Robot dream: why do robots sleep?

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Consciousness ⇒ Emotions

Human:

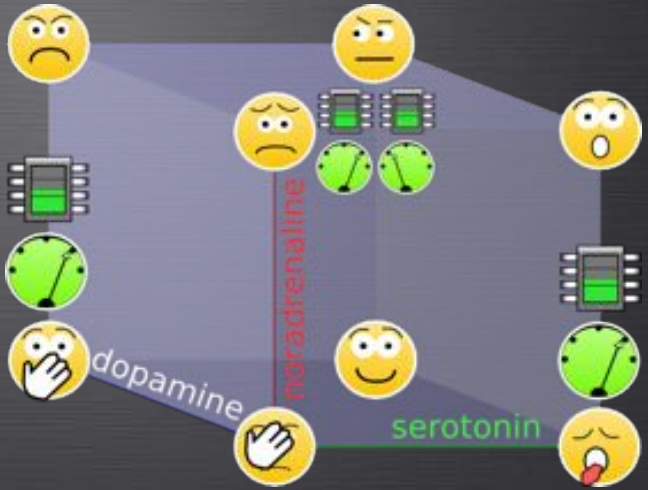
- Cognition ⇒ Consciousness ⇒ Emotions

Machine:

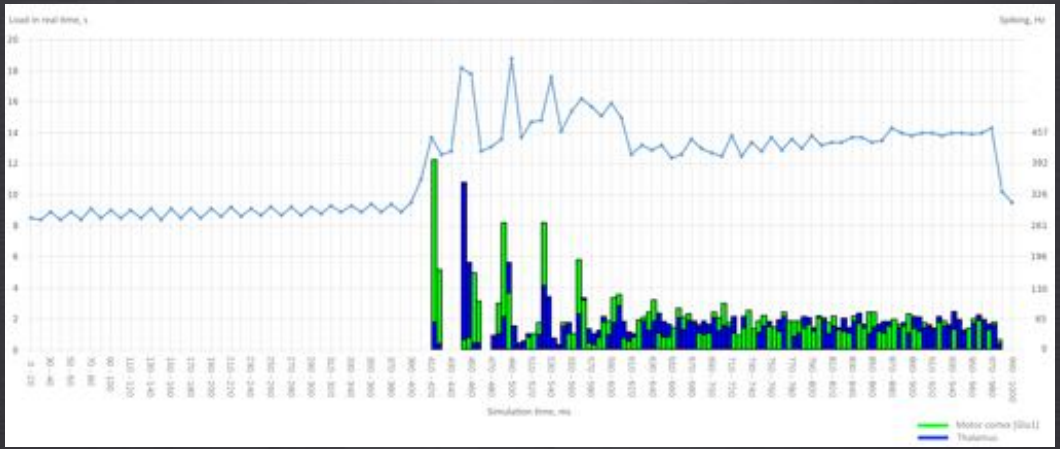
- Cognition ⇒ Consciousness ⇒ Emotions

Robot emotions

- Biologically plausible
- Updated cube of emotions by Hugo Lövheim
- Implementation: Realistic Neural Network (rNN)



Machine emotions



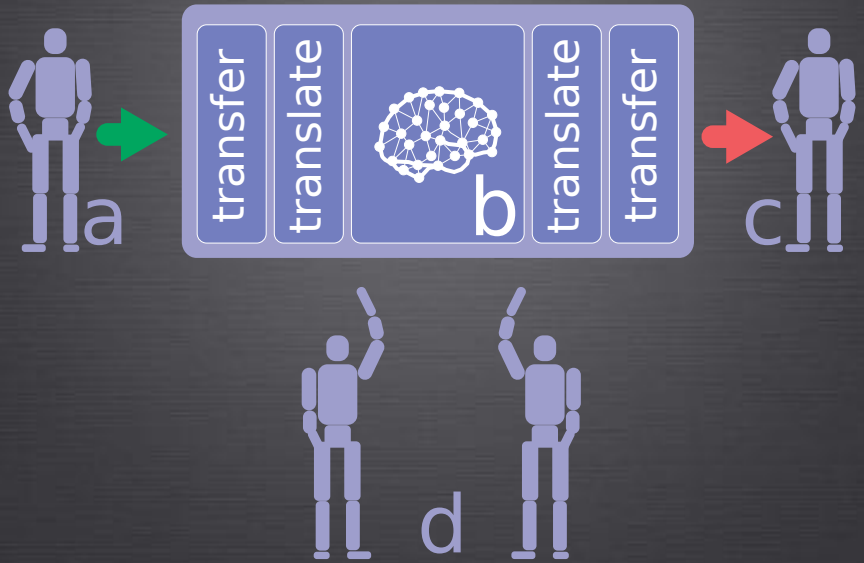
Robot performance

- **AR-601**: Intel Core i7-4700EQ; 8 GB;
- **REEM-C**: Intel Core i7 2710QE x 2;
- **Nao**: Intel Atom @ 1.6 GHz;
- **iCub**: Intel Core2 Duo; 2 GB;

Performance

RIKEN 2013: 1% of human brain - 250 K-supercomputers (96 computing nodes, 2.0 GHz 8-core SPARC64; 16 GB of memory), slower than human brain in 1000 times.
Human brain project: a whole human brain – 10 exaflop.

Approach



Day and night phases

A. A robotic system transfers the accumulated experience into the "Sleeping brain".
B. Processing:
   0.1 The accumulated experience is transferred from a robotic system to the "Sleeping brain";
   0.2 Simulation starts producing a set of updated rules;
C. The updated rules of the "Sleeping brain" are transferred to the robotic system and applied to it.
D. The robotic system continues it's job running updated with adjusted emotional reactions and accumulating new experience to be processed again starting from **A**.

Problems and future work

- Robot platform (we started from automatic vacuum cleaner)
- Forward translation: rules $\rightarrow$ rNN: “Pain and Pleasure” problem
- Reverse translation: rNN $\rightarrow$ rules: “Criteria” problem

THANK YOU

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