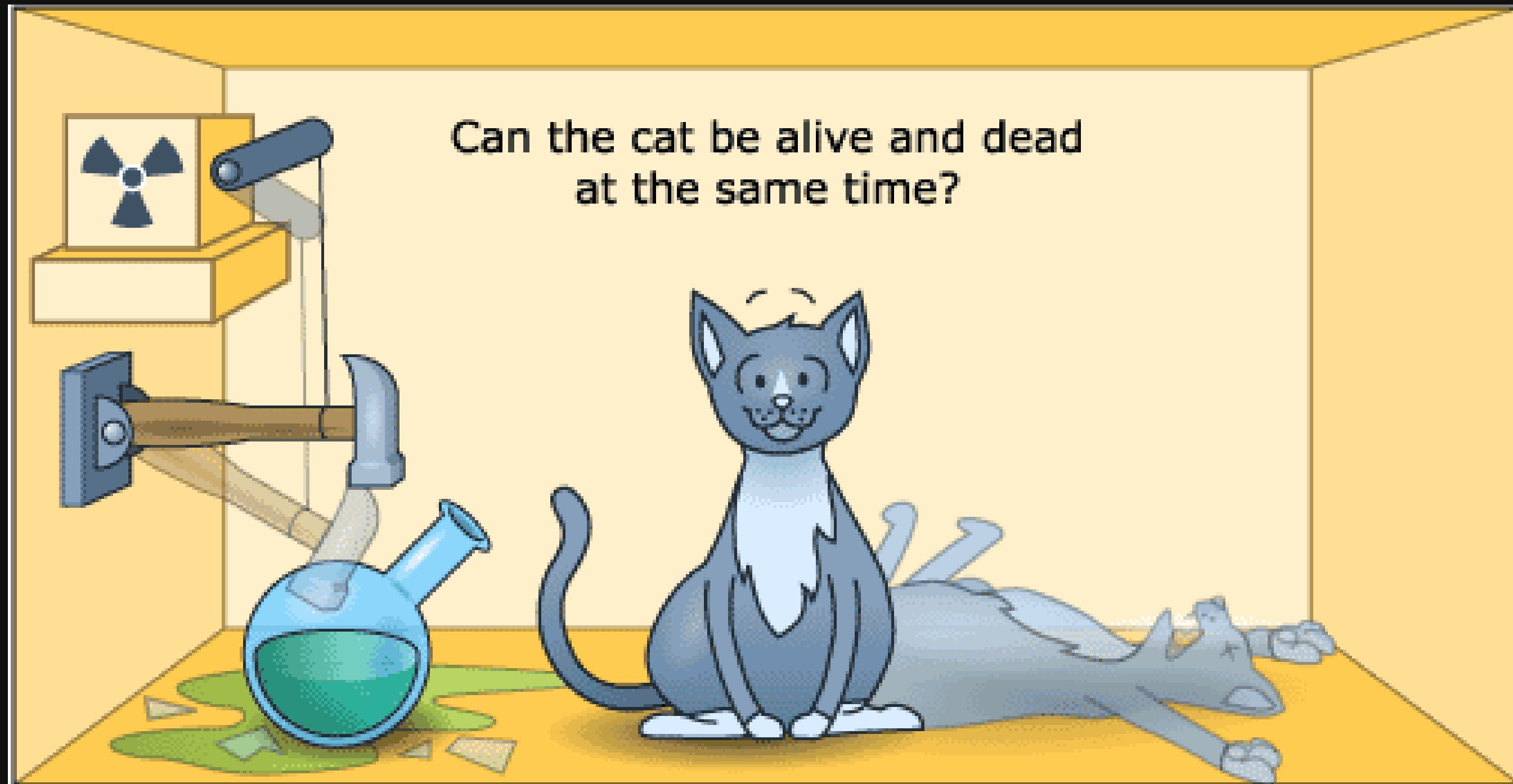
Machine Learning

Winter

Y

- observation/measurement
- seeing is believing ?

