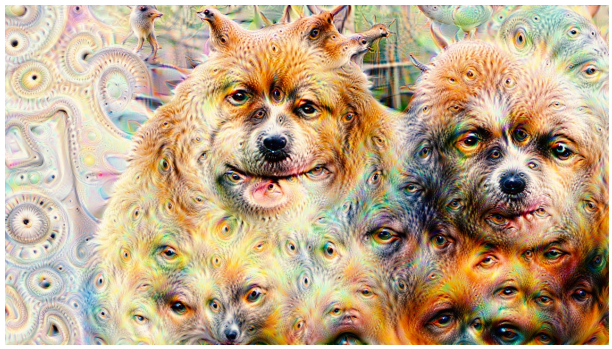
Thesis Proposal (MA, ev. BA)

Using Deep Learning to Create new Functionality in Smart Spaces

Outline

Smart Spaces are spaces with computing hardware that interfaces between the Cyber and the Physical World. Examples for such devices are remote controllable building control entities such as shutters, lighting, air conditioning, heating, ventilation, multimedia equipment, etc.
For the past years we developed the Distributed Smart Space Orchestration System (DS2OS). It is a middleware framework that manages service Apps within Smart Spaces. The core of DS2OS is the Virtual State Layer (VSL) middleware.
In the image you see a graphical representation of a trained neural network for image recognition. Deep learning is a technique where many layers of neurons are cascaded to recognize structures and identify things. With the VSL representation of data, deep learning can be applied to Smart Spaces.



In this thesis you will combine sensor data with deep learning to identify situations. This will bring fascinating insights about combining deep learning and the Internet of Things (IoT).
You will analyze different techniques of deep learning, you will implement sensors, you will get to know DS2OS, and you will create running demos and experiment with them including real people in our office living lab.

Possible Structure

- Analysis
  - Analyze the problem domain.
  - Identify relevant research questions that you will work on.
  - Present relevant technology.
- Related work
  - What do other projects do that answer your questions?
- Design
  - Which components do you need?
  - Which are options for the design? Why are your choices good?
- Implementation
  - Relevant details such as frameworks used.
- Evaluation
  - How well does it work?
    - Metrics!

Requirements

Curiosity, Joy to work in a team, Knowledge in Java.
Ability to write good code (including unit tests and documentation).

Contact

If you are interested, please send an email briefly explaining why you think to be the right person for this thesis to:

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Image sources: http://i.vimeocdn.com/video/525472954_1280x720.jpg

Distributed Smart 2pace Orchestration System

ds2os.org/