

# “I’m Evolving into a Box:” The Paradoxical Condition in AI.

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## **Abstract**

“I’m evolving into a box” is an iron box with an irrelevant mechanical arm and brain. The mechanical arm has been manufactured with aluminium pipes and two servo motor. Using Raspberry pi as brain which runs NEAT algorithm in real time, the iron box, just like a newborn life, learns how to use the unknown arm. The whole exhibition period demonstrates how artificial intelligence drives daily objects. Through this process, the installation transmits a paradoxical condition.

Video Link : <https://youtu.be/P6GfyQsixwE>

## **Introduction**

The main discussion of this artwork is about the transition period in the evolution of artificial intelligence. What can we see in this transition period?

Nowadays, lots of artificial intelligence products have been created. Many incredible research projects and developments, like developed by DeepMind, robot dogs by Boston Dynamics, and other great emerging technologies have shown us some new dimensions of technology. However, they are not the final goal of artificial intelligence. They are simply a transitional period in artificial intelligence evolution.

What can we see beyond those technologies? Engineers try to make things work like biological entities, but it doesn’t seem to be so simple. Actually, engineers sometimes create artifacts with a status that exists between biological and non-biological and this status can feel strange.

According to the “Chinese Room Argument,” the logic of science and technology is contradictory when it comes to a final

hypothesis about AI. [1] Therefore, I try to demonstrate this subtle status in my work. When I created this work, I was wondering what would happen if an artificial intelligence algorithm was installed into a lifeless object? After simulating what it would look like, the answer was unimaginable, and that is why the algorithm works. The end result was that I combined an iron box and a machine learning algorithm: training a box to act like a box (Fig. 1)



Fig. 1 I'm evolving into a box., 2017, Wei-Yu Chen, Copyright © 2017 Wei-Yu Chen All rights reserved.

## **Machine Learning Algorithm**

There have been hundreds of types of machine learning algorithms. In this work, I try to find the algorithm that is closest to the theme of “biological evolution,” rather than mathematical feasibility. What I was searching for in this algorithm is the essence of complex operation.

Neuro Evolution of Augmenting Topologies (NEAT) algorithm is composed of a genetic algorithm and a neural network (NN) algorithm. [2] In the original NN, the neurons are fully connected, and compute in a single topology. The genetic algorithm imitates the concept of cell evolution, like crossover, reproduction and mutation, trying to keep better genes. As the

combination of the above two algorithms, NEAT algorithm considers multiple NN topologies as genomes. Through crossover, reproduction, mutation in each generation, those well-behaved topology will keep evolving.

### System Architecture

The system was constructed on Raspberry Pi, and NEAT algorithm was implemented by Python. The outputs and inputs for the machine learning algorithm were the rotation angle of two servos and the distance of installation movement calculated by two rotary encoders (See Fig. 2).

foundation of the algorithm, he seeks to delve into the essence of technology and attempts to find some subtle phenomena within it. He Uses human-computer interaction and creative coding to intervene in daily space, in order to explore imaginations of the future in everyday reality.

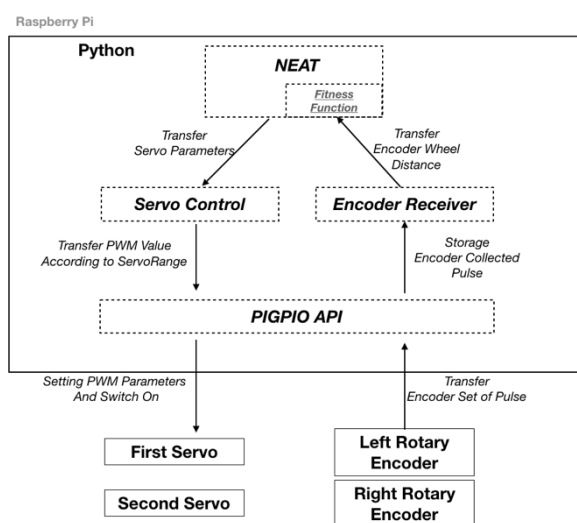


Fig 2. The system is constructed on Raspberry Pi

### References

1. Searle, John. R., “Minds, brains, and programs”, *Behavioral and Brain Sciences* 3, no. 3 (1980): 417-457.
2. Kenneth O. Stanley and Risto Miikkulainen, “Evolving Neural Networks through Augmenting Topologies,” *Evolutionary Computation*, 10, no. 2 (2002): 99-127.

### Biography

Wei-Yu Chen was born in 1993 in Taipei, Taiwan. His artworks derive from the exploration of Computer Science and Engineering, and focus on the contradictory situation of how technology affects the human environment. Extending the theory and