Observations

Measurement

Measurement

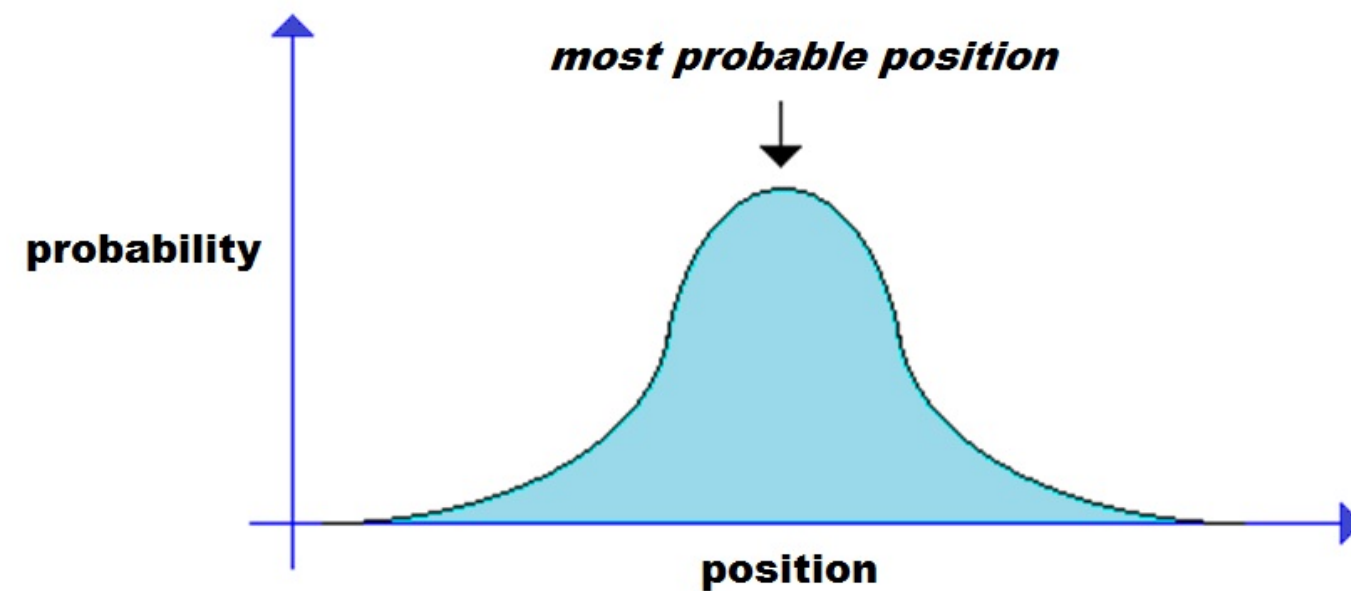General time-dependent Schroedinger equation

$$i\hbar\frac{\partial}{\partial t}\Psi(\mathbf{r},t) = \hat{H}\Psi(\mathbf{r},t)$$

Time-dependent Schroedinger equation for a single particle

$$i\hbar\frac{\partial}{\partial t}\Psi(\mathbf{r},t) = \left[\frac{-\hbar^2}{2\mu}\nabla^2 + V(\mathbf{r},t)\right]\Psi(\mathbf{r},t)$$

