Are we living
in a simulation ?

FB วันนี้คุณ ปลั้ม เรียน อะไร

Artificial Intelligence - Games

mainstream AI

Monte Carlo Tree search

procedural content generation

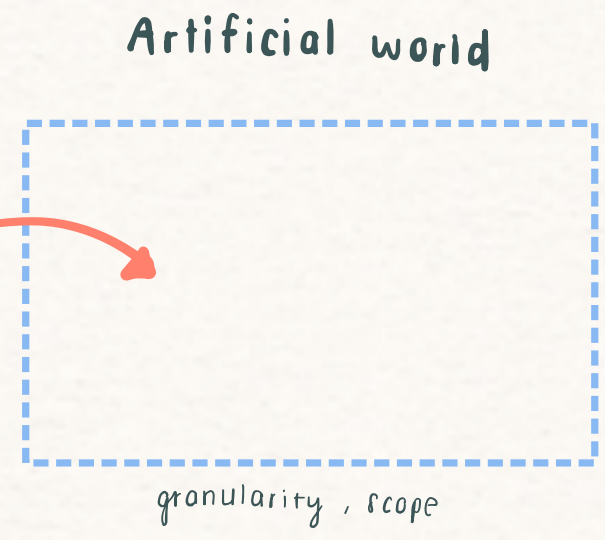**Progress in Deep Learning** → cognitive service

Human

Biological mind

computing Power →

replicate Human brain function

Augmented intelligence

Post-Human

Artificial ~~Human~~ mind

↳ replicate conscious human mind.

Artificial mind →

Artificial world

granularity, scope

Reality

Real-world Physical existence

- complexity
(?) infinite state

innovation;
evolutionary

"Quantum Field"
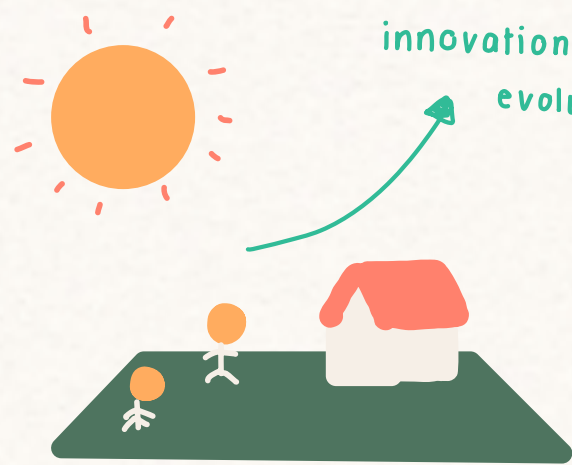
Human activity

- interaction
- transaction

Agent Human Level intelligence

Brain; High efficient information processing

Action ←

drive ─
internal world
- Purpose
- desire

Biological intelligence

Human
Ability to
- Problem solving
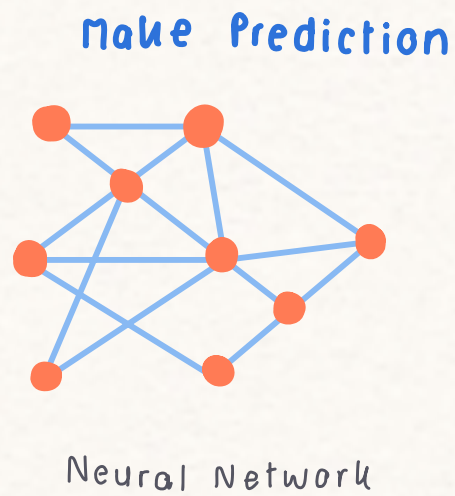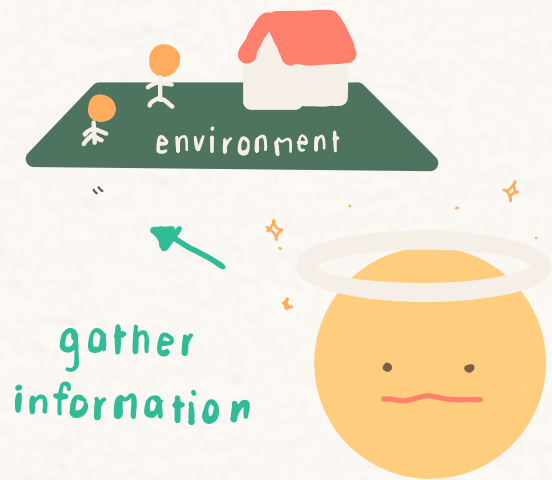- decision making

