

2017-10-01

## SCIENTIFIC SEMINAR

### **Spiking neural networks for vision tasks**

#### Problem description:

Neural networks have achieved striking results in different visual task like object recognition or image segmentation lately. However, most networks, like standard convolutional networks, work on full images/frames and can be expensive with respect to computing resources. How to overcome this, is an active field of research at the moment. On the one hand, hardware is designed to efficiently processes specifically neural nets. On the other hand, new networks paradigms and architectures are tested. One example of this are spiking convolutional nets: they may use frames - as generated by conventional cameras - as input or operate on event-based vision streams generated by novel vision sensors (DVS [1]) instead of full frames and process data asynchronously. For this project, we want you to have a look into the capabilities and limits of spiking neural nets for machine vision tasks and compare them to traditional approaches.

- Get familiar with the fundamentals of convolutional neural nets and their area of application
- Do literature on spiking neural networks in vision and their fields of application
- Work out advantages/ disadvantages of using spiking neural nets
- Compare them with regular CNNs in terms of performance, areas of use etc.

Supervisor: Lukas Everding

(Jörg Conradt)  
Professor

#### Bibliography:

- [1] Lichtsteiner, P., Posch, C. and Delbruck, T. *A 128 times; 128 120 dB 15 us Latency Asynchronous Temporal Contrast Vision Sensor* IEEE Journal of Solid-State Circuits Feb. 2008 p. 566-576