Quantum Wave Function

most probable position
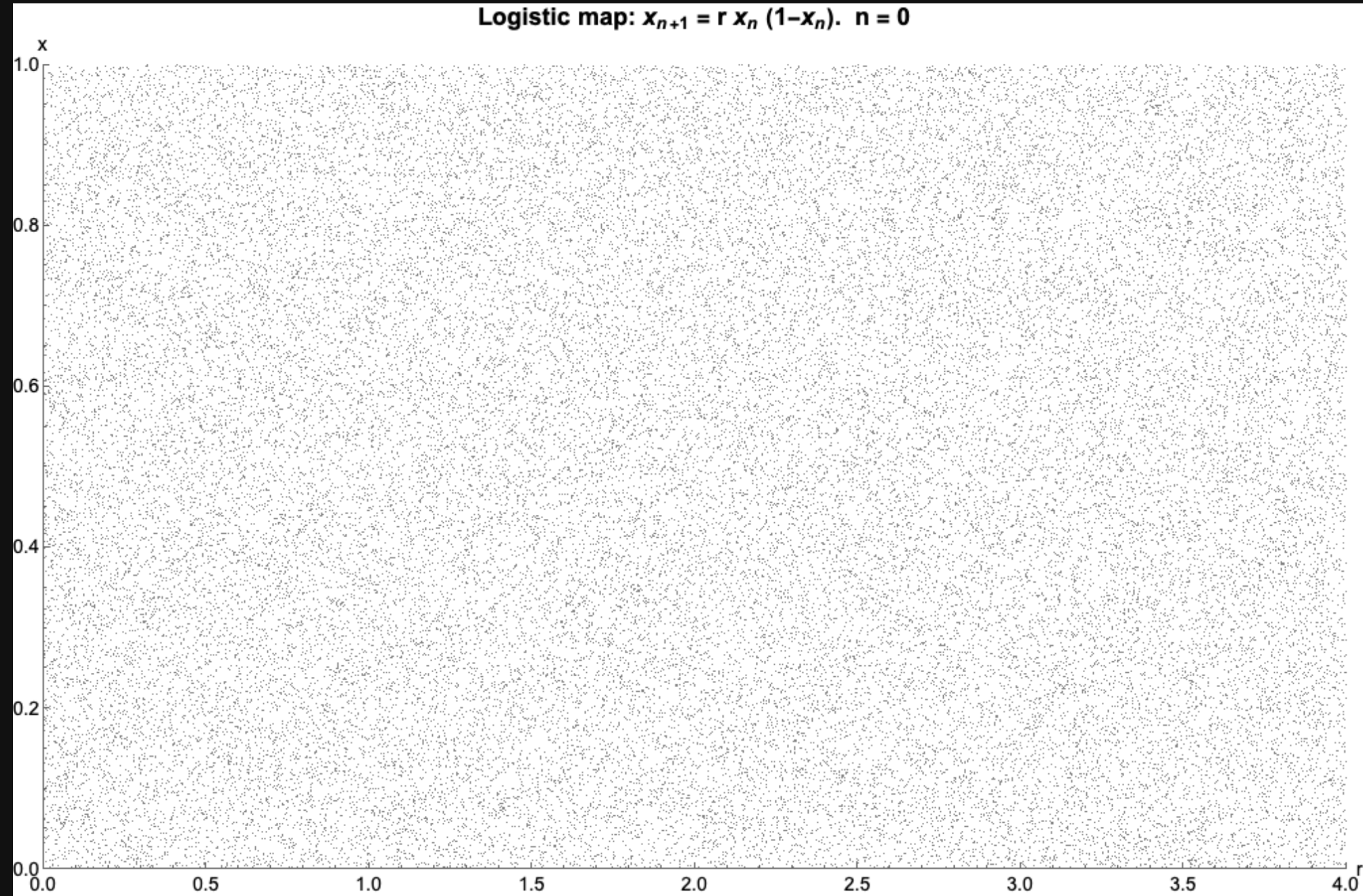
probability

position

Deterministic

if this intellect were also vast enough to submit these data to analysis, ... nothing would be uncertain and the future just like the past would be present before its eyes.