under

scarcity
Limited competition → **Creativity**

Brain "Difference Engine"
information processing machine

drive Behavior → organism's survival
causally drive

Evolutionary → DNA
[Human software]

environment

gather information

Make Prediction

Quark → consciousness

Neural Network
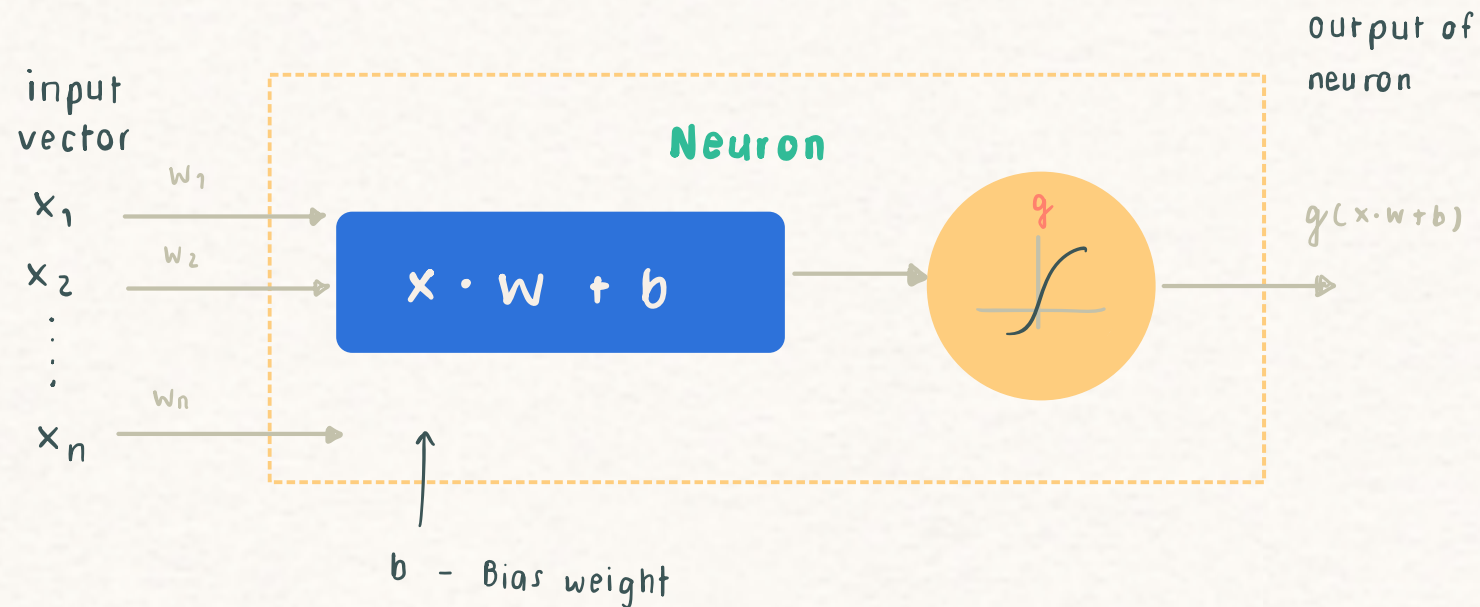
intelligence ; emergence phenomena

