AI, Deep Learning, and Fujitsu

2015/6/24 Hiroaki Kondo
ABC of AI and Deep Learning
Deep Learning is emerging as a key technology of AI.
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→ Deep Learning is emerging as a Key technology of AI
What is Deep Learning?

(Definition in Wikipedia)
Deep learning is a branch of machine learning based on a set of algorithms that attempt to model high-level abstractions in data by using model architectures, with complex structures or otherwise, composed of multiple non-linear transformations.

In short,
**Mechanism for a machine to perceive the world**

(ex) image recognition

Input: Images  

Output: Recognized images
Is Deep learning useful?

YES, ABSOLUTELY

Deep learning will give a machine an ability to recognize external worlds through sight and hearing

- The development of the vision resulted in explosion of Life.
  - Emergence of trilobite with eye forces all creatures differentiate and evolve themselves to survive.

→ Why not for computer with deep learning?
Fujitsu’s Approach
Possible collaboration with BU

- To develop a dedicated Deep Learning HW and SW.
- The HW is named DLU (Deep Learning Unit)
Deep learning & CPU

- Deep learning is a multi-layered network of artificial neuron and synapse.

- Each neuron transfers signals to the next neuron based on the weighted sum of the inputs.

- Deep “Learning” is a process to determine the best weights (Wi).

- The process requires **huge** computing power.

→ We would like to utilize Fujitsu’s CPU development competency to speed up Deep Learning.

- DLU (Deep Learning Unit) will be the 3rd leading-edge LSI after CPU and GPU.
Candidates of Deep Learning Applications

- **Medical diagnosis support**
  - Diagnosis support with electrical medical record, CT images, genome information, etc.

**Diagnosis of Disease**  
(Collaboration with OIST: Okinawa Institute of Science and Technology Graduate University)

- **Deep Learning** is good at extracting correlation of things  
  (Not necessarily causal relation)
  - Applications of Deep Learning will be very wide.
Deep Learning (DL) gives a machine an ability to perceive the world
- Fujitsu believes DL will change the future of IT.

Our competitors have been already working on DL development and market

On the other hand, Fujitsu lab and BU just started on DL
- We will quickly catch up and surpass with DLU.

Your inputs and collaboration are highly welcome.