Pierre Simon Laplace

Deterministic

Logistic map: $x_{n+1} = r\,x_n\,(1-x_n)$.   n = 0

$$x_{n+1} = rx_n(1 - x_n)$$
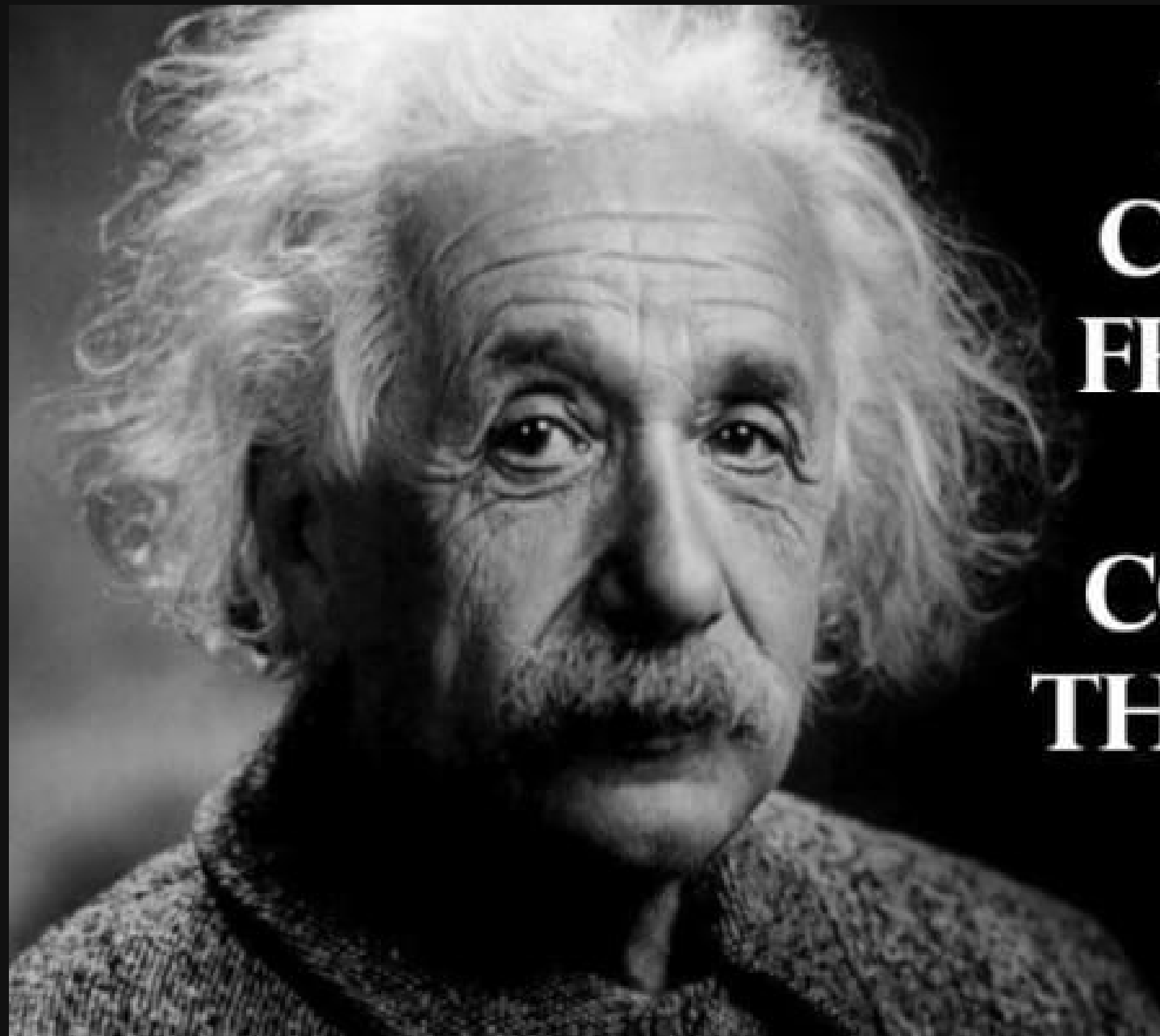
Deterministic

Deterministic

Deterministic

"I think, therefore I am."

- René Descartes

Deterministic

NO PROBLEM
CAN BE SOLVED
FROM THE SAME
LEVEL OF
CONSCIOUSNESS
THAT CREATED IT.
Albert Einstein

Deterministic

Course Offering

Insight

- seeing deeper
- seeing farther

Insight

- Modelling principles instead of recipes
- Not about the number of problems solved but about how to solve problems when paths were unclear

Connections

"Though free to think and act, we are held together, like the stars in the firmament, with ties inseparable. These ties cannot be seen, but we can feel them."

Nikola Tesla

www.UniverseExplorersHere.com

Power of Prediction

Freedom

The **essence** of mathematics
lies in its freedom.

-Georg Cantor

Acknowledgement

Thanks for Your Attention