input vector

x_1 w_1

x_2 w_2

x_n w_n

Neuron

$x \cdot w + b$

output of neuron

$g(x \cdot w + b)$

b - Bias weight

Measure of goodness

แต่ละคน ไม่เหมือนกัน

Search space

Search - Algorithm

Utility Function

— Economics — Game Theory

Mechanism design

measure of rational choice

- Market mechanism

Search - algorithm

↳ มีการแข่งขัน

Quantum Probability wave

Wave function collapse (?) **By consciousness**

observation

uncertainty principle

↳ information

choice/decision making → Collapse wave function → single future
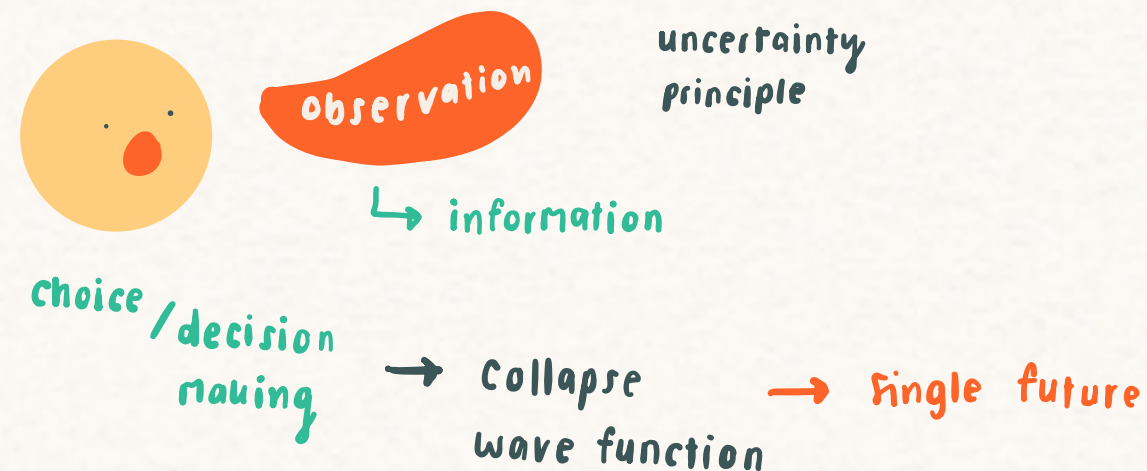
Reality

Virtual Reality

- finite state spaces
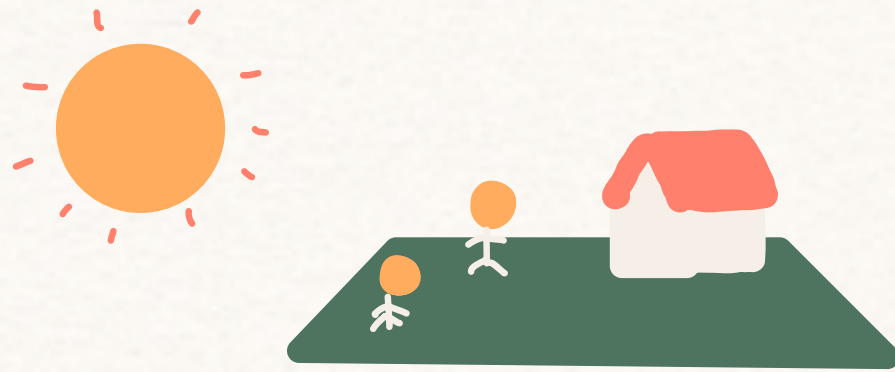
computational power

finite state machine

virtual environment

"Quantum Field"

Real-world
Physical existence

- complexity
(?) infinite state

inputs → Combinational Logic → outputs
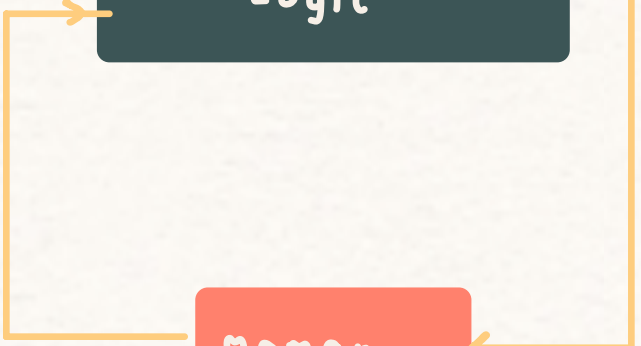
Memory

NP-HARD

computational complexity

non-deterministic polynomial time

? System dynamics

Utility Function

optimization problem

Entropy — Energy cost function

fundamental Characteristic of games

4 connon elements

Representation

interaction
- media
- dynamic

conflict
- conflict arises naturally from the interaction of a game.
  * conflict need not be violent   Safety

interface : representation
            information

Stochasticity (non-deterministic)

Game
└ Psudo-random number generator

connon game   game mechanics

deterministic   cause ──determine──> effects

+ combination

stochastic element

increase complexity

- ภาษา ──> แร่
        ──> เกลือ

เกลือแบบของแมร่

Pac-Man

Non-deterministic arcade game

Boss สุ่ม mechanism

Observability   ╭ Characteristic
                      ที่เกี่ยวข้องกับ stochasticity

information : game state ที่สังเกตได้

Perfect information

Hidden information
- only Partial observability

? depend on Question

"curiosity"

?   ?   ?

Time Granularity

Time Domain (T; ≤)

The set of primitive temporal entities used to define and interpret time-related concept.

discrete time domain

Real-world Dynamics Systems
↳ complexity
   non-deterministic

Price formation

increasing time granularity

* information and communication

Time Granularity
Electricity Markets   